



Contents

04 — Executive Summary

08 — Introduction

12 — The Tools in Our Toolkit

14 — Housing Affordability 101

24 — Eight Guiding Principles

32 — Existing Resources for Designing Healthy, Affordable Housing

40 — Future of Home Survey

64 — Case Studies

66 — Wyoming Community Development Authority

80 — Progress Foundation

90 — Lafayette Terrace Apartments

102 — Northtown Library and Apartments

112 — The Sugar Hill Project

120 — Beach Green Dunes Phase II

130 — Summary of Design Implications

132 — Looking Ahead

138 — Conclusion

140 — References



Executive Summary

In Fall 2020, the American Society of Interior Design Foundation awarded Perkins&Will a research grant to study health-promoting interior design elements in affordable housing during the COVID-19 pandemic. Our research focused on the impacts housing can have on human health and well-being, and recognizes the unique challenges experienced by affordable housing developers, designers, operators, and most importantly, residents.

While focusing on the interior design of affordable housing is critical, human dignity does not begin when you open the door to your unit but when you enter the development. Therefore, this report also highlights the quality of outdoor experiences, opportunities to support human connection, and optimizing the sequence from the development entry to the home. In addition, it is critical to recognize that affordable housing is just one component of the overall health and well-being of a person, family, and community. Residents need jobs, public transit, and basic-needs businesses such as pharmacies and grocery stores; proximity and access to this critical social infrastructure is essentially an extension of a healthy home.

To craft this story, the research team identified design tools, deployed a national survey with compensation, and hosted over 20 meetings with community stakeholders focused on the daily life, health, and safety of this sensitive population. Through these collective efforts, we curated a series of research-informed tools and six case studies across the United States.

To capture both the practical solutions and lived experiences, the report consists of two main elements—Tools and Case Studies.

Tools

Housing Affordability 101

This is an essential primer for understanding affordability, development and operational strategies and the different types of affordable housing.

Eight Guiding Principles

These tenets serve as a central framework to put people at the center of affordable housing design.

Existing Resources for Designing Healthy, Affordable Housing

We are not here to reinvent the wheel. There is research, building certifications, and practical resources available for affordable housing stakeholders to inform new and existing buildings.

Future of Home Survey

We developed a validated 15-minute questionnaire for affordable housing residents and surveyed stakeholders across the country to collect feedback on their housing experiences during the pandemic. Housing providers can use this survey to understand their own post-pandemic lessons learned.

EXECUTIVE SUMMARY

To rebuild our communities after this pandemic, we must use all available tools to support human stability, health, and happiness. When we spend 65% of our time in our homes, the interior design of housing can be instrumental in optimizing the health potential of a critical indoor environment.

In this next section, we engaged residents and staff across the affordable housing spectrum to share how building design shaped their experience. These case studies were diverse in terms of geography, stretching across the country; in size, from single family homes to large multitenant buildings; in program and resident makeup, from senior housing to transitional, from dedicated housing to mixed use; and in context, from rural to urban.

There is a significant difference between reading a list of design strategies and putting yourself in someone else's shoes.

For example, imagine opening the front door of your building to be greeted by a compressed lobby, and as you enter the elevator you wonder what that smell could be. As the elevator door opens, you stare down a long dingy corridor without daylight and views, to then get home and start doing your 8th grade math homework to the noise of traffic and Mr. Apartment 302 watching TV. What are the psychological and physiological impacts of this entry sequence?

Case Studies

Wyoming

A state-wide approach to delivering affordable housing to rural residents.

Progress Foundation

Exploring a continuum of care for San Francisco's most vulnerable population in supportive, transitional housing.

Lafayette Terrace Apartments

Supporting a wide range of individuals, from seniors and those with disabilities to families with young children in the Englewood neighborhood of Chicago.

Northtown Library and Apartments

An innovative collocation of affordable senior-housing apartments and a public library in Chicago.

Sugar Hill Project

A mixed-use affordable housing building that offers on-site preschool and a children's museum in Harlem, New York.

Beach Green Dunes II

An independent affordable housing building that provides energy savings and comfort through Passive House Standards in Far Rockaways, New York.



Introduction

Why now?

Quality affordable housing has been an urgent priority in cities across the nation for the past few years. The connection between home and health is not new and is supported by a wealth of research and resources. The average person spends about 65% of their time inside their homes, according to the Harvard T.H. Chan School of Public Health, Healthy Buildings Program. When you consider environmental factors that have wide-ranging effects on your health, such as fresh air flow and access to the outdoors, it's clear that residential interior design can either optimize or hinder its inhabitants' wellbeing. For the first time in 100 years, we saw critical role of a home's health during the COVID-19 pandemic when we relied on interior residential spaces to protect people's health and well-being while working, learning, healing, and mourning.

Why you?

Affordable housing residents experience direct and indirect challenges triggered by the COVID-19 pandemic. But their ability to adapt hinges on the design, layout, maintenance, operations, and affordability of their home—all of which are determined before they started living in the space. As we navigate this collective physical and mental health crisis, both affordable housing designers and operators must rise to the moral imperative of providing living conditions that promote long-term resiliency and wellness so they are healthy enough to take on inevitable challenges later on.

This is not the only emergency they will face in their lifetime.

Why us?

Our research team is comprised of interior designers, architects, urban planners, public health experts, and policy analysts. Through these diverse perspectives, we identified an array of resources and best practices to promote healthy affordable housing. These pieces include reviews of peer-reviewed research, examinations of current healthy housing guidelines, meetings with experts, and most importantly, conversations with building owners and residents.

Why this report?

If we want all residents to benefit from healthy residential design—no matter their socioeconomic status—then we must apply the same rigor, innovations and process we use for market-rate housing to affordable housing. Democratizing “interior design” is essential to supporting peoples' dignity and community well-being.

This report provides tools for designers, developers, and operators to readily integrate public health principles that reflect resident priorities and needs. Whether you are a seasoned housing developer or a budding interior designer, affordable housing is complex. This toolkit can help to inform your decision making by equipping you with tried-and-true methods that apply to your project. In it, you'll find resources such as:

- a primer on housing affordability to understand the variability across different affordable housing types and populations.
- lessons learned from affordable housing residents, including case studies across the U.S. and housing type.
- tailored design strategies that can support residents in future emergencies.
- a compendium of existing tools and guidelines endorsed by other organizations that can be regularly used.

INTRODUCTION (WORDS FROM OUR TEAM)

“I learned about affordable development staff who continue to work harder during the pandemic than ever before. They support their tenants, but also care for themselves and their team. Tenants and staff are a community. Self-care and collective care alike fuel that community’s resilience.”

Allison on Interconnectedness
Columbia University, Mailman School of Public Health

“Our conversations with residents and staff demonstrated that housing is enormously foundational to people’s lives, especially during the pandemic. Access to affordable housing that promotes health creates a strong, positive foundation on which people can build their lives.”

Erin on Foundational
RxHome NYC

“This challenge cannot be solved by one person, one organization, or with one idea. We need to be active participants and partners, working together for the common good. We have a unique opportunity to leverage our skills, expertise, and voices, putting design as the driver to make better, healthier, and safer living conditions for all.”

Stephen on Opportunity
Perkins&Will, Boston Studio, Architecture

“People come together in times of crisis. Bonds are created, and relationships are strengthened. Architecture itself is rendered meaningless in these moments without people to inhabit it. Everything we design and everything we’ve experienced during the pandemic; it is all rooted in people.”

Patricia on People
University of Waterloo

“Even in the darkest hours, the power of relationships, joy, and laughter illuminated these buildings, so they truly glowed from within. People remain the greatest differentiator of social and physical safety among our case studies. Everyone we spoke to gave us the purpose and strength to keep going.”

Erika on Warmth
Perkins&Will, Human Experience (Hx) Lab

“We have spoken to several residents and building staff who have been very gracious and entrusted us with details about their living and work situations. They were honest because they believed that we had noble intentions with this research effort. Now, we have a responsibility to use their testimonies to support resilient housing design in the future.”

Marc on Trusting
Perkins&Will, San Francisco Studio, Urban Design

“Human nature is survival. We have a certain resilience that craves to see current good and always seeks out good to come. The people we talked with displayed the same traits we have seen globally throughout the pandemic, which is a tenacious determination to come together, take care of their own, and fight for a better future. This encouraged us to renew our efforts in doing the same.”

Corrie on Hope
Perkins&Will, Boston Studio, Interior Design

“During our research, it became clear that everyone was coping with the pandemic and the changes that it brought to people’s lives. Property managers stretched way beyond their roles to help residents follow public health mandates and encourage others to do the same, everyone’s hands were full. Nevertheless, individuals cared about one another and persevered to try and stop the spread of COVID-19.”

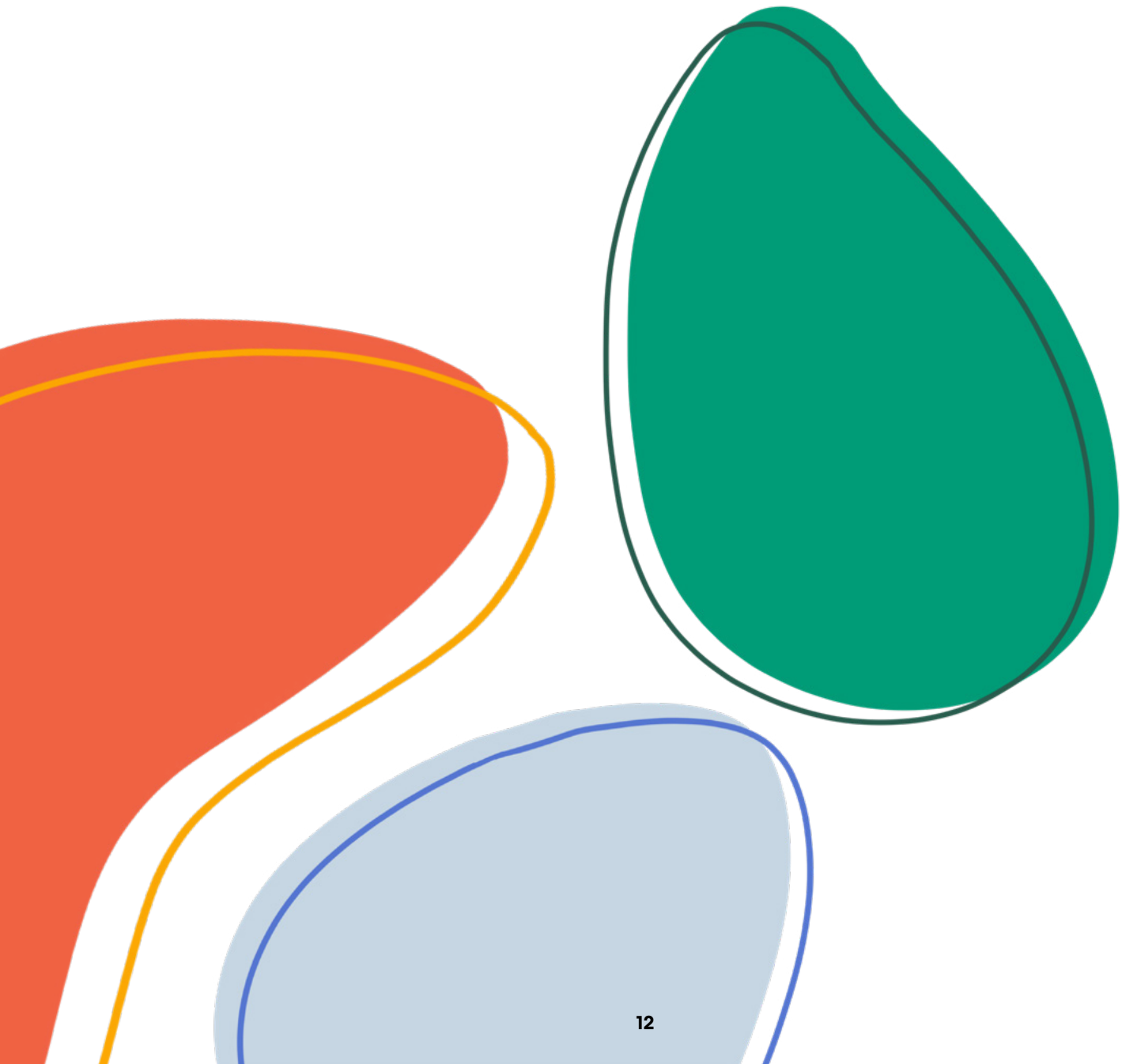
Michael on Effort
University of Waterloo

“The staff and residents we spoke to showed us vulnerability, and in vulnerability lies their strength. During the COVID-19 pandemic, they were faced with uncertainty, risk, emotional exposure, and physical exposure. They displayed courage in the ways they supported one another, and in how they opened up to our research team to share their stories and virtually welcome us into their homes.”

Amina on Vulnerability
Perkins&Will, Chicago Studio, Interior Design



The Tools in Our Toolkit



01.

Housing Affordability 101

The essential primer for answering the following questions: What makes affordable housing affordable? What developmental and operational strategies exist? What are the unique differences between supportive, supported or specialized, and independent affordable housing?

03.

Existing Resources for Designing Healthy, Affordable Housing

We are not here to reinvent the wheel. There are many resources available for affordable housing stakeholders to inform new and existing buildings. We highlight three key categories to build healthier projects, which include: Research, Tools for Practitioners, and Certifications. Each resource is tagged with the pertinent Guiding Principle.

02.

Eight Guiding Principles

These tenets serve as a central framework to put residents at the center of affordable housing design. The significance and prioritization of each principle may be tailored to the specifics of the physical housing type, specialized programs, and resident populations.

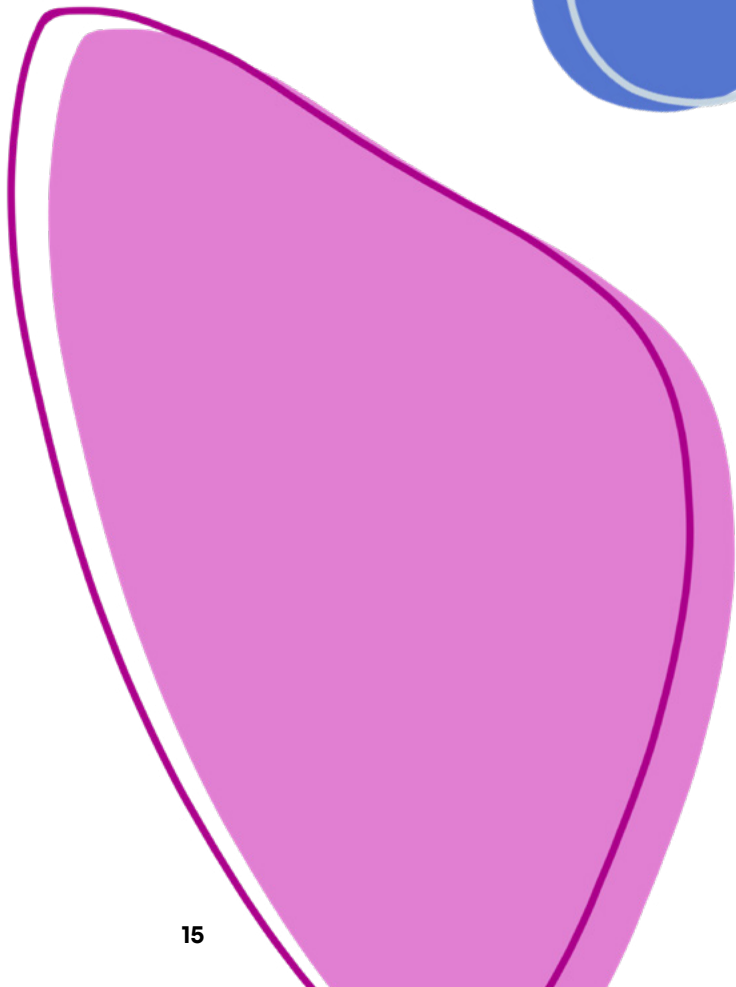
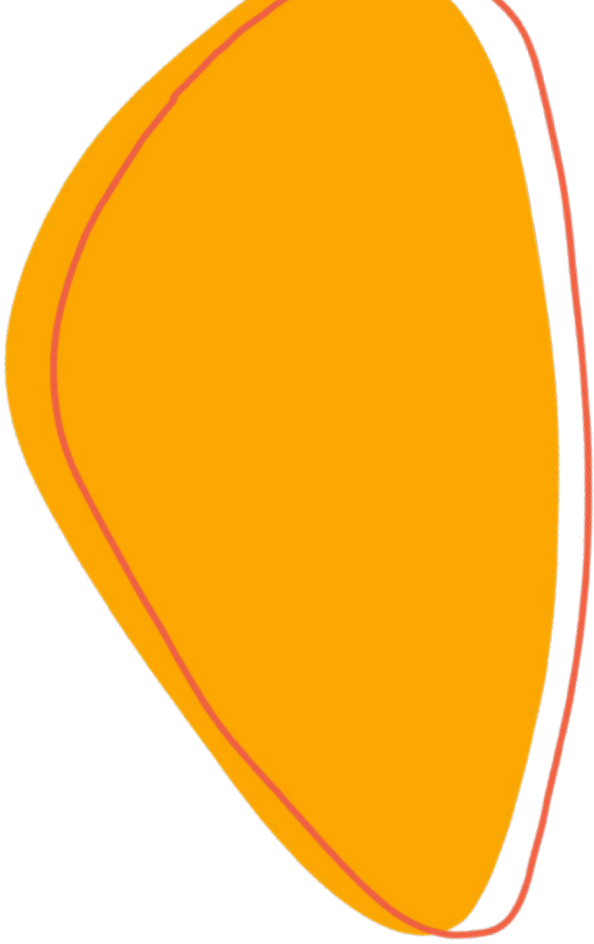
04.

Future of Home Survey

To inform our research, we developed a validated 15-minute survey for affordable housing residents. While we highlight the results in our case studies, we also want housing providers to have the questions in case it can help to engage their residents and understand post-pandemic lessons learned.

Tool 01: Housing Affordability 101

In this report, we focus on the physical infrastructure of affordable housing projects to better understand how the built environment affects a community's overall wellbeing and individual's health.



TOOL 01: HOUSING AFFORDABILITY 101

“Affordable housing” can describe a range of buildings, projects, and programs. The federal Department of Housing and Urban Development (HUD) considers an individual unit affordable if the occupant spends no more than 30% of their gross income on housing, which includes utilities. Household income usually determines tenant eligibility for affordable housing—specifically, whether this amount falls below a certain percentage of the area median income (AMI). HUD publishes the AMI by household size for all jurisdictions in the United States on an annual basis.

Affordable housing stock varies not just in the level of affordability (e.g., accessible to people earning below 80% AMI), but also in the onsite services provided and in the policies play a role in making projects affordable. To effectively apply these healthy strategies outlined in this report, understanding these differences is fundamental.

We offer key terms and strategies for readers who are new to the world of affordable housing.

Affordability by the numbers

If the AMI for a household of three in a given city is \$50,000, and a building is committed to renting units to households with income less than 100% of AMI, the annual rent for a household of 3 will be set at 30% of \$50,000, or \$15,000 (\$1,250 monthly). If the building is committed to renting units to households with income less than 80% of AMI, the annual rent for a household of 3 will be set of 30% of \$40,000 (80% of \$50,000), or \$12,000 (\$1,000 monthly). *Note that income can include both earned income from employment and unearned income from government benefits like social security.*

What makes affordable housing affordable?

Housing can be made affordable through two types of strategies. The first hinges on the development of housing. An example would include a subsidy to help build or renovate a project. The second supports the operations of housing, such as a direct fund to help pay tenants' rent.

Examining how the initial design phases and ongoing operations are funded is key to including health-promoting features in an affordable housing project. The forms of the feature and where it is located within the residence can also determine feasibility. If it's part of the building's infrastructure, for instance, it's harder to alter after construction but easier to maintain.

However, if it's surface design, the alterations are easier to carry out after construction but harder for long term, sustainable maintenance. This can skew affordability if investment is made too far in one direction. For example, if an affordable housing project is supported solely with developmental subsidies, some of the surface design features may be harder to maintain. Conversely, if a project is supported solely with operational subsidies, some infrastructure features may be harder to generate.

The following chart lays out the strategies used by government, nonprofit organizations, and philanthropy to develop and operate affordable housing for both private and public housing.

DEVELOPMENT	OPERATIONAL
<p>Government directly funds public housing project development (required to be affordable) and the development of privately owned buildings committed to being affordable</p> <p>Ex. Federal budget allocates new funding for public housing in specific states or localities.</p>	<p>Government and/or philanthropy subsidize building operational costs with direct funds to the building</p> <p>Ex. Building receives a private grant to run wellness programs in common areas or receives an ongoing government subsidy to support utility costs.</p>
<p>Government provides upfront grants; loans and/ or tax breaks to subsidize the development of private housing committed to remaining affordable.</p> <p>Ex. The Low-Income Housing Tax Credit (LIHTC) program provides tax credits to developers of private buildings for committing to rent a portion of units below market rent for a given number of years.</p>	<p>Government and/or philanthropy subsidize client rent through ongoing rental subsidies.</p> <p>Ex. The federal Section 8 program provides ongoing monthly rental assistance to families that meet specific income and other criteria.</p>
<p>Philanthropy funds building development through direct grants or low/no cost loans.</p> <p>Ex. A philanthropic organization may directly fund the development of a private building on the contingency that the developer commits to rent a portion of units below market rent for a given number of years.</p>	

Table 1: Strategies used to develop affordable housing & maintain housing affordability

TOOL 01: HOUSING AFFORDABILITY 101

Affordable housing typologies

Healthy design features should correspond with how a building will be used, and by whom, to maximize benefits for residents. All typologies can be made affordable through any combination of strategies outlined. Below is a simplified framework for learning more about a project and its future residents' health needs.

Affordable housing types vary primarily in the features or services offered to residents and the population served. Here we define affordable housing in three broad buckets: supportive housing; supported or specialized housing; and independent housing (see Table 2 for an overview).

Supportive Housing

Supportive housing is permanent affordable housing linked with intensive person-centered services, including case management, health services, and other social services. A nonprofit or medical organization typically coordinates these services onsite or in the community. While intensive services are offered as a feature, residents are not explicitly required to use the services.

Supportive housing serves people with complex medical, mental health and/or substance use issues, especially co-occurring issues, who do not have another place to live. Most supportive housing programs, especially those funded through government subsidies and grants, specifically serve people who have also experienced homelessness. Many projects serve people with specific needs, such as people with HIV/AIDS, serious mental illness, or substance use conditions. The intensive services offered in supportive housing programs are specific to that population and may include clinical medical, mental health and substance use services, psychiatry, case management, assistance connecting to government benefits, and employment training. Supportive housing projects may also offer features such as recreation rooms, meeting spaces, green spaces, and common laundry facilities.

Supportive housing programs' operations are typically funded by government subsidies. National and local advocacy organizations are often responsible for ensuring funding for the creation and maintenance of supportive housing programs. These include the national Corporation for Supportive Housing, the Supportive Housing Network of New York, and the Supportive Housing Providers Association

Supported and Specialized Housing

is permanent affordable housing linked with person-centered services, including case management and other social services. These programs are similar to supportive housing programs in that they provide affordable housing with person-centered services, but differ in that the services are less intensive and clinical, and more specific to the resident population. A nonprofit organization may coordinate services onsite or in the community, or tenant leaders may coordinate services themselves. Supported and specialized housing programs are typically created for specific resident populations and offer corresponding services. For example:

- Housing for seniors may offer regular wellness checks and specialized social events.
- Housing for justice-involved people may offer computer classes and employment training, and connection to relevant government benefits.
- Housing for artists may offer studio space or art skill classes.
- Housing for veterans may offer connection to relevant government benefits and specialized social events.

Like all affordable housing projects, the development and operations of supported housing projects may be subsidized using private or government loans or grants. That funding often comes from entities that specialize in serving the resident population, like the the United States Department of Veteran Affairs (VA), criminal justice advocacy organizations, or artist funds. Read more from specific organizations that support this type of housing including: [Artspace](#); [LiveOn NY](#), the [Reentry and Housing Coalition](#) and the [VA](#).

Independent Affordable Housing

is permanent affordable housing without substantial person-centered features, although projects offer general features such as recreation rooms, meeting spaces, green spaces, and common laundry facilities. Like any building, the mix of unit sizes determines the type of households that live there (i.e., families, single people).

Like supportive and supported affordable housing, independent affordable housing may be subsidized through any combination of development and operational strategies outlined above. Government rent stabilization and rent control policies can maintain the ongoing affordability of independent housing.

Read more from specific organizations that support this type of housing including: the [National Low-Income Housing Coalition](#), the [National Fair Housing Alliance](#) and the [NYU Furman Center](#).

Public vs Private Housing

Public housing is any residential building owned by government entities; private housing is any residential building owned by private entities, even if it's supported by government funds.

TOOL 01: HOUSING AFFORDABILITY 101

Rental Subsidies

“Rental subsidies” are administered in two forms. Tenant-based subsidies are given to individual tenants and can “follow” the tenant to other units, while project-based subsidies are administered to building managers or landlords to support tenants in entire multi-unit complexes.

Tenant-based rental subsidies may be used in buildings that are entirely operated as affordable housing, or buildings with both affordable and market rate housing, also known as mixed-use housing. In most cases, a rental subsidy covers most of a tenant’s rent. Additionally, there is a maximum that the subsidy will cover and a maximum total rent that a unit can reach. The tenant is responsible for a set portion of the rent.

The largest government rental subsidy is the Housing Choice Voucher (HCV, or Section 8), the number of which is limited by federal funding allocations. Because of the lack of federal vouchers (only one in four households eligible for HCV actually receive the benefit), numerous states and localities operate their own rental subsidy programs for their residents, although these may also be limited by funding allocations. These include programs in New Jersey and New York City. Philanthropic organizations also provide some rental subsidies.

Rental subsidies may be provided to specific populations, like veterans, or to households that meet specific income and demographic criteria. Note that in situations where a building owner/operator anticipates rental subsidies will be used in that building, the owner may leverage that anticipated subsidy to secure private development funding.

	SUPPORTIVE HOUSING	SUPPORTED AND SPECIALIZED HOUSING	INDEPENDENT AFFORDABLE HOUSING
Duration of residence	Permanent	Permanent or time-limited	Permanent
Services provided	Intensive person-centered services, often including clinical services for people with behavioral health conditions and case management General amenities	Light touch person-centered services specific to the specialized population General amenities	General amenities
Residential population	People with complex medical, mental health and/or substance use issues, and/or chronic homelessness	Specialized populations including: seniors, justice-involved individuals, artists, LGBTQ individuals, and veterans.	General population; may need to meet income thresholds
Household types	Mostly single adults; some families	Mostly single adults; some families	Families and single adults
Rent obligation of tenants	Tenant has lease, but rent is typically capped at ~30% of tenants earned/ unearned income	Tenant has lease, rent is subsidized through government and/or private funding	Tenant has lease, rent is subsidized through government and/or private funding
Prerequisites to enter/ maintain housing	None/ few	Ability to pay rent (tenant portion, if subsidized)	Ability to pay rent (tenant portion, if subsidized)
Case Study	Progress Foundation	Lafayette Terrace Northtown Library and Apartments	Beach Green Dunes II Wyoming Sugar Hill Project

Table 2: Types of affordable housing

TOOL 01: HOUSING AFFORDABILITY 101

The COVID-19 Pandemic as a Shock to Housing Affordability

Several determinants affect housing affordability. While affordability established at the building level is a powerful intervention, individual circumstances such as a change in the number of people in a household, health conditions, or income loss can be detrimental to a household's ability to pay their rent. Even if an affordable housing complex has been subsidized, it may not be affordable or continue to be for all tenants.

The COVID-19 pandemic demonstrates the potential for a large-scale shock to bankrupt peoples' lives. As of July 5, 2021, almost 7.5 million American households reported that they did not pay the previous month's rent, according to the [U.S. Census Bureau, 2021](#). The pandemic worsened existing challenges many households were already facing. Guardians lost childcare through social distancing or school closures and were forced to reduce their work hours or leave altogether. People who did not have healthcare had to seek medical attention because they were infected by COVID-19 and are now saddled with debilitating medical expenses. While some affordable housing complexes include provisions that require rent reductions when residents lose their income, this is not true for all locations.

To respond to the ongoing COVID-19 crisis, governmental bodies from the local, state, and federal level as well as private organizations implemented several programs and policies so people can continue to live in their homes.

WHAT ARE TENANCY PRESERVATION STRATEGIES AND HOW HAVE THEY BEEN USED DURING THE COVID-19 PANDEMIC?

FINANCIAL SUPPORT	Federal Emergency Rental Assistance (ERA)	<p>States and localities administer direct funding to either tenants or landlords to cover back rent or utility payments as well as a limited amount of future rent payments. The Consumer Financial Protection Board compiled a list of all state and local programs.</p> <ul style="list-style-type: none"> COVID-19 example: The Georgia Department of Community Affairs hosts an online application for federal COVID-19 rental assistance, the awards from which are paid directly to landlords.
	State rental assistance	<p>States may use their own funds to further prevent tenant evictions through expanded assistance paying rent arrears, future rent payments, or legal help beyond that provided by federal funding and programs. States can administer these funds directly or work with localities to do so.</p> <ul style="list-style-type: none"> COVID-19 example: Massachusetts administers the locally-funded Residential Assistance to Families in Transition (RAFT) program, in addition to the federally-funded ERAP program (which has a narrower eligibility threshold) through regional agencies, such as Metro Housing in Boston to cover up to \$10,000 in rental arrears.
	City rental assistance	<p>Much like states, localities may also use their own funds to augment state and federal housing assistance programs, typically providing benefits to a wider range of households or providing additional benefits.</p> <ul style="list-style-type: none"> COVID-19 example: The City of Cambridge, in Massachusetts, raised over \$5 million through the Mayor's Disaster Relief Fund to pay tenants' rental arrears (administered through a COVID-19 Housing Stabilization Program).
	Privately funded rental assistance	<p>Organizations serving people experiencing homelessness and housing instability may collect private or corporate donations towards an emergency rental assistance fund.</p> <ul style="list-style-type: none"> COVID-19 example: The Conway Gives campaign in Arkansas is a collaboration across seven nonprofits, streamlining their provision of donated eviction prevention funds.
GOVERNMENT REGULATION	Federal	<p>The federal government instituted eviction moratoriums, which generally prevent landlords from evicting tenants due to nonpayment of rent.</p> <ul style="list-style-type: none"> COVID-19 example: The CDC released an order blocking evictions for nonpayment between September 4, 2020, and July 31, 2021.
	State	<p>States can implement their own eviction moratoriums and restrict rent increases in certain buildings that meet outlined standards.</p> <ul style="list-style-type: none"> COVID-19 example: California has in place legislation blocking eviction for non-payment, as of August 31, 2020, until September 30, 2021.
	Local	<p>Local jurisdictions may also enact eviction moratoriums and restrictions on rent increases in buildings that meet specific criteria.</p> <ul style="list-style-type: none"> COVID-19 example: The City of San Francisco implemented an emergency, temporary rent freeze, between April 24, 2020 and October 21, 2020.

Tool 02: Eight Guiding Principles

People's needs should be at the heart of designing healthy, affordable housing. We developed a list of guiding principles to serve as a lens through which we are structuring this research and evaluating our case studies. The significance and prioritization of each principle may vary for different housing types, specialized programs, and resident populations.



TOOL 02: EIGHT GUIDING PRINCIPLES

Promotes Belonging and Acceptance

Affordable housing, like any market-rate home, should reflect residents' identities, histories, cultures, and families. About 14% of the United States population is foreign-born, underscoring the importance of creating residential spaces that welcome community involvement and are safe for people from diverse backgrounds (U.S. Census Bureau, 2019). Affordable housing can promote belonging and acceptance at various scales. Residents may develop a greater sense of ownership of their space if they are included in decision-making processes that will affect their built environment, such as design or maintenance issues, use of space, and policy authorship. Centering residents' lived experiences in this way can help build trust and subsequently improve communication between residents and operators. Compassionate modes of community building can invite resident participation, which includes resident-driven artwork creation and supporting equitable access to amenities.

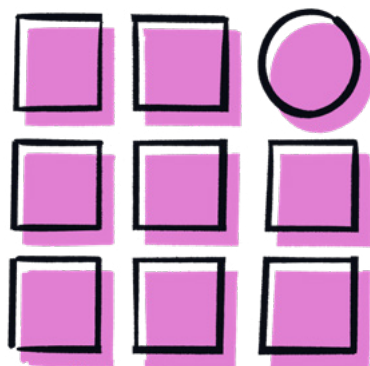
Healthy, affordable housing promotes positive, trusting relationships among residents and operators through inclusive decision-making and design.



Integrates into Community

Community integration occurs in both a physical and social sense, and is reciprocal; affordable housing residents should feel welcome in their neighborhoods, and the building should benefit the neighborhood. Most subsidized housing in New York City resides in neighborhoods where poverty is 10% higher than the city's average (Gould Ellen & Weselcouch, 2015). Affordable developments can widen their impact by making on-site amenities accessible by the broader community, such as hosting a vaccination clinic or weekly farmer's market. Even a building's exterior appearance can influence its relationship to the surrounding neighborhood, and whether its residents are welcomed. Urban design conducted thoughtfully, in consideration of local context and need, has the potential to limit the impacts of stigma towards affordable housing residents.

Healthy, affordable housing integrates physically, socially and at various urban scales to support community cohesion and connectivity.



Supports All Ages

Across the life course, there are distinctive health vulnerabilities associated with age. Childhood is a critical time for physical development, socialization, and growth, making children increasingly susceptible to harmful chemicals, poor air quality, and adverse childhood experiences. Depending on the severity, these harmful exposures can produce challenges with sleep, mental health, balancing work, and life stressors into adulthood, diminishing overall quality of life. There is increasing demand for housing tailored to the unique needs of older adults. The number of households headed by people over 65-years-old in the United States is growing more quickly than that of any other age group; a million such households were added each year between 2014 and 2019 (JCHS, 2020). For older adults, the ability to receive care at home and live independently without tripping hazards, mobility concerns, and social isolation present different opportunities for housing to respond.

Healthy, affordable housing accounts for the needs of all ages, allowing for greater flexibility, safety, and security at home.



Adopts Universal Design Principles

Residents' physical needs change over the lifetime of a building. According to the U.S. Department of Housing and Urban Development (HUD), approximately 20% of households that receive federal rental assistance include at least one person with a disability (Brucker, Helms & Souza, 2017). Creating both individual and communal spaces with adaptability in mind reduces risk of accidents and creates uncomplicated access for every resident (Raggi et al., 2016). Physical environments have the power to reflect a culture of inclusivity and equity by various means. Furniture selection, for instance, should be easy to navigate, properly sized for individual needs, and consider the width of circulation. Color and signage choices created for low vision or color-blind individuals allow all residents to navigate building amenities and entrances.

Healthy, affordable housing is designed and operated for all residents to thrive.

TOOL 02: EIGHT GUIDING PRINCIPLES

Reinforces Resilience

Building community resilience is an ongoing process and consistent efforts better position both the individual and community during hard times. From a resident losing their job to the spread of infectious diseases like COVID-19, affordable housing developments should respond supportively to shocks at any scale. In New York City, 84% of households represented in court by lawyers—which tenants can access either through a referral from their property managers or via on-site legal clinics—avoided eviction, so they were able to keep living in their homes (NYC HRA, 2019). Other modes of support may include the building’s community center offering reskilling or training programs to regain employment, serving as a haven during extreme heat, and providing services such as meals or a food bank, eviction prevention, donated or discounted furnishings, and cleaning supplies.

Healthy, affordable housing strengthens residents’ capacity during individual and/or community hardships.



Reduces Environmental Exposure

Healthy homes not only prevent disease, but holistically protect human beings throughout their life. The selection of healthy materials prevents environmental exposures that cause short-term health challenges, such as asthma or headaches, or more severe diagnoses, like cancer. Other key environmental considerations include air quality, noise, and light, which influence occupant health and cognitive function. According to a study that analyzed 215 United States tracts, lower socioeconomic status communities face higher levels of exposure to air pollution; for some pollutants, estimated exposures among people without a high school degree were 10% higher than estimated exposures among college graduates (Bell & Ebisu, 2012). Buildings with properly maintained outdoor spaces reduce exposure to outdoor allergens, risks of injury, infections from mosquitos or ticks and lower noise pollution, and in turn reduce resident stress and increase social cohesion (Braubach et al., 2017).

Healthy, affordable housing reduces a range of environmental exposures to protect short and long-term health.

Prioritizes Energy Efficiency

Greater energy efficiency alleviates financial burdens on residents and reduces operational cost. The decision to keep lights on, pay rent, or buy healthy food forces residents to make unhealthy trade-offs, leaving them vulnerable to housing, energy, or food insecurity. Achieving energy efficiency is essential for keeping affordable housing affordable. Green housing strategies have also been associated with better health outcomes, including reductions in childhood asthma risk and asthma-related absenteeism (Colton et al., 2015). Low-income housing units in the Washington, D.C. area that were renovated to meet Enterprise Green Communities criteria (a resource explained in [Existing Resources for Healthy, Affordable Housing](#)) saw a 16% reduction in energy usage, a 54% reduction in water usage, and an 8% increase in the number of adults reporting good health (Jacobs et al., 2014). Some of these sustainable housing strategies are early design decisions, such as the selection of green building certifications, which can be strengthened by prioritizing indoor environmental quality credits focused on indoor air, acoustics, and lighting.

Healthy, affordable housing prioritizes energy efficiency within units and across the building to alleviate operational costs that may impact affordability.



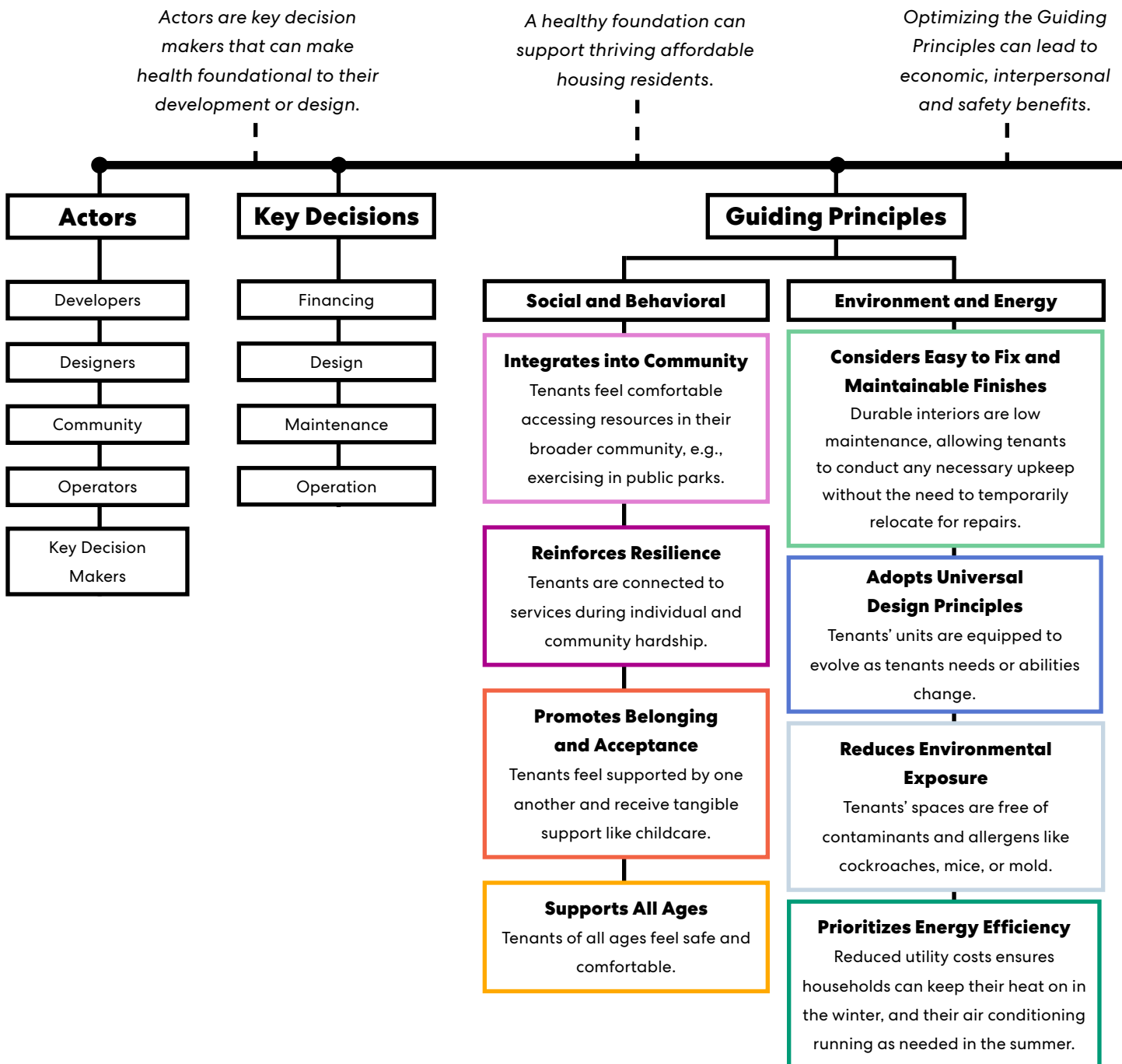
Considers Easy to Fix and Maintainable Finishes

Building new or renovating affordable housing requires full life cycle project understanding—not just first-cost. Consideration must be given to durability, ease of maintenance and operations, and the specification of materials that do not require harsh chemical cleaners. Fixtures and furnishings that require intensive fixes can lead to disrepair, deferred maintenance, and other environmental challenges (e.g., pests, mold). These selections should be coordinated with a commitment to regular building upkeep and retouching, including walls and other surfaces affected by normal wear and tear. Nationally, about 40% of all occupied housing units (including both rented and owned homes) needed at least one repair in 2017, yet this percentage increases for Native American households (48%), single-mother households (47%), and people living in manufactured housing (45%) (Housing Matters, 2020). A combination of the right strategies could reduce financial and health burdens on affordable housing renters.

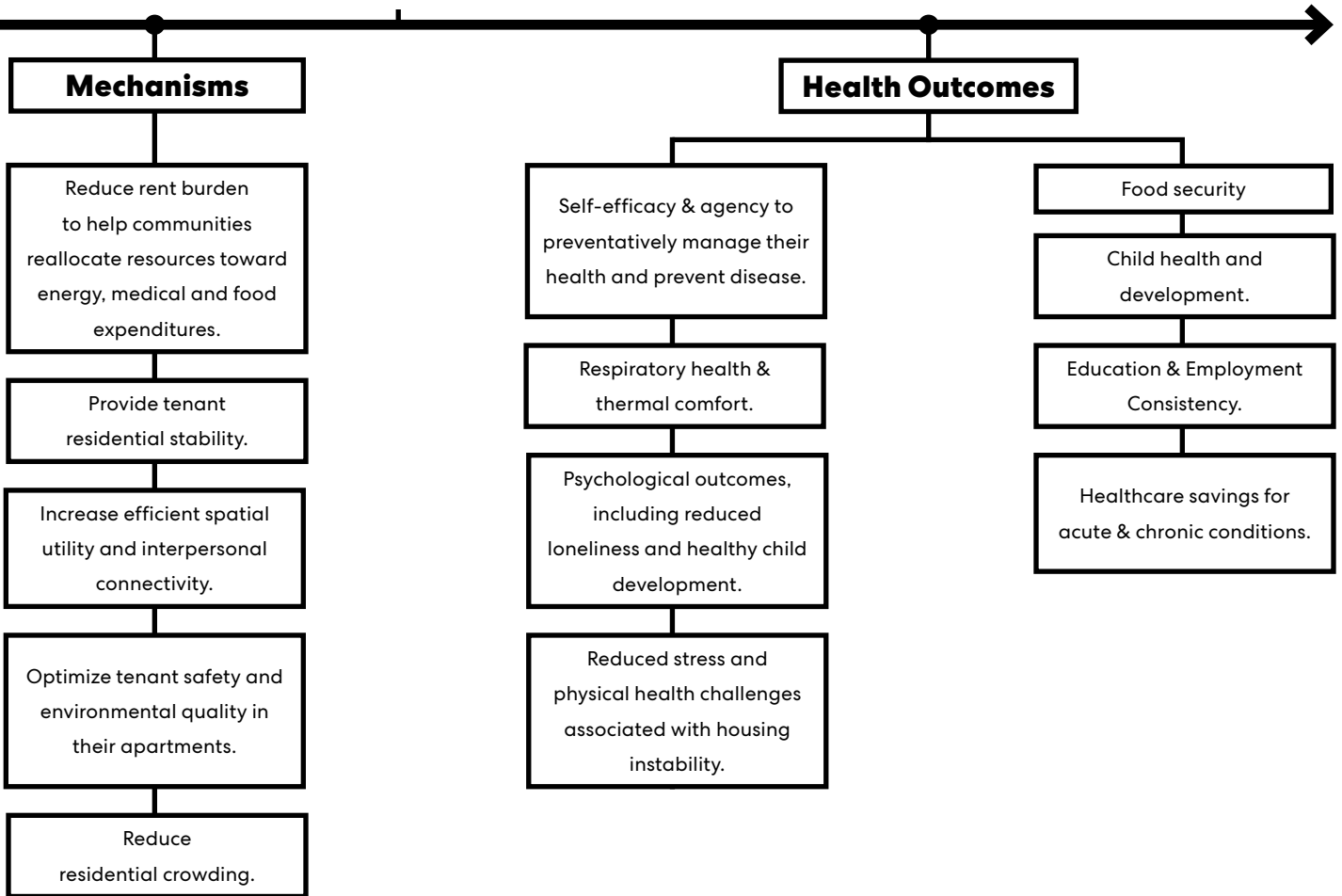
Healthy, affordable housing maintains its integrity and safety through durable, healthy materials.

TOOL 02: EIGHT GUIDING PRINCIPLES

The Health Impacts of Affordable Housing



These mechanisms support physiological and psychological health improvements



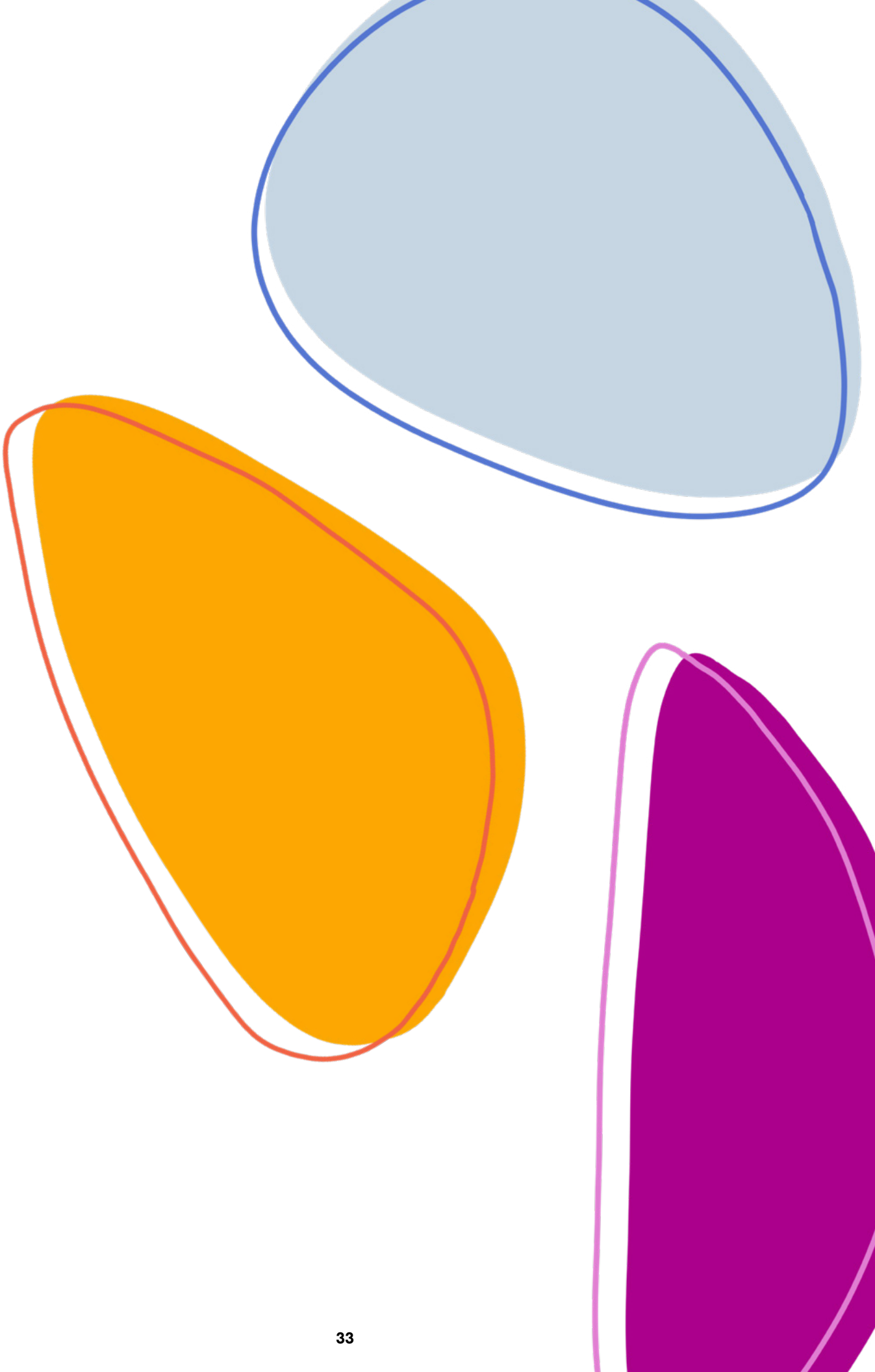
Tool 03: Existing Resources for Designing Healthy, Affordable Housing

Tools 1 and 2 highlight the importance of the lived experience in affordable housing. Tool 3 is here to help you successfully integrate health into your design and decision-making. Prior to the COVID, there was already a wealth of resources available to designers. The resources are at the intersection of public health, energy efficiency, and affordability.

Key categories of resources

1. Research
2. Tools for Practitioners
3. Certifications

Each resource is tagged with the pertinent Guiding Principles.



TOOL 03: EXISTING RESOURCES FOR DESIGNING HEALTHY, AFFORDABLE HOUSING

Research

Peer-reviewed literature, white papers, book chapters, research databases

**Harvard T.H. Chan School of Public Health,
Homes for Health**

This report outlines 36 expert tips that can be implemented to make a home healthier.

Key Terms: Public Health, Indoor Environmental Quality, Strategies

Guiding Principles: [Reduces Environmental Exposure](#),
[Considers Easy to Fix and Maintainable Finishes](#)

**Metropolitan Washington Council of Governments,
Healthy Design for Affordable Housing Guidebook 2014**

A 180-page report focused on healthy affordable housing highlighting the importance of location, proximity, access, site, and building design. Provides strategies across the affordable housing community including ways to promote physical activity, enhancing food access, lowering energy and transportation costs, improving indoor air quality, supporting Universal Design, and other topics focused on social, behavioral, and environmental well-being of residents.

Key Terms: Health, Indoor Environmental Quality, Policy

Guiding Principles: [Reduces Environmental Exposure](#);
[Prioritizes Energy Efficiency](#); [Adopts Universal Design Principles](#)

**The National Academies of Science, Engineering,
and Medicine; Healthy, Resilient, and Sustainable
Communities After Disasters: Strategies, Opportunities,
and Planning for Recovery – 2015, Chapter 10 Healthy
Housing**

A deep dive in how housing can advance health, especially after disasters, and actions that federal, state, and local levels can take to strengthen communities during times of crisis. The chapter highlights connection between green housing standards and health.

Key Terms: Public Health, Indoor Environmental Quality, Emergencies, Policy

Guiding Principles: [Reduces Environmental Exposure](#),
[Reinforces Resilience](#), [Prioritizes Energy Efficiency](#)

**National League of Cities, Affordable Housing & Health:
City Roles & Strategies for Progress 2019**

This white paper provides information on how to develop, preserve, and improve access to healthy affordable housing as well as protect against displacement. Case studies across the United States showcase the role of different financing approaches and stakeholders.

Key Terms: Health, Financing, Policy, Partnerships

Guiding Principles: [Reduces Environmental Exposure](#),
[Reinforces Resilience](#), [Promotes Belonging and Acceptance](#)

**National Center for Healthy Housing,
National Healthy Housing Standard 2018**

In partnership with the American Public Health Association and input from two expert committees, NCHH developed the National Healthy Housing Standard to inform and deliver housing policy that reflects the latest understanding of the connections between housing conditions and health.

Key Terms: Public Health, Indoor Environmental Quality

Guiding Principles: [Reduces Environmental Exposure](#),
[Considers Easy to Fix and Maintainable Finishes](#)

Perkins&Will, Precautionary List

The Precautionary List is a compilation of substances of concern that are relevant to the built environment. Used as a filter to screen toxic substances from product selections, it is a powerful tool to aid the designer in finding sources of these hazards in order to avoid them. The database can be searched by product type, MasterFormat specification number, health hazards, and environmental hazards.

Key Terms: Public Health, Indoor Environmental Quality, Material Health, Transparency, Precautionary Principal, Health Product Declaration

Guiding Principles: [Reduces Environmental Exposure](#)

Tools for Practitioners

Guidelines, Assessments, Websites

City Health Dashboard

A resource for viewing and comparing data on over 35 categories of health and the factors that shape health. The rigorous data is provided from multiple sources at the census tract or city level.

Key Terms: Health, Well-Being, Public Health

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Supports All Ages, Reinforces Resilience, Reduces Environmental Exposure

Enterprise Community, Affordable Housing Design Leadership Institute

Provides affordable housing developers with the design tools, ideas, and relationships that overcome financing and regulatory challenges.

Key Terms: Developers, Tools, Affordable Housing, Racial Equity, Healing, Sustainability, Cost Control, QAP Alignment, Community Engagement, Well-Being

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Reinforces Resilience

Enterprise Community, Aging-in-Place toolkit

A series of tools to support affordable housing owners and developers seeking to assess and respond to the needs of their aging residents through the built environment.

Key Terms: Developers, Affordable Housing, Aging, Inclusive Design

Guiding Principles: Promotes Belonging and Acceptance, Supports All Ages, Adopts Universal Design Principles, Reinforces Resilience

Enterprise Community, Health Action Plan

This is a process for identifying and addressing the health outcomes of residents through affordable housing design and development.

Key Terms: Public Health, Developers

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Supports All Ages

Environmental Protection Agency (EPA), EJScreen: Environmental Justice Screening and Mapping Tool

An environmental justice mapping and screening tool that provides a nationally consistent dataset and approach for combining environmental and demographic indicators. All indicators are publicly-available data. It includes 11 environmental data indicators, 6 demographic indicators, and 11 EJ indexes.

Key Terms: Environmental Justice, Demographics, Environmental

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Supports All Ages, Reinforces Resilience, Reduces Environmental Exposure

HomeFree

HomeFree raises awareness about toxic building materials and their associated health hazards as well as build the capacity of affordable housing practitioners to make informed decisions and transform the current practice of affordable housing products specified to healthier options for everyone. The website provides specific guidance on products used in housing (e.g., flooring, paint, insulation), case studies, educational materials, and other actionable resources.

Key Terms: Materials

Guiding Principles: Reduces Environmental Exposure

TOOL 03: EXISTING RESOURCES FOR DESIGNING HEALTHY, AFFORDABLE HOUSING

Homeless Hub, Universal Design and Accessible Housing

This guide provides seven features of universal design and specific strategies throughout the dwelling that can increase tenant accessibility.

Key Terms: Interiors, Design

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Adopts Universal Design Principles, Reinforces Resilience

Living Building Challenge (ILFI), Affordable Housing Framework 2.x – 2019

An affordable housing framework that outlines building strategies for multi-family affordable housing projects. Highlights energy and health including healthy indoor air quality, access to nature, responsible material selection, and inclusion.

Key Terms: Framework, Strategies, Energy, Health

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Supports All Ages, Adopts Universal Design Principles, Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency, Considers Easy to Fix and Maintainable Finishes

International Living Future Institute (ILFI), Materials List for Affordable Housing

A list of building products specific to affordable housing that are Living Building Challenge Red List Free. These products have been vetted by ILFI through a Declare label or the documentation required under the Living Building Challenge Materials and Health + Happiness Petals for Red List ingredients, CDPH compliance, and FSC Certification.

Key Terms: Materials, Health, Transparency

Guiding Principles: Reduces Environmental Exposure, Considers Easy to Fix and Maintainable Finishes

Local Initiatives Support Corporation (LISC), Guide to Green and Healthy Multi-Family Affordable Housing

Provides resources for owners, developers, managers, non-profit intermediaries, policy makers, and advocates. Tools include specific steps for supporting Green and Healthy Property Management, dashboard and templates to adapt for your needs, and practical examples and case studies implementing healthy, affordable green housing.

Key Terms: Developers, Health, Policy

Guiding Principles: Adopts Universal Design Principles, Reduces Environmental Exposure, Prioritizes Energy Efficiency

National Low Income Housing Coalition, Out of Reach 2021

Interactive map to understand how much someone would need to earn to afford a modest apartment in your state. By understanding the financial constraints in your state, it can help make the case for increased affordable housing.

Key Terms: Affordability, Employment, Policy

Guiding Principles: Integrates into Community, Reinforces Resilience

Tribal Healthy Homes Network

A tribal-led coalition focused on promoting indoor air quality in tribal homes. The website includes the Air Matters Toolkit, webinars, indoor air quality funding opportunities and resources for 12 different indoor air quality concerns.

Key Terms: Public Health, Indoor Environmental Quality

Guiding Principles: Reduces Environmental Exposure

U.S. Department of Housing and Urban Development, Making Homes Healthier for Families

Healthy Home resources provide a checklist, eight tips that can improve the environmental quality of homes, and specific topic guides (e.g. allergies, mold, integrated pest management).

Key Terms: Public Health, Indoor Environmental Quality

Guiding Principles: Reduces Environmental Exposure, Considers Easy to Fix and Maintainable Finishes

Certifications

Building Standards, Certifications, Rating Systems, Scorecards

Enterprise Green Communities

The only national green building program designed specifically for green affordable housing. Focuses on integrative design, resilience, path to zero energy, healthy living, and water. Affordable housing that certifies to Enterprise's Green Communities 2020 Criteria will also achieve WELL Certification.

Key Terms: Buildings, Public Health, Reduces Emissions, Net Zero, Affordable, Certification, WELL, Integrative Design, Location and Neighborhood Fabric, Site Improvement, Water, Operating Energy, Materials, Healthy Living Environment, Operations and Maintenance, Resident Engagement

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Supports All Ages, Adopts Universal Design Principles, Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency, Considers Easy to Fix and Maintainable Finishes

Fitwel, Multifamily Residential

Scorecards that include evidence-based design and operational strategies that enhance existing and new buildings. Strategies address walkability, proximity to transit, indoor environmental quality, stairs, and food access. Other resources exist specifically for senior housing.

Key Terms: Certification, Location, Building Access, Outdoor Spaces, Entrances and Ground Floor, Stairs, Indoor Environments, Dwelling Units, Shared Spaces, Water Supply, Nourishment, Materials, Indoor Environmental Quality, Health, Emergency Preparedness

Guiding Principles: Promotes Belonging and Acceptance, Integrates into Community, Supports All Ages, Adopts Universal Design Principles, Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency, Considers Easy to Fix and Maintainable Finishes

Green Globes, Multifamily

As an online assessment protocol, rating system, and guidance for green building design, operation and management, it provides an in-depth approach that leverages the knowledge of building owners and facility managers with personalized assistance to produce the best practices in sustainable design, construction, and operations. Certification benefits help reduce operating costs, qualify for tax incentives and utility rebates, meet government regulations, attract & retain employees, and increase property marketability.

Key Terms: Certification, Sustainability, Project Management, Site, Energy Efficiency, Water Use Reduction, Materials and Resources, Emissions, Indoor Environment

Guiding Principles: Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency, Considers Easy to Fix and Maintainable Finishes

ICC 700 National Green Building Standard

First residential green building standard to undergo the full consensus process and receive approval from the American National Standards Institute.

Key Terms: Certification, Sustainability, Sustainable Sites, Energy Efficiency, Water Efficiency, Materials and Resource Use, Indoor Environmental Quality, Operations and Maintenance, Building Owner Education

Guiding Principles: Promotes Belonging and Acceptance, Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency, Considers Easy to Fix and Maintainable Finishes

TOOL 03: EXISTING RESOURCES FOR DESIGNING HEALTHY, AFFORDABLE HOUSING

Energy Star Certification

Saves energy, saves money, and helps protect the environment by generating fewer greenhouse gas emissions than typical buildings. To be certified, a building must meet strict energy performance standards set by EPA based on actual, measured energy use of a building.

Key Terms: Certification, Buildings, Energy Efficiency, Products

Guiding Principles: Reinforces Resilience,
Prioritizes Energy Efficiency

International Living Future Institute, Core Green Building Certification

A simple framework that outlines the ten best practice achievements that a building must obtain to be considered green or sustainable building. Connection to nature, equity and the need for a building to be loved are equal to water, energy, and materials.

Key Terms: Certification, Buildings, Reduces emissions, Resilience, Materials, Equity

Guiding Principles: Promotes Belonging and Acceptance,
Integrates into Community, Supports All Ages, Reinforces Resilience,
Reduces Environmental Exposure, Prioritizes Energy Efficiency

International Living Future Institute, Zero Energy Certification

The Zero Energy Certification program presents a new energy paradigm, where built projects catalyze a transition towards a prosperous future for all with energy infrastructure that is clean, abundant and resilient. This certification is the only global third-party verified standard that recognizes built projects with industry leading energy performance and a balance of renewable energy without the use of combustion. The program utilizes a simple approach to certification that is based on measured energy performance rather than predicted outcomes.

Key Terms: Certification, Buildings, Net Zero, Renewable Energy, Reduces Emissions, Resilience

Guiding Principles: Reinforces Resilience,
Prioritizes Energy Efficiency

International WELL Building Institute, WELL Core Multifamily Residential

Leading tool for advancing health and well-being in buildings globally. Focuses on making buildings healthy for the inhabitants through air, water, light, nutrition, thermal comfort, movement, sound, materials, mind, community, and innovation.

Key Terms: Certification, Air, Indoor Environmental Quality, Public Health, Materials, Water, Nourishment, Light, Movement, Thermal Comfort, Sound, Mind, Community

Guiding Principles: Promotes Belonging and Acceptance,
Integrates into Community, Supports All Ages,
Adopts Universal Design Principles, Reinforces Resilience,
Reduces Environmental Exposure, Prioritizes Energy Efficiency,
Considers Easy to Fix and Maintainable Finishes

Passive House Institute US (PHIUS) Certification

Combines a thorough passive house design verification protocol with a stringent Quality Assurance and Quality Control program performed on site by highly skilled & specialized raters. Targets the intersection between aggressive energy & carbon reduction overlap and cost effectiveness, accounting for climate zone, source energy, and costs.

Key Terms: Certification, Energy Efficiency, Indoor Environmental Quality, Resilience, Reduced Carbon Emissions, Energy Modeling

Guiding Principles: Reinforces Resilience,
Reduces Environmental Exposure, Prioritizes Energy Efficiency

U.S. Green Building Council (USGBC), LEED (Leadership in Energy and Environmental Design), Residential Certification

Green building rating system for all building types and phases. Provides a framework for healthy, highly efficient, and cost saving green buildings.

Key Terms: Certification, Sustainability, Sustainable Sites, Water Efficiency, Energy Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Regional Priority

Guiding Principles: Integrates into Community, Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency, Considers Easy to Fix and Maintainable Finishes

Residential Energy Services Network (RESNET), Home Energy Rating System (HERS), HERS Index

Recognized by the United States Department of Energy (DOE) and the International Code Council (ICC), the Residential Energy Services Network (RESNET) uses certified energy rater providers to calculate the energy efficiency of a single or multifamily home. The rater uses the HERS Index, which references a 2006 IECC code minimum constructed home as a baseline, to determine the energy efficiency as a relative performance score, thus allowing any project to be compared against all other modeled projects. Since 1995, RESNET has rated over 3 million homes for energy performance.

Key Terms: Certification, Test, Inspection, Energy Analysis, Blower Door Test, Duct Test, Plan Review, HERS Index, 2006 IECC, Air Leakage, Energy Code, Home Energy Audit, Energy Efficient Mortgages

Guiding Principles: Reinforces Resilience, Reduces Environmental Exposure, Prioritizes Energy Efficiency

What we are reading

Rolfe, S., Garnham, L., Godwin, J. et al. **Housing as a social determinant of health and wellbeing: developing an empirically-informed realist theoretical framework.** BMC Public Health. 2020; 20, 1138.

A peer-reviewed research article providing an empirically-informed framework for causal pathways connecting specific aspects of the housing experience to health and wellbeing.

Key Terms: Public Health, Policy, Causal Pathways

Guiding Principles: Affordable Housing; Promotes Belonging and Acceptance; Supports All Ages

Swope CB, Hernández D. **Housing as a determinant of health equity: A conceptual model.** Social Science & Medicine. 2019; 243,112571.

A peer-reviewed article offering a conceptual model on how housing impacts health and a comprehensive vision for healthy housing that uses a historical and social justice lens and aims to promote health equity.

Key Terms: Public Health, Healthy Housing; Socioeconomic Factors

Guiding Principles: Affordable Housing; Promotes Belonging and Acceptance; Reduces Environmental Exposure; Reinforces Resilience



Tool 04: Future of Home Survey

To deploy the survey, building managers sent our recruitment flyer virtually and in some buildings posted it in common areas. We received over 100 responses during the Spring of 2021.

FUTURE OF HOME SURVEY

WE'VE BEEN THROUGH A LOT THIS YEAR.

- THE COVID-19 PANDEMIC IMPACTS NOT ONLY OUR HEALTH, BUT ALSO OUR EXPERIENCE OF BEING AT HOME.
- HELP US UNDERSTAND HOW YOU CHANGED YOUR HOME THIS PAST YEAR, AND HOW YOU WOULD DESIGN A HEALTHY HOME IN THE FUTURE.

TAKE THE SURVEY AT
[TINYURL.COM/FUTUREOFHOME](https://tinyurl.com/futureofhome)

OR SCAN THE QR CODE:



SCAN ME

\$30 gift card for a 15 minute survey

This survey is completely anonymous. Your responses will not be shared with your building.

Sponsored by:
Perkins&Will
PERKINS
THE PERKINS
WILL
FOUNDATION

Eligibility: Over 18 years old, have an email address to send the gift card to. You will provide the email at the end of the survey.

For any questions please contact Erika at erika.eitland@perkinswill.com

TOOL 04: FUTURE OF HOME SURVEY

Welcome to the **Future of Home Survey!**

We appreciate your time and support.

Our research is identifying how buildings, specifically homes, influenced health and happiness during COVID-19. Your experience during this past year is valued by our team. We would like to know how you changed your home during the last year and if given the opportunity to design a home in the future, what would you like to include.

This survey is **completely anonymous** and your building manager will not see your responses to these questions. This survey should take less than 15 minutes to complete.

Consent

By selecting 'Yes, I agree to participate' below, you acknowledge that your participation in the research study is voluntary, you are 18 years of age or over, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason. You may select 'No, I do not wish to participate' and not continue with the survey.

- Yes, I agree to participate
- No, I do not wish to participate

Has anyone else in your household already taken the Future of Home survey?

- Yes
- No

We can only accept one survey response per household. So, if you selected “Yes,” we ask that you end the survey now. Thank you for your understanding.

We wanted to encourage openness about resident experiences during the pandemic—including improvements to their building’s pandemic response.

Q1 What is your age?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+
- Prefer not to answer

We can only accept responses from individuals who are 18 or older. So, if you selected "Under 18," we ask that you end the survey now. Thank you for your understanding.

Q2 What is the 5-digit zip code where your home is located?

**Q3 Please share your building's street address.
*You do not need to include the unit or room number.***

Q4 How would you describe your gender?

- Male
- Female
- Non-binary
- Prefer not to answer
- Prefer to self describe (use the blank below to describe)

Future use of this survey would benefit from translation into additional languages, to expand the diversity of responses.

TOOL 04: FUTURE OF HOME SURVEY

Q5 What is your race/ethnicity? [Check all that apply]

- White / Caucasian
 - Hispanic or Latino/a
 - Black or African American
 - Asian / Pacific Islander
 - American Indian or Alaska Native
 - Prefer not to answer
 - Other (use the blank below to describe)
-

Q6 What is the highest level of school you've completed or the highest degree you've received?

- High school diploma or less
 - Vocational Training/Certification
 - Some college, but no degree
 - Associate's degree, or two-year college degree
 - Bachelor's degree, or four-year college degree
 - Graduate degree
 - Other (use the blank below to describe)
-

Q7 Regularly, how many people live in your home?

Please include yourself in this count.

	0	1	2	3+
Elderly (60+ years old)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adults (18-59 years old)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School-aged children (5-18 years old)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Children under 5 years old	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8 What is your annual household income?

- Less than \$15,000
- \$15,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 or more

These following questions ask about your specific unit as well as about your experience during the last year.

Q9 How long have you lived at your current apartment?

- <6 months
- 6 months - 1 year
- 1-3 years
- 3+ years

Q10 How many bedrooms are in your home?

- Studio
- 1
- 2
- 3+

We asked about household and home size to get a sense of density. Were respondents living in overcrowded housing?

TOOL 04: FUTURE OF HOME SURVEY

Q11 During the pandemic, please share how satisfied you were with the following aspects of your personal apartment/home?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Unsatisfied	Very Unsatisfied	Not Applicable
Access to Daylight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Open Windows	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heating in Unit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooling in Unit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Noise Levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ventilation/ Air Quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mold/ Moisture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lighting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12 Please share any additional physical features of your home that made you feel safer, happier, or more comfortable during the pandemic? *Examples: Easy to open windows, laundry in building, good sunlight*

Q13 If given the opportunity to build or redesign your home in the future to promote health and comfort, which features would you include with no cost to you? More choices on the next page

[Select up to 10]

- Easy to open windows
- Easy to clean surfaces
- Enhanced ventilation & filtration
- Easy access to clean & safe stairs
- Access to elevators
- Air purifiers
- Private outdoor space (e.g. personal balcony)
- Large living room
- Ample in-unit storage
- Additional basement storage units
- Built-in furniture (desks, table tops)
- Large windows
- Large interior common spaces (lobby, hallways)
- Touchless (building entrance/exit, elevators)
- Speech privacy in-unit
- Dedicated workspace in unit for WFH or remote school
- High-speed internet/WiFi
- Visual privacy in-unit
- Good temperature control (heating/cooling)

TOOL 04: FUTURE OF HOME SURVEY

This section will ask about communications, connectivity, and non-physical features of your building.

**Q14 How do you communicate with other residents in your building?
[Check all that apply]**

	Before COVID-19	During COVID-19	Your Preference in the Future	Never Used this Method
In-person Indoors: in the hallways or common spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In-person Indoors: visiting neighbors' homes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In-person Outdoors: sidewalk, common outdoor areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Posting on physical bulletin boards or walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal email/Text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building-wide email listserv or text group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do NOT communicate with other residents in my building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Effective communication with building residents became all the more important during the COVID-19 pandemic. Tailoring messaging according to tenants' preferred modes would likely improve tenant access—and adherence—to public health guidance.

Q15 How important are the following social aspects of your building?

	Very important	Somewhat important	Neutral	Somewhat unimportant	Very unimportant
Sense of pride in your building	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of community or friendship with neighbors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signs, posters, or other notifications about available resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Help with accessing local health and social services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of physical safety and security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Receiving regular information from building management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communal spaces that are kept clean and treated with respect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

TOOL 04: FUTURE OF HOME SURVEY

Q16 During the pandemic, please share how satisfied you were with the social aspects of your apartment?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Unsatisfied	Very Unsatisfied	Not Applicable
Sense of pride in your building	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of community or friendship with neighbors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signs, posters, or other notifications about available resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Help with accessing local health and social services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of physical safety and security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Receiving regular information from building management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communal spaces that are kept clean and treated with respect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Comparing respondents' selections here to those for the previous question may reveal ways the pandemic blocked a building's social benefits. Were developments able to continue meeting residents' social needs in a physically distanced capacity?

This section will ask you to consider how you may have adapted your home during the pandemic, for functionality, comfort, & safety.

Q17 During the pandemic, what physical changes did you make to keep your family safe and comfortable within your unit?

	Added	Removed	Moved Around	No Changes
Fans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Furniture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing furniture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Window screens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blinds or curtains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heating or cooling devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sound insulation to reduce noise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carpeting or rugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Portable air purifiers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lighting or lamps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TOOL 04: FUTURE OF HOME SURVEY

Q18 Please share any changes you made to the following spaces in your apartment/home during the pandemic.

Kitchen: _____

Bedroom: _____

Bathroom: _____

Living Room: _____

If hosting a focus group, this question can serve as a probing question to get more specific about changes to specific spaces not reflected in previous questions.

Q19 Which of these helped or supported your household to make those changes to your home during the pandemic?

- Increase in household size
- Decrease in household size
- COVID-19 illness within the household
- Building rules or restrictions
- Landlord or building staff availability or assistance
- None of these

Q20 How, if at all, did your household income impact the changes you made to your home during the pandemic?

- Loss of income during the pandemic limited the changes we were able to make to our home.
- Consistently low income (since even before the pandemic) limited the changes we were able to make to our home.
- Our income increased during the pandemic, which helped us make these changes to our home.
- Income did not impact the changes we made to our home.

We wanted to understand the factors influencing residents' health-promoting changes to their units. Even if a tenant wanted window screens installed, was building staff responsive to this request?

Q21 During the pandemic, did your behaviors change in any of the following ways?

	Yes	No	Not Applicable
Cleaning more often	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not allowing unknown guests in your home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limiting visitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changing the time you would do errands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check 'Not Applicable' for this question	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking the stairs instead of an elevator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

This response was included to improve survey quality and understand who was carefully completing the survey.

Q22 At any point during this school year, did children participate in school remotely in your home...

- Yes, they were participating in remote learning from home part-time or full-time.
- No, they attended school in-person or did not attend school.
- No, there were no children in my home during this school year.

If you selected, "Yes, they were participating in remote learning from home part-time or full-time," please continue the survey with Q23.

If you selected, "No," please move to Q24.

Q23 When these children participated in school remotely, where did they attend their virtual classes?

- Kitchen
- Bedroom
- Living Room
- Communal Spaces
- Other _____

TOOL 04: FUTURE OF HOME SURVEY

Q24 During the pandemic, did you work from home?

- Yes, I already worked from home pre-COVID
- Yes, most or all the time at home
- Sometimes, I regularly work in and outside the home
- No, I stopped working
- No, I had to report to work
- Other _____

**If you selected any of the following choices, please answer Q25-Q27:
“Yes, I already worked from home pre-COVID”
“Yes, most or all the time at home”
“Sometimes, I regularly work in and outside the home”
If you selected “No” or “Other,” please move to Q28.**

Q25 Which of the following settings do you work from? [Check all that apply]

- Dedicated room
- Room shared with adults
- Room shared with children/students
- Dedicated desk/table
- Desk/table shared with adults
- Desk/table shared with children/students
- Desk/table shared for other household activities
- Sofa/Couch/Recliner/Chair
- Bed
- Other _____

Q26 Did you make any modifications to your home to make it easier to work?

Q27 What were the biggest challenges working from home this past year?

[choose up to 5]

- Concentration
- Energy levels
- Physical activity/exercise
- Balancing non-work related commitments
- Proximity to other people
- Background noise
- Speech privacy
- Visual privacy
- Comfort (Thermal, air, humidity)
- Availability of workspace
- Ergonomics (Furniture, movement, standing)
- Daylight & Windows (Glare, sunshine, temperature)
- Electrical lighting (Visual acuity, brightness)
- Technology (Internet access)
- Storage
- Electrical outlets
- Size of workspace
- Other _____

Working and attending school remotely are likely to remain ways people use their homes. Knowing the current challenges can inform future design. In our study sample, we had a small number of individuals respond to this question. More data is needed - help us answer this question together!

TOOL 04: FUTURE OF HOME SURVEY

The following questions are going to ask about hallways, stairs, elevators and other common spaces that all building residents may use.

Q28 During the pandemic, please share how satisfied you were with the following aspects of your entire building?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Unsatisfied	Very Unsatisfied	Not Applicable
Access to Daylight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Noise Levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hallways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elevators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Laundry Room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trash Area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Additional Common Spaces (fitness, lounge, building kitchen)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mail room access & security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building Safety & Security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q29 During the pandemic, what measure made you feel or would have made you feel more comfortable or safe in your hallways? [Select all that apply]

- Communication or signs from management about cleaning practices
- Signs for social distancing and mask wearing
- Signs about COVID testing and other health resources
- Less people
- Artwork
- No dust or pests
- More open windows
- Hand railings
- Wider hallways for social distancing
- Other _____

Q30 Does your building have an elevator you can use?

- Yes
- No

If you selected “Yes,” please answer Q31 and Q32.

If you selected “No,” please move to Q33.

Q31 How nervous are you about getting into an elevator with other people?

- Not at all anxious
- A little anxious
- Moderately anxious
- Very anxious
- Extremely anxious

Q32 What would make you feel safer or more at ease taking the elevator?

TOOL 04: FUTURE OF HOME SURVEY

Q33 In your ideal building, what amenities would be most helpful to you?

[Select top 3 choices]

- Computer rooms
- Community gardens
- Community centers & play space
- Gym/Fitness facilities
- Laundry facilities
- Safe outdoor spaces
- On-site childcare
- On-site healthcare
- Other _____

We are almost done! The following questions will ask you about outdoor spaces, access to green space and transit.

Q34 Can you easily access the following within 10 minutes of where you live? [Check all that apply]

- Corner store or bodega
- Park or playground
- Large grocery store
- Public Transit
- Your job/place of employment
- Pharmacy
- Library
- Social services
- Hardware stores
- Medical care or clinics
- School
- Restaurant
- Coffee shop
- Other _____

We chose to ask whether respondents can “easily access” these services, as we recognize different modes of travel are “easy” for different people.

Q35 For you personally, how important is being outdoors or in nature?

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Before COVID	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During COVID	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After COVID	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q36 During the pandemic, did you use your building's outdoor spaces?

- Yes, I used it frequently
- Yes, I used it occasionally
- No, I never used it, but it was open
- No, it was closed and could not use it
- No, we do not have outdoor space in our building.

If you selected “No, we do not have outdoor space in our building,” please skip Q37.

If you selected any other answer choice, please continue with Q37.

TOOL 04: FUTURE OF HOME SURVEY

Q37 Please tell us more about your building's outdoor space...

[Check all that apply]

- Covered
- Uncovered
- Playground
- Play Fountains
- Seating/Benches
- Picnic Table
- Views of outdoors
- Plants or trees
- Wheelchair accessible
- Trash/Recycling
- On the roof/ roof deck
- Courtyard
- Ground Level
- Fenced/Protected

Q38 If you could design outdoor spaces for your building, what would you like to include that makes you feel happy, relaxed, and safe?

Examples: Covered shelter during rainy weather, more seating or tables, play equipment for kids, less blacktop to reduce heat, more plants

Especially after spending more than a year mostly indoors, we wanted to provide respondents' the opportunity to highlight the role of outdoor space in their life.

The next section is about your health and is completely optional. This information will not be shared with anyone in your building and the research team will not know your identity.

Q39 What features of your home are negatively influencing your daily health and comfort?

[Select all that apply]

- Outdoor Noise/Acoustics (traffic, aircraft, construction)
- Indoor Noise/Acoustics (mechanical equipment, neighbors)
- Indoor Air Quality (cleaners, disinfectants, odors)
- Artificial Lighting
- Dust/Pests/Allergens (cockroach, mouse, pet dander, dust)
- Ventilation (kitchen exhaust, bathroom exhaust, operable windows)
- Temperature/Humidity (fluctuations, controllability)
- Chemicals in your furniture
- Plants and views of outdoors
- Moisture (mold, mildew)
- Natural Light or Daylighting
- Safety and security (carbon monoxide monitors, adequate lighting, emergency egress, emergency plan, building security)
- Water quality (water filters, outdated plumbing)
- None of the above

Q40 At this moment, how would you rate the following aspects of your health?

	Excellent	Very Good	Good	Fair	Poor
Mental Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Happiness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social & Relationship Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

This survey was surely not the first time respondents thought about how their homes impact their health. We wanted to know what ways residents were noticing their surroundings impacting their health, to inform priorities for future design.

TOOL 04: FUTURE OF HOME SURVEY

Q41 How has the pandemic affected your health?

	A great deal better	Somewhat better	A little better	No change	A little worse	Somewhat worse	A great deal worse
Mental Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Happiness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social & Relationship Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q42 Most of this survey asked about you, personally, but we are also interested in understanding the experience of your entire household during COVID-19. Please select any of the following that are true of any member of your household (including you):

- At least one member of my household lost full or partial employment income during the pandemic.
- At least one member of my household became ill with COVID-19.
- At least one member of my household was or is employed as an essential worker (e.g., grocery store staff, medical staff, teacher).





Case Studies

The case studies serve as an opportunity to learn from everyday affordable housing projects. To pull out insights from the ongoing COVID-19 pandemic, we explore different settings that span the affordable housing spectrum. This includes factors such as the scale at which they supported local residents, building certification status, and the year they opened to residents. By talking to stakeholders with different lived experiences, each building illuminated unique affordable housing lessons and implications for future healthy design.

How to Use Our Case Studies

Get the Facts

Start with a basic overview of the building, which should include factors like age, certifications, recent renovations, and the amount of individual residential units.

Context Matters:

Dive deeper into the case study by using our “Project Summary.” This resource lays out additional history, context before and during the COVID-19 pandemic, and how it provides affordable housing to residents.

People-Centered Approach:

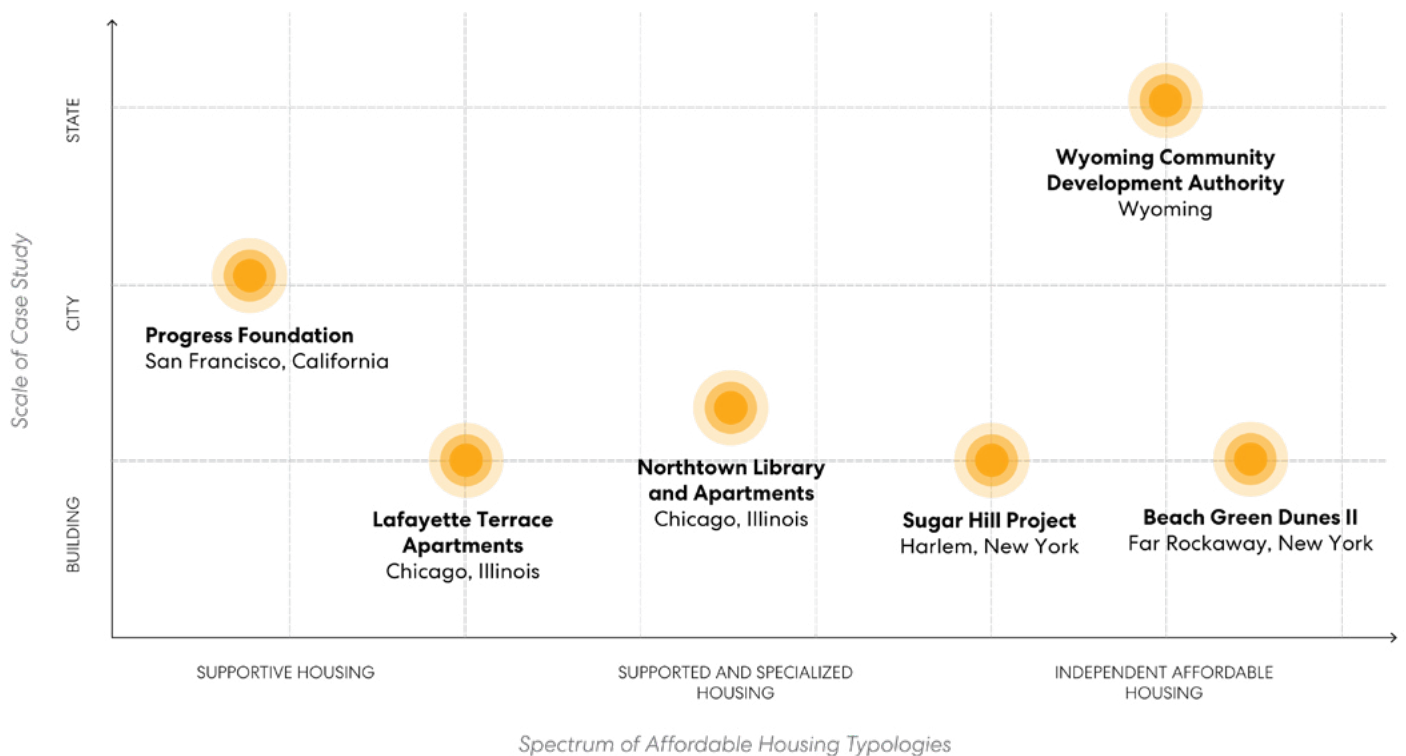
In “How We Engaged the Community,” we highlight the different strategies we used to engage key community stakeholders, which includes focus groups with residents, surveys, in-depth interviews with building staff, and management.

Guiding Principles in Action:

From our “Eight Guiding Principles,” we selected three for each project that we believe were in action in these case studies.

Lessons Learned:

Each case study highlights three to five “Healthy Lessons,” which grew out of our analysis of its successes and areas for growth in response to the COVID-19 pandemic. Each lesson informs how future affordable developments can promote residents’ health.



CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)

Wyoming Community Development Authority (WCDA)

LOCATION:

Wyoming

NO. OF UNITS:

WCDA funds seven to ten projects per year that average 24-30 units each

TYOLOGY:

Various affordable housing typologies including single-family residences and, small, mid, and large multi-family complexes

YEAR STARTED:

1975

MOST RECENT RENOVATION:

Stat here

GREEN CERTIFICATIONS EARNED:

Varies by project



The forward-thinking yet pragmatic Housing Finance Authority improves healthy and sustainable design across a wide range of affordable housing projects in the state of Wyoming. By simplifying funding resources for developers, applying an allocation planning process, and scoring matrix as mechanisms, the state’s leading resource for housing finance consistently supports residents and communities with each project it funds.

Why is WCDA important to this study?

One of the most challenging aspects of delivering affordable housing is the complicated financial processes. In order to become eligible and receive funds, projects are required to reach out to various sources such as Low-Income Housing Tax Credits (LIHTC), federal block grants (such as HOME Investment Partnerships Program or the Community Development Block Grant Program), and the National Housing Trust Fund (NHTF). State Housing Finance Authorities (HFA's) are a central part of collecting and dispersing funding and therefore well-positioned to facilitate the design and construction of healthy, sustainable, affordable housing.

WCDA is one of the few state Housing Finance Authorities (HFA's) that manages all of this in one place, thus simplifying the process for potential developers. In addition, WCDA leverages the project selection scoring criteria to promote health, well-being, and sustainability by increasing the point values for certain categories and subcategories. Incentivizing the selection process with healthy sustainable design leads to better buildings and better outcomes for the residents.

Fast Stats




- Wyoming has the second-lowest population density in the United States. Unlike typical urban centers such as New York and Chicago, which are extremely challenged to find parcels of land to affordably develop, Wyoming has a different set of challenges. In fact, one of the biggest obstacles is not the land, but that there is too much land. Often, affordable housing projects are challenged by the distance to amenities and social infrastructure. . Locating projects in specific and targeted locations is critical for Wyoming residents.
- State Housing Finance Authorities are at the center of delivering healthy, sustainable affordable housing in the United States. Each year, HFAs provide more than \$40 billion in Housing Credits, HOME Partnerships, Rental Assistance, and the Housing Trust Fund. These groups also focus on the most vulnerable populations struggling with housing through the Hardest Hit Fund (HHF) that provided almost \$9 billion in the third quarter of 2020 . These kind of efforts and other funds focus on emergency rental assistance, mortgage default assistance, borrowing and lending to people of color, low-income individuals and families, and COVID-19 relief options.

CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)



“We try to focus on items that will reduce long term operating costs for the project that will hopefully translate to a reduced cost of occupancy for the residents through a reduction in energy consumption.”

JOHN BATEY, DIRECTOR OF AFFORDABLE HOUSING DEVELOPMENT

GUIDING PRINCIPLE	RATIONALE
 <p data-bbox="147 747 386 768">INTEGRATES INTO COMMUNITY</p>	<ul data-bbox="496 491 1490 806" style="list-style-type: none"> • The WCDA uses existing frameworks to prioritize funding projects that benefit the broader community. For example, in the Method of Distribution for Community Development Block Grants (CDBG's), the WCDA documents directly reference the CDBG National Objectives which specifically includes "addressing urgent community development needs." • For HOME Investment Partnership Program (HOME) and National Housing Trust Fund (NHTF) projects to be selected for funding, they must be scored with a rigorous allocation criteria matrix. This matrix offers 265 of a possible 489 points for community and site related criteria including "housing need," "vacancy in community," "geographic distribution," "proximity to services," and "concentration of low-income housing."
 <p data-bbox="123 1083 412 1104">REDUCES ENVIRONMENTAL EXPOSURE</p>	<ul data-bbox="496 896 1490 1127" style="list-style-type: none"> • In the method of distribution documentation for CDBG funding, the WCDA states that all projects must meet one of the three criteria: (1) benefitting low-income people, (2) reducing blight, and (2) addressing urgent community needs. Within the subjects of blight and urgent community needs, detailed language is included to address "physical decay or environmental contamination," and projects must perform remediation of these attributes. Furthermore, in the "urgent needs" description, it states that projects must address any "existing conditions [that] pose a serious and immediate threat to the health or welfare of the community."
 <p data-bbox="144 1367 391 1388">PRIORITIZES ENERGY EFFICIENCY</p>	<ul data-bbox="496 1165 1471 1430" style="list-style-type: none"> • The WCDA allocation criteria for rental project selection under HOME, NHTF, and TCAP funding lists "Quality of Construction" as the second-largest individual points total (behind "need"). This category is described as "Construction/ Energy Efficiency Standards Exceeded" and is worth 65 points. It lists a specific breakdown of points for certifications, Energy Star appliances, efficiency windows, lighting, envelope, and passive strategies such as ceiling fans. For home ownership projects, "Quality of Construction" is the single-highest value category. There is a clear emphasis to project developers that there is both a financial value and a health and wellness benefit in sustainable design practices.

Community Engagement Approach

- 89 WCDA residents responded to Future of Home Survey
- Interviewed Director of Housing and Neighborhood Development

CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)

Healthy Lesson 1

Financing process, protocols, and safety nets must be flexible and adaptable to support those in need during challenging times.

The COVID-19 challenges Wyoming faced in 2020 were widespread and far-reaching —affecting folks mentally, emotionally, and physically. According to statewide surveys, by May of 2020, approximately 60% of the state’s population either lost a job, had an immediate family member lose one, experienced reduced hours, or a pay cut. This led to almost 80% of the population struggling with either food or basic household item insecurity and 70% worried about their personal finances. Of the people who filled out the Future of Home Survey as part of this research project, 75% make less than \$35,000 per year, 25% had a household member become ill from COVID-19, 33% had someone in their household lose their job, and nearly 50% were essential workers facing the perils and unknowns of how COVID-19 spread. These are staggering numbers showing how traumatizing the ongoing COVID-19 pandemics and how delicate people’s lives are when hit with shocks and stressors.

There will be other disasters, challenges, and health crises in the future, and we know that the most vulnerable populations will be most affected. When these challenges arise, the support mechanisms often take time to put in place, leaving people in precarious positions in terms of paying rent and mortgages, and putting food on the table. Trusted organizations such as WCDA help people in need, keeping them in their homes, and providing resources and information to ease their struggles. Strengthened by the understanding of their community and putting people at the core of their mission is critical to keeping people from experiencing homelessness and further at risk.

Implications for Future Healthy Design

- Non-profit, independent and self-supporting financial organizations such as WCDA that facilitate funding for affordable housing must be valued by our government and private institutions. Even more, external forces can undermine their ability to function efficiently and stay solvent. Without them, low-income and vulnerable populations could lose. These organizations are not only a financial pipeline to support low-income and vulnerable populations, but a lifeline for many when a crisis hits. They are a source of stability and calm at a time when panic is common. Furthermore, due to their very nature of creating strong local and community relationships, these organizations should be seen as the first line of support when a crisis hits and, when the next crises hits, should be included in the planning.



CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)

Healthy Lesson 2

The affordable housing market is a relatively reliable and long-term investment opportunity that allows developers to consider more communally structured and longer-term payback sustainable practices.

Almost all affordable housing projects leverage government incentives and tax credits (LIHTC, HOME, CDBG's, for example). This can be perceived as a challenge for investors who must (1) understand all the nuances of the process and (2) plan for an initial investment that will likely take 5 to 30 years to recoup. But the framework and timeline to deliver these projects is a benefit that can lead to real improvements in healthy and sustainable building practices.

According to Harvard's Joint Center for Housing Studies, market rate housing vacancy increased substantially to around 10% in 2020 while moderate and lower priced housing remained relatively stable. This highlights the fact that the need for affordable housing is more resilient to shocks and stressors than the more volatile categories of market rate and luxury housing. This level of predictability, coupled with the longer-term framework of incentivized paybacks and tax credits, allows developers to consider implementing sometimes costly and often slower payback energy efficiency measures such as geothermal wells, solar thermal, and solar arrays.

The average payback for a mid-sized commercial solar installation in Wyoming is 10-15 years. Payback on geothermal systems ranges widely and depends on many factors, but studies have shown that the average US household would reduce energy consumption by 30-70% and that the life of the system is longer than that of traditional heating and cooling systems. These kinds of savings can be rolled into the cost of the initial investment and can also provide savings back to the residents. John Batey, Director of Affordable Housing Development for WCDA highlights this opportunity: "We try to focus on items that will reduce long term operating costs for the project that will hopefully translate to a reduced cost of occupancy for the residents through a reduction in energy consumption."

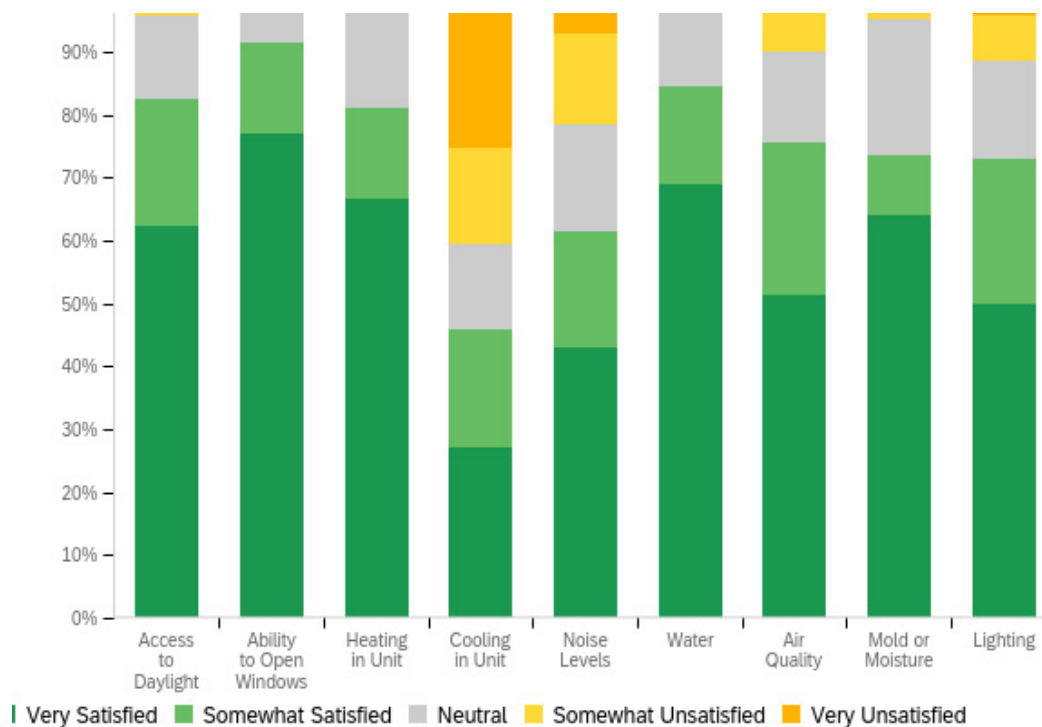
For affordable housing developments, scaling up the size and/ or combining systems can reduce the cost per unit of installation and operation. In the state of Massachusetts, for example, the relatively new SMART program seeks to specifically incentivize low-income customers with improved energy costs and better loan rates.

Implications for Future Healthy Design

- Design teams, developers, and stakeholders should explore opportunities and incentives for longer-term payback design elements such as energy efficient systems, energy generation, and super insulated building envelope. This process should take place early in the planning process for a project.
- Housing Finance Authorities and investment institutions should incentivize energy efficiency and enhancement measures on projects. Lessons learned from previous successes in implementation should be shared with future project stakeholders.

CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)

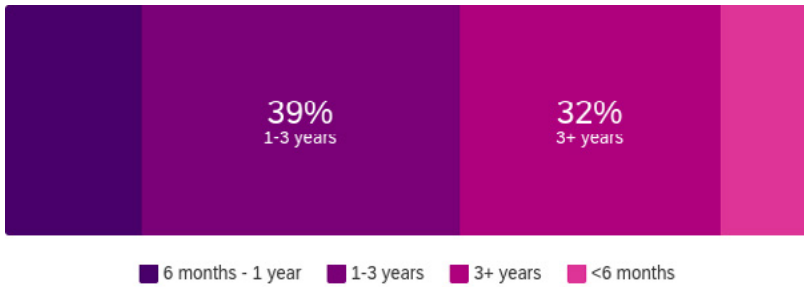
Future of Home Survey Results



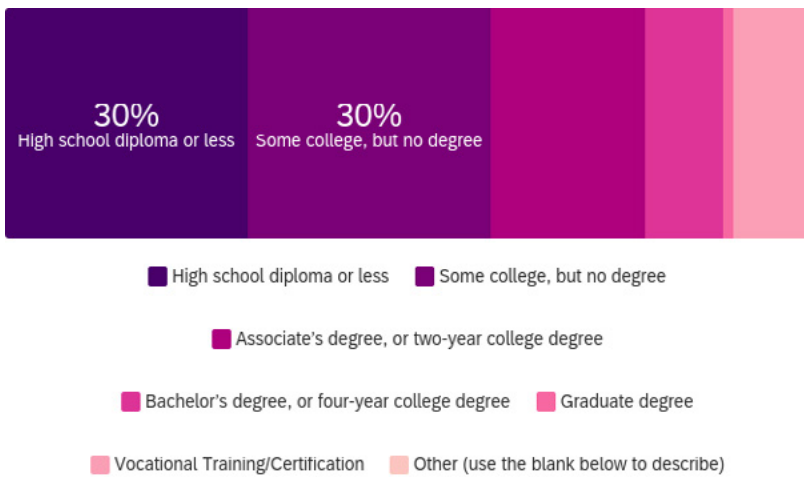
During the pandemic, please share how satisfied you were with the following aspects of your personal apartment/home?

Survey respondents were most satisfied (>80% either “Very Satisfied” or “Somewhat Satisfied”) with their ability to open windows, water quality, access to daylight, and heating in unit. However, 37% of respondents were either very unsatisfied or somewhat unsatisfied with cooling units, while 21% were either very unsatisfied or somewhat unsatisfied with the noise levels in their home.

Time in Current Residence



Educational Attainment



Survey Stats

- 81 Survey Responses
- 33% of participants' family members lost full or partial employment income during the pandemic.
- 22% reported at least one member of my household became ill with COVID-19.
- 46% said at least one member of my household was or is employed as an essential worker (e.g., grocery store staff, medical staff, teacher).
- 54% of respondents may be categorized as millennials (25-44 years old) (Dimock, 2019)
- Survey respondents were educationally diverse and predominately low-income (76%) (less than \$35,000 annually), female (76%) and White/Caucasian (72%) respondents.
- 52% of households had three or more bedrooms, and only 8% had one bedroom.
- 53% were required to physically go to their workplace and did not work from home.

CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)

Additional physical features that made respondents feel safer, happier, or more comfortable during the pandemic:

- Washer/dryer in unit, or the hook-up to install one.
- Reliable internet
- Plenty of windows and natural sunlight
- Private balcony or privacy fences for backyards
- Easy-to-open windows
- Ceiling fans

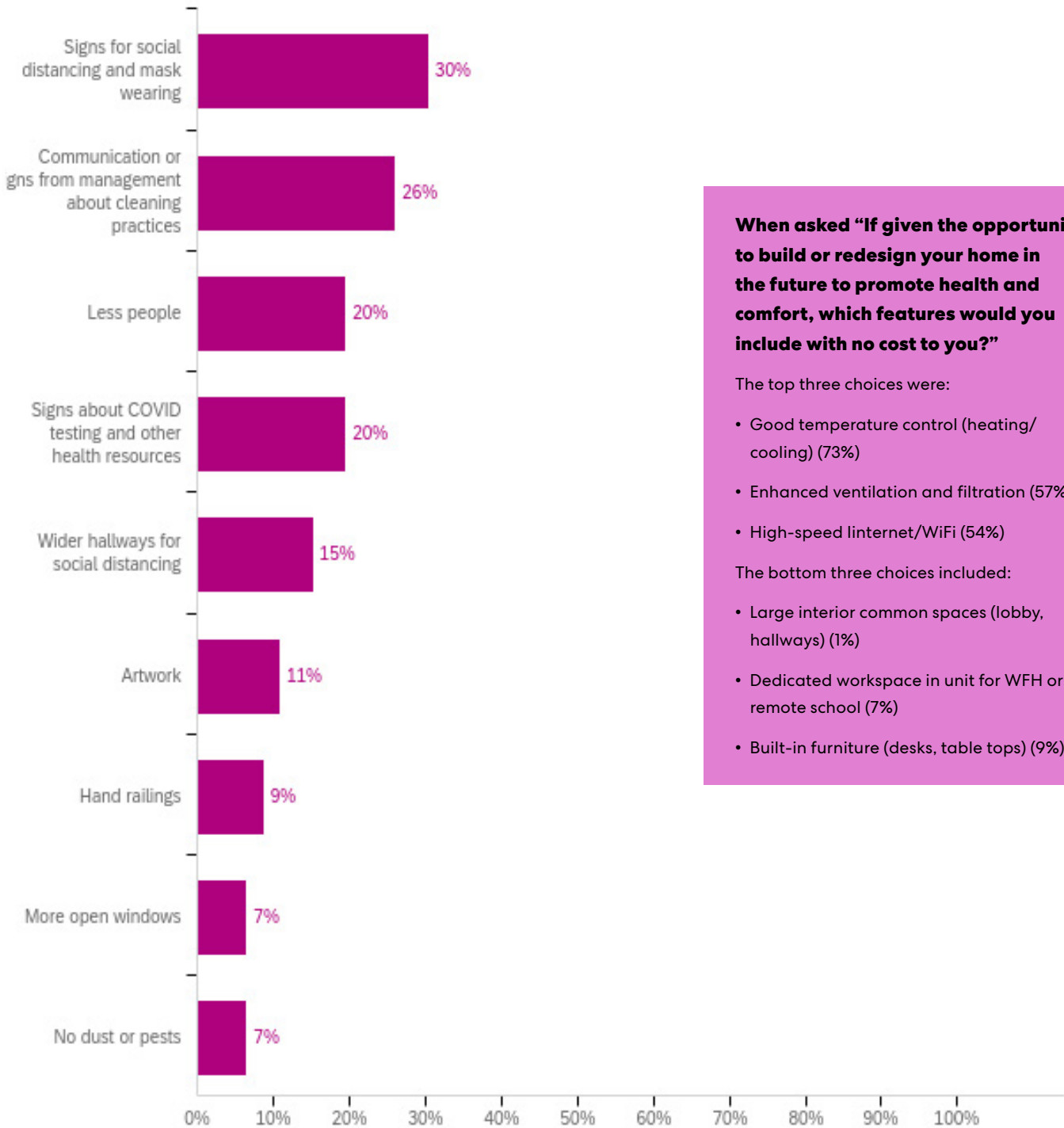
Physical changes added to their homes during the pandemic:

- Fans (47%)
- Heating/cooling devices (42%)
- Lighting or lamps (34%)
- Plants (31%)

WFH

For the small subset of residents (n=9) who could work from home (WFH), there was variation where they could work. Spaces included a desk or table shared with other activities; sofa, couch, recliner, or chair; or a dedicated room. The top WFH challenges when working from home included thermal comfort (46%), background noise (44%), concentration (33%), daylight and windows (glare, sunshine, temperature) (33%), energy levels (33%), and balancing non-work commitments (33%).

During the pandemic, what measure made you feel or would have made you feel more comfortable or safe in your hallways? [Select all that apply]



When asked “If given the opportunity to build or redesign your home in the future to promote health and comfort, which features would you include with no cost to you?”

The top three choices were:

- Good temperature control (heating/cooling) (73%)
- Enhanced ventilation and filtration (57%)
- High-speed internet/WiFi (54%)

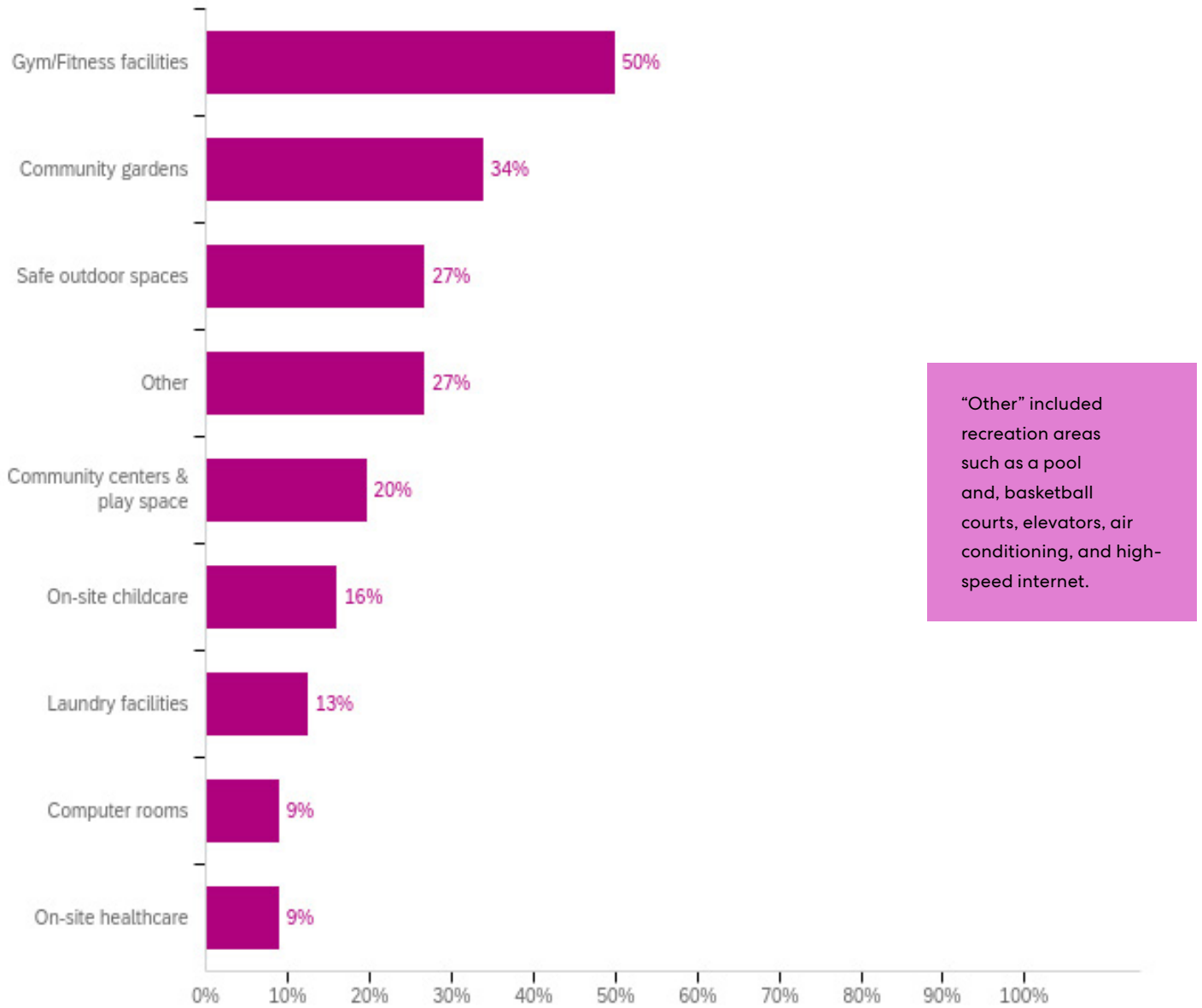
The bottom three choices included:

- Large interior common spaces (lobby, hallways) (1%)
- Dedicated workspace in unit for WFH or remote school (7%)
- Built-in furniture (desks, table tops) (9%)

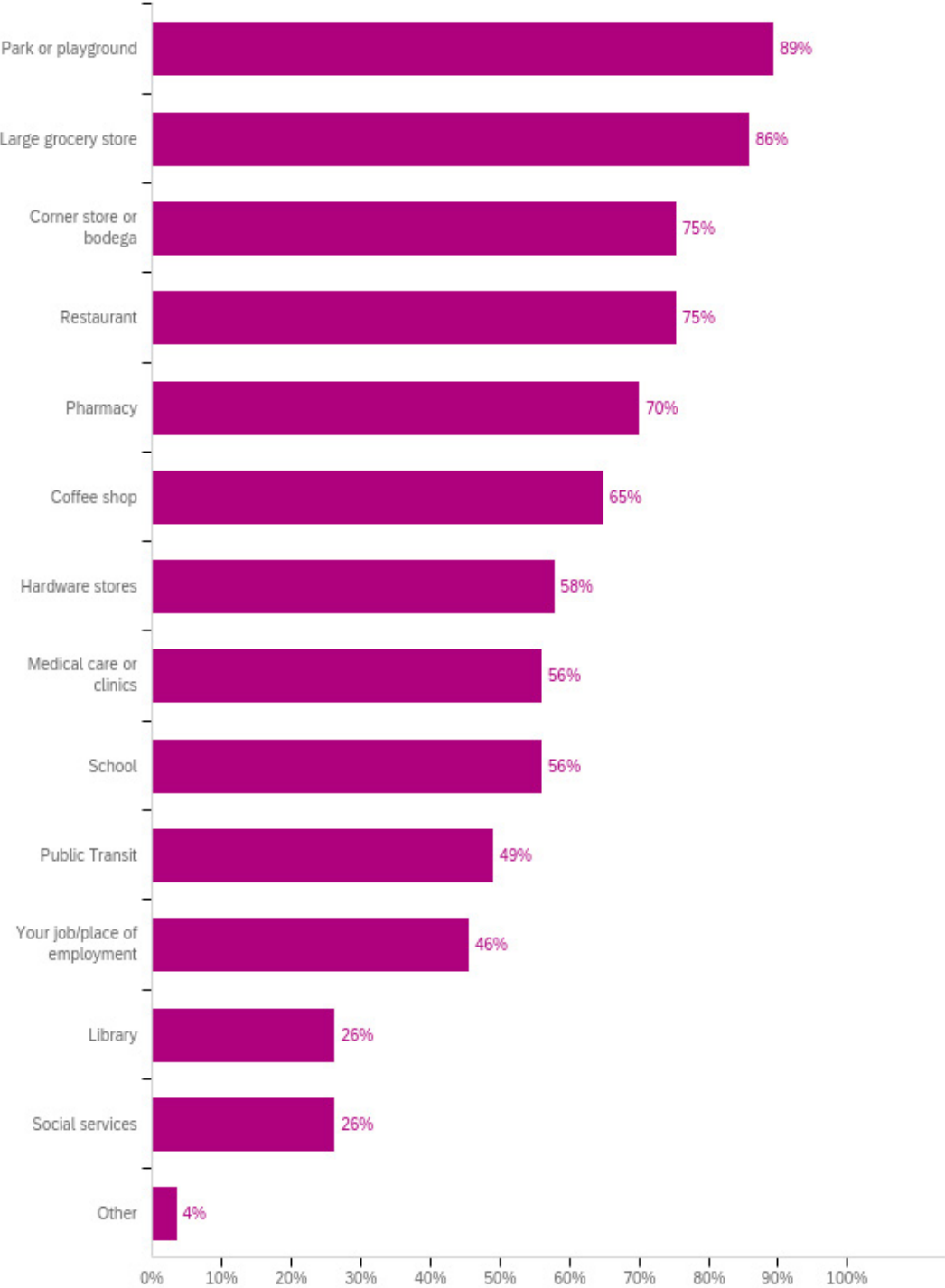
CASE STUDY: WYOMING COMMUNITY DEVELOPMENT AUTHORITY (WCDA)

In your ideal building, what amenities would be most helpful to you?

[Select top three choices]



**Can you easily access the following within 10 minutes of where you live?
[Check all that apply]**



CASE STUDY: PROGRESS FOUNDATION

Progress Foundation

LOCATION:

San Francisco, California

NO. OF UNITS:

6 Crisis Residential Treatment Programs,
9 Transitional Residential Treatment Programs

TPOLOGY:

Supportive Housing, Transitional Housing

YEAR BUILT:

First project established in 1969

GREEN CERTIFICATIONS EARNED:

None



Progress Foundation is a private, non-profit mental health agency operating in the San Francisco Bay Area. The agency consists of one emergency clinic, six Crisis Residential Treatment Programs providing short-term stays, and nine Transition Residential Treatment Programs for long-term stays. The typical client experiences symptoms of acute mental illness and other co-occurring disorders.

Fast Stats

- During the height of the COVID-19 pandemic, the Progress Foundation successfully kept all residents safe from contracting the contagion.
- Shelter-in-place policies enacted to slow the spread of COVID-19 indirectly led to social isolation among vulnerable populations. As a result, more people died of opioid overdoses because they were not around people who could have helped them. Social isolation within hotels designated for people experiencing homelessness to shelter in place led to an increase in individual drug use and abuse of more potent opioids such as Fentanyl. (Source [1](#) and [2](#))
- Between the eight months before and after the March 17, 2020 shelter in place order, San Francisco saw a 50% increase in fatal overdoses ([Appa et al., 2021](#)).




Founded in 1969, the organization provides mental health and addiction treatment services based on the Social Rehabilitation model, which prioritizes community, belonging, and client agency to accomplish healing in residential settings. As such, the agency overcame unique challenges during the onslaught of the COVID-19 pandemic and adapted to continue providing services and keeping residents safe.

One tragic aspect among many is the staggering increase in opioid-related overdose deaths in unhoused and marginally housed communities. An ironic twist of social isolation policies that protect people from contracting COVID-19 actually increased the risk of accidental overdose. People are more vulnerable to dying when using opioids alone rather than in the company of others, where signs of overdose could be monitored and responded to. People in isolated settings, already suffering from the loneliness and stigma of mental health struggles, are vulnerable to using more potent forms of opioids. In 2020, according to data from the office of the Chief Medical Examiner, the number of opioid-related overdose deaths in the Bay Area greatly surpassed the number of deaths from COVID-19.

Progress Foundation adapted their interiors and programmatic use of space to combat both the direct threat of COVID-19 contagion and the indirect but equally devastating effects of social isolation. For this case study, we spoke with Executive Director Steve Fields and Assistant Director of Clinical Services Kimberly Taylor, about pandemic-related policy changes and the importance of design for future residential treatment programs strengthened by resiliency.

CASE STUDY: PROGRESS FOUNDATION



GUIDING PRINCIPLE	RATIONALE
 <p>PROMOTES BELONGING AND ACCEPTANCE</p>	<ul style="list-style-type: none"> • Safety protocols enacted during the pandemic emphasize open communication and mutual responsibility. • Method of treatment reduces social isolation through communal activities such as wellness walks, group activities, and communal meal preparation.
 <p>INTEGRATES INTO COMMUNITY</p>	<ul style="list-style-type: none"> • Site selection criteria for new residential treatments programs prioritizes well-connected, urban areas within a 10-minute walking distance to transit. Residents need to be able to get to appointments via public transportation. • Residential treatment facilities blend seamlessly into the neighborhood. The majority of Progress Foundation residential treatment programs are located in rehabilitated large single-family homes that have been converted to accommodate congregate housing. • When opening a new residential treatment program, Progress Foundation leadership conducts several community outreach meetings during the property acquisition and planning period to inform and educate local residents.
 <p>REINFORCES RESILIENCE</p>	<ul style="list-style-type: none"> • Progress Foundation pairs housing needs with community mental health treatment. Each house utilizes acute diversion as a transition strategy to get people into permanent housing when available. • Effective policies are enforced such as COVID-19 testing, mask requirements, hand washing and social distancing to minimize spread.

Community Engagement Approach

- Interviews with Progress Foundation Leadership

CASE STUDY: PROGRESS FOUNDATION

Healthy Lesson 1

Prioritize common spaces that can maintain community togetherness while adhering to COVID-19 protocols.

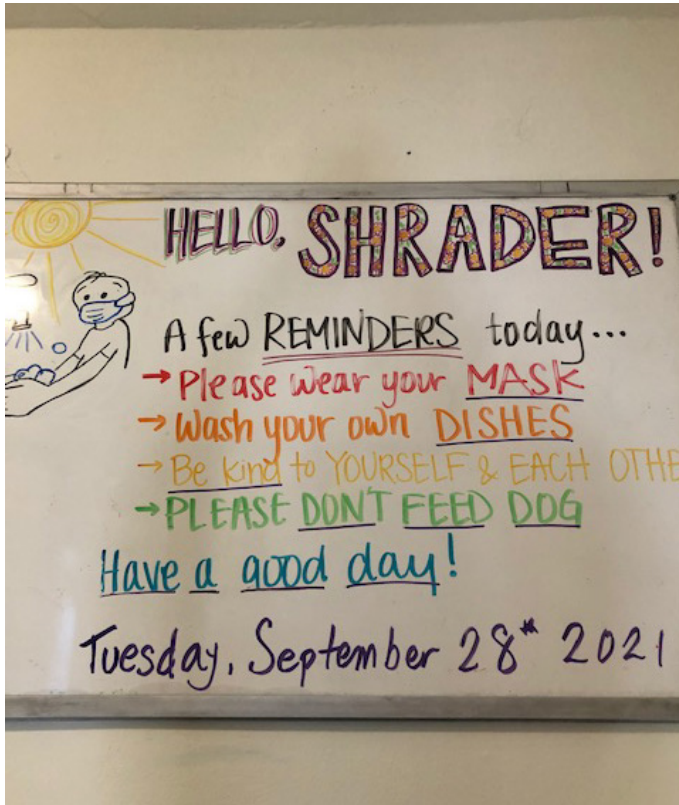
Physical Distancing, Not Social Distancing

Progress Foundation's residential facilities offer shared bedrooms, making the need for ample communal spaces outside the bedroom critical. Common spaces are designated where residents can connect with their community members, attend groups, and have opportunities to work through treatment programs with staff, while remaining physically distanced. These same areas are used for respite and reflection at different times of the day.

- Incoming residents are tested for COVID-19 and introduced to community life in the house after a period of observation for symptoms.
- In lieu of large house-wide communal dinners, each floor is assigned cooking and eating times in the communal kitchen. This created a COVID-19 "bubble" that reduced risk of transmission while still allowing for necessary social interactions.
- The communal spaces were kept open with consistent messaging and protocols to minimize spread, including COVID-19 testing for new residents, mask requirements, handwashing education, and social distancing.
- Programs placed emphasis on outdoor house events like wellness walks, park visits, and shopping trips were organized by floor to minimize contagion risk.

Implications for Future Healthy Design

- Make the communal kitchen the largest room in the house and the primary social area where everyone can comfortably cook and meal prep together. A lot of life in a treatment program happens in the kitchen.
- Create multiple common living areas — e.g., a more social TV room and a quiet room that provides residents space to themselves.
- Living areas (both indoor and outdoor) should be connected to the kitchen, allowing for additional space where people can congregate while still being socially distant.
- Install operable windows for proper ventilation and natural light for the kitchen and living areas.



CASE STUDY: PROGRESS FOUNDATION

Healthy Lesson 2

Integrate residential treatment programs into well-connected, amenity rich neighborhoods.

Resilience through Site

The vitality of a neighborhood is critical to site selection for future residential treatment programs. During the pandemic, well-connected, walkable, amenity-rich neighborhoods contributed to the health, well-being, and resilience of Progress Foundation residents who do not have a private vehicle.

- Most residents are reliant on public transit to get to appointments, including outpatient treatment.
- When expanding into Marin County, several potential locations were ruled out of contention, due to being too remote for residents. Unlike compact San Francisco, the social services and everyday amenities in this county are more dispersed. It was critical to remain in the heart of San Rafael, the main city and county seat, to set residents up for success.
- Neighbors' prejudice towards and stigmatization of people living with a mental illness can be a major barrier.

Implications for Future Healthy Design

- Locate residential treatment programs in established residential neighborhoods. By retrofitting large single-family homes or lower density multi-family complexes, you enable these programs to seamlessly blend into the neighborhood — a house like any other.
- Look for larger homes that can be internally converted to house around 10 people, including staff facilities, without overcrowding.
- Site housing within a 10-minute walking distance from a frequent transit line.



Spotlight on Avenues

Avenues is an acute diversion unit located in San Francisco's Sunset area. Its purpose is to provide mental health stabilization, an alternative to hospitalization for single adults in crisis. Built as a handicap-accessible program, it has seven bedrooms, a large kitchen, and ample community space to encourage social interaction and reduce isolation. The average length of stay for residents is two weeks.

- Progress Foundation acquired the property while it was undergoing a major conversion, originally planned for three market-rate apartments. The interiors of the project were already completely gutted, which provided an opportunity for Progress Foundation to transform the interior layout to best fit the needs of the program.
- Avenues was the first accessible crisis residential program within the Progress Foundation portfolio. The non-profit was able to put in a two-story elevator for people with limited mobility at a lower cost.
- The individual in-unit kitchens were removed, allowing for larger bedrooms and larger, more comfortable communal spaces on each floor.
- The common kitchen was enlarged and designed to serve as social hub for all residents.



- Community Outreach: There was community push back on opening the program at this location.
 - Clear Steps for Effective Community Acceptance Strategy:
 - › **Start at the top.** Reach out to the Board of Supervisors who represents the district and tell them what you are going to do ahead of time, and explain the program to them. Also, engage the planning commission and let them know that there will be community opposition.
 - › **Get control of the property before you have the first community meeting.** Acquire your agreement to purchase before telling the neighborhood.
 - › **Start the conversation with the community early.**
 - › **Tell the truth.** When in a community meeting, don't obfuscate and avoid making it sound worse than it is. This helps gain trust among your neighbors. While you won't be able to change peoples' minds, being transparent helps to alleviate concerns.
 - › **You have the law on your side.** Live up to the agreements that you have set. Be respectful of your neighbors.
 - Avenue's neighbors sued the City and County of San Francisco to overturn their conditional use permit. The court's ruling affirmed the right of residential treatment programs of 20 people or less in any neighborhood to be considered a residential use of property.

CASE STUDY: PROGRESS FOUNDATION

Healthy Lesson 3

Create interior spaces that exude a sense of calm, support, and home.

This Is Your Home

- Interior spaces need to counteract the feeling of institutional living, especially for people who are experiencing an acute mental health crisis.
- Progress Foundation advocated for longer stays for residents in short-term treatment programs.
 - The pandemic allowed Progress Foundation to push back on artificial time limits for how long a resident could stay in the residential facility to maximize the use of beds.
 - “County leadership is more open to allowing for residents to stay beyond a typical 90-day program and extend to upwards of six months. This is one of the good things that can come out of the pandemic. We have seen stability for clients that have been allowed to extend their stay due to COVID-19 and better prepare them for successfully leaving the facilities.”
 - Steve Fields

Implications for Future Healthy Design

- Durability of carpeting and furnishings is critical but buying all new stuff can make the house feel sterile and inhospitable.
- Take advantage of used furniture stores; this can help make the environment feel more human-scaled. “No two dining room chairs can match.” The funkiness of the furniture is part of the charm and the familiarity of the space.



“A client experiencing a crisis should be able to walk into the house and sit in the living room and feel better already.”

STEVE FIELDS, EXECUTIVE DIRECTOR OF PROGRESS FOUNDATION



CASE STUDY: LAFAYETTE TERRACE APARTMENTS

Lafayette Terrace Apartments

LOCATION:

Chicago, Illinois

YEAR BUILT:

1983

NO. OF UNITS:

94

MOST RECENT RENOVATION:

2015

TYOLOGY:

Family, Senior Housing

GREEN CERTIFICATIONS EARNED:

None



*All images acquired
from [POAH website](#).*

Lafayette Terrace Apartments supports a wide range of individuals, from seniors and those with disabilities to families with young children. Close relationships between residents and management provide the inclusion of necessary accessibility accommodations, all in affordable living.

Lafayette Terrace Apartments houses residents from different socioeconomic backgrounds. For this case study, we focused on the 52-unit mid-rise apartment building for older adults and persons with disabilities. During the pandemic, residents from ages 69 to 86 who participated in the focus group shared that they filled their days with cooking, using their stationary bike during “Price is Right,” gardening inside and outside, watching TV, visiting their doctor, and talking to neighbors outside the building. They spent their time inside for most of the year due to the pandemic but took comfort in talking on the phone with family and friends, doing crosswords, puzzles, and shopping online.

The property is nestled between the Englewood and Greater Grand Crossing neighborhoods. Occupants have access to grocery stores, casual dining, transit, and other amenities. Lafayette Terrace underwent a nearly \$7 million makeover in 2015 funded by Low-Income Housing Tax Credits (LIHTC) and gap-filling funds from Illinois Housing Development Authority (POAH, 2021). Preservation of Affordable Housing (POAH), a national non-profit organization, renovated the building with energy efficiency upgrades, a new roof, improved windows, kitchens, baths, and common areas (MKC Communications, 2015).

Lafayette Terrace actively engages its residents with a Resident Services Coordinator who works on-site throughout the week and makes sure that seniors receive meals, stay physically and mentally healthy and safe, and socialize with peers. Prior to the pandemic, the community room acted as a social hub, hosting numerous events and activities. COVID-19 forced the building to adapt to protect one of the most vulnerable populations during the pandemic: the elderly.

Fast Stats




- According to the CDC, “An analysis of more than 114,000 COVID-19 associated deaths during May – August 2020, found that 78% of the people who died were aged 65 and older, 53% were male; 51% were White, 24% were Hispanic, and nearly 19% were Black.” (CDC, 2021)
- The senior population of Lafayette Terrace were among the most vulnerable during the height of the pandemic.

CASE STUDY: LAFAYETTE TERRACE APARTMENTS



How We Engage the Community

- Paper survey for seniors who may not have email, smart phones, or computers.
- Focus Group with senior residents (69-86 years old)
- Interview with Property Manager

GUIDING PRINCIPLE	RATIONALE
 <p>PROMOTES BELONGING AND ACCEPTANCE</p>	<ul style="list-style-type: none"> Each floor of the building has a “Floor Captain” that checks in on residents and supports them with weekly needs (e.g., groceries). Residents have access to outside communal space where they can garden and take ownership for their building.
 <p>INTEGRATES INTO COMMUNITY</p>	<ul style="list-style-type: none"> Nearby grocery stores, farmers markets, dining, and subway stations offer residents amenities. Lafayette Terrace has been a part of the community for nearly 40 years. To bridge accessibility challenges, a collaboration formed with a private transportation service that rented out vehicles for residents to travel. Also, delivery services for groceries and medications came directly to the building’s lobby.
 <p>REINFORCES RESILIENCE</p>	<ul style="list-style-type: none"> On-site service coordinator provides additional support to residents for income loss, food, and eviction prevention through trusted relationships with community members. They also tailor programming and on-site services to senior residents.



CASE STUDY: LAFAYETTE TERRACE APARTMENTS

Healthy Lesson 1

Support intimacy and human connection in common areas.

Senior housing became a major concern as COVID-19 hospitalization and mortality rates ranked the highest among older adults. The number of households headed by people over the age of 65 is growing faster than that of any other age group; a million such households were added each year between 2014 and 2019 (JCHS, 2020). It is estimated that 26% of Americans over the age of 65 live alone, which can lead to social isolation in the absence of family or friends (APA, 2016).

During the height of the pandemic, the building's management removed the seating near the elevators due to concerns of fomite/surface transmission. Although this action reflected the scientific understanding at the time, this removed a place for seniors to socialize in the hallways, rest, and/or stably wait for the elevator. Laundry rooms remained open and had enough room for circulation and social distancing. Large windows provide natural lighting and support impromptu social interactions for seniors who may have otherwise remained socially isolated. Counseling services as well as close relationships between staff and the residents allowed for clear communication and mental support during the isolating periods of the pandemic. During our focus group, we found that seniors continued to flirt with other residents and seek out intimate relationships. Participants shared their desire to have overnight guests, get remarried, and enjoy the company of others.

Implications for Future Healthy Design

- Residents' suggestions included:
 - Increasing opportunities to walk around the building safely
 - Provide chairs in the hallway six feet apart for socializing safely
 - Provide opportunities outside of the gym for physical activity
- Larger hallways for safe social distancing and seating.
- Flexible, non-porous furniture in common areas that is easy to clean and move.
- Place doors across from each other so residents can open doors and safely socialize from the comfort of their homes.



Photo Credit:
Annette Jones

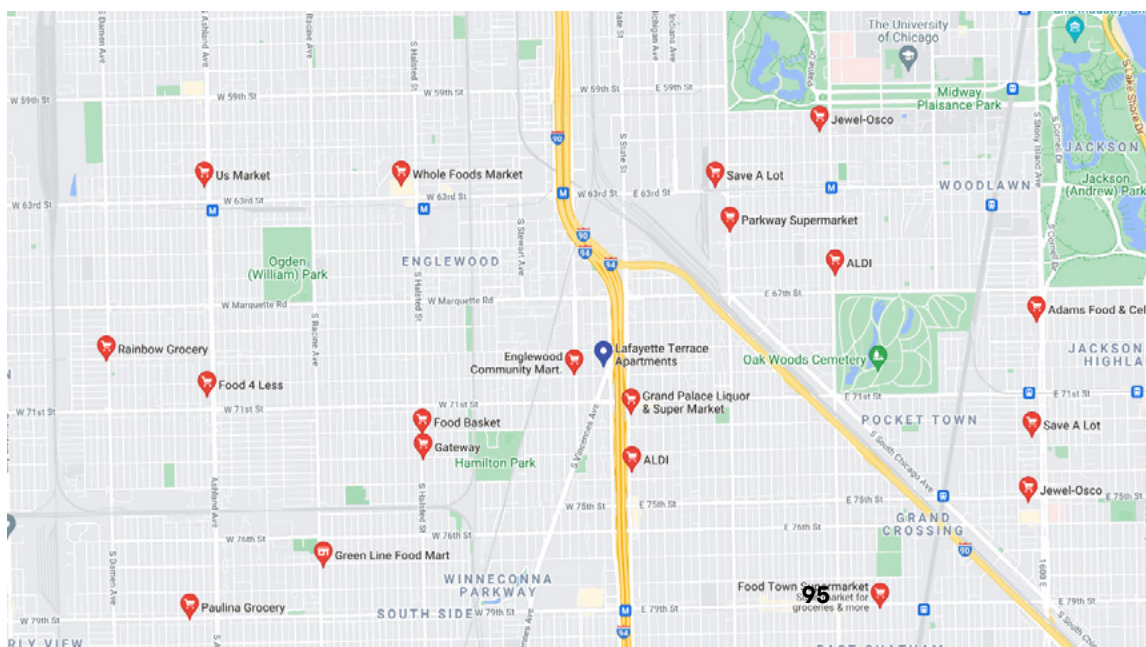
Healthy Lesson 2

Create a tailored communication strategy that supports residents with different levels of education and comprehension and responds to specific individual needs.

In Lafayette Terrace, the educational attainment ranges from individuals who did not complete high school to those with doctoral degrees. Ongoing in-person, confidential communication with residents created a sense of trust among residents that helps maintain the building's rules and regulations. Listening to residents also helped Lafayette Terrace staff to respond to specific needs including food, meals on wheels deliveries, and after-school services for kids. The property management and community impact coordinator's offices are on either side of the main entrance so they can connect with residents as they enter or leave the building. For example, all residents could acquire a mask from the front desk if needed. Residents were put on a payment plan if they were unable to pay full rent price (through POAH and the City of Chicago) due to employment loss during the pandemic.

Implications for Future Healthy Design

- Place services and offices near the building entrance to encourage communication with residents and staff.
- Provide opportunities along each floor and in common areas for written and visual communication (e.g. bulletin boards, tackable wall covering).



Location of nearby grocery stores, Google Maps 2021

CASE STUDY: LAFAYETTE TERRACE APARTMENTS

Healthy Lesson 3

Allow outdoor spaces to be enjoyed and maintained by the residents.

Studies show that elderly adults who spend more time outdoors and pursue physical activities experience improved mental health and sleep quality as well as fewer depressive symptoms (Pasanen, Tyrvaïnen & Korpela, 2014). When interior common spaces (e.g. TV room, community room) closed due to COVID-19, Lafayette Terrace residents could still connect with their neighbors outdoors. One notable feature is Lafayette Terrace's surrounding greenspace, despite being located by a major highway that may expose residents to air and noise pollution.

According to the Future of Home Survey results, the most common form of communication pre-COVID, during COVID, and their preference in the future was "In-person Outdoors", specifically the ability to chat in-person on the sidewalk or in common outdoor spaces. They do not rely on building-wide listservs or group texts that may be common in buildings with younger residents. Similarly, during the focus group residents shared the importance of outdoor space during the pandemic.

"When you enter this facility, I started planting flowers outside...people can smell the relationship, and...the contentment. And if they see anyone sitting outside, they will say, "good morning, how are you?" and they return "I'm fine, yourself" and when they come into the facility, they see it is very comfortable." – Focus Group Participant

For those who felt safe leaving their unit, the outdoor garden space provided an opportunity for physical activity and to engage with others during the pandemic. It created an opportunity for ownership, pride, and building beautification for residents.

Implications for Future Healthy Design

- Residents' suggestions via survey and focus group:
 - Increase shady places with more seating options and benches under trees
 - Provide a canopy for residents to use outdoor space during the winter
 - Increase security near the outdoor seating and tables area to increase residents' and property safety
 - More vegetation around the grounds
 - Screened-in gazebo
 - Barbeque grills that could be used by residents
- Provide electrical outlets outside to support outdoor activities and events that cannot happen indoors (e.g. socially distanced bingo).
- Provide additional seating for rest that is easy to sit and get up without assistance.
- Include easy to maintain sidewalks void of tripping hazards (e.g., cracks, fallen leaves, obstacles).



Photo Credit:
Annette Jones

CASE STUDY: LAFAYETTE TERRACE APARTMENTS

Healthy Lesson 4

Create a safe, inviting lobby for transportation and deliveries.

Through disinvestment and white flight, Chicago's Englewood neighborhood, where Lafayette Terrace Apartments is located, continues to experience high crime rates, underperforming schools, and high unemployment (LISC, 2017). According to the CDC Places Database, nearly one in five adults over the age of 18 experienced poor mental health for two or more weeks in 2018. These existing social and safety conditions have led residents in the focus group to worry about neighborhood security. Residents said unknown people may enter the building behind them and loiter in the building without having a specific resident to visit. Also, flowers planted, watered, and maintained by the residents at the main entry have been stolen in the past.

During COVID-19, Lafayette Terrace had an increase in deliveries including online shopping, meal and grocery delivery, medication, and general mail. If during business hours, packages could be dropped at the front desk and residents could be called to come and collect their mail.

Implications for Future Healthy Design

- Residents' suggestions included: connecting the intercom system to their television to see who they were letting into the building, doors that do not stay open so long

Support physical distancing, not social distancing.

By making flexible common spaces (mail rooms, corridors, laundry) residents can continue to connect with each other with reduced disease risk.

Key Lessons Learned According to Residents

Focus Group Findings

What would you want people to know in the future?

Clear communication.

Using clear, open communication with the residents can greatly increase operations and rule enforcement. If they know what you want, they can do what you need them to do.

Provide for resident needs.

It is difficult to anticipate what a resident might need in these times of crisis, so stocking a steady supply of essentials such as food and medication, can allow you to be prepared for anything a resident might need from you. For example, they had a food pantry that could provide for the residents and called out the necessity for nutrition programs that could come to them (e.g. meals on wheels) or harder to maintain. Conversely, if a project is supported solely with operational subsidies, some infrastructure features may be harder to generate.

Make sure that you're doing everything you can to keep your building clean.

While residents can play a role in the maintenance of their own apartments, the management team is responsible for keeping our buildings clean. By applying an organized cleaning schedule, you not only care for the building, but most importantly the people within the building.

Future of Home Survey Findings

The most important social aspects of their building were:

- Sense of physical safety and security
- Receiving regular information from building management
- Communal spaces that are kept clean and treated with respect

During the pandemic, the most added features to homes were:

- Fans
- Plants
- Portable Air Purifiers

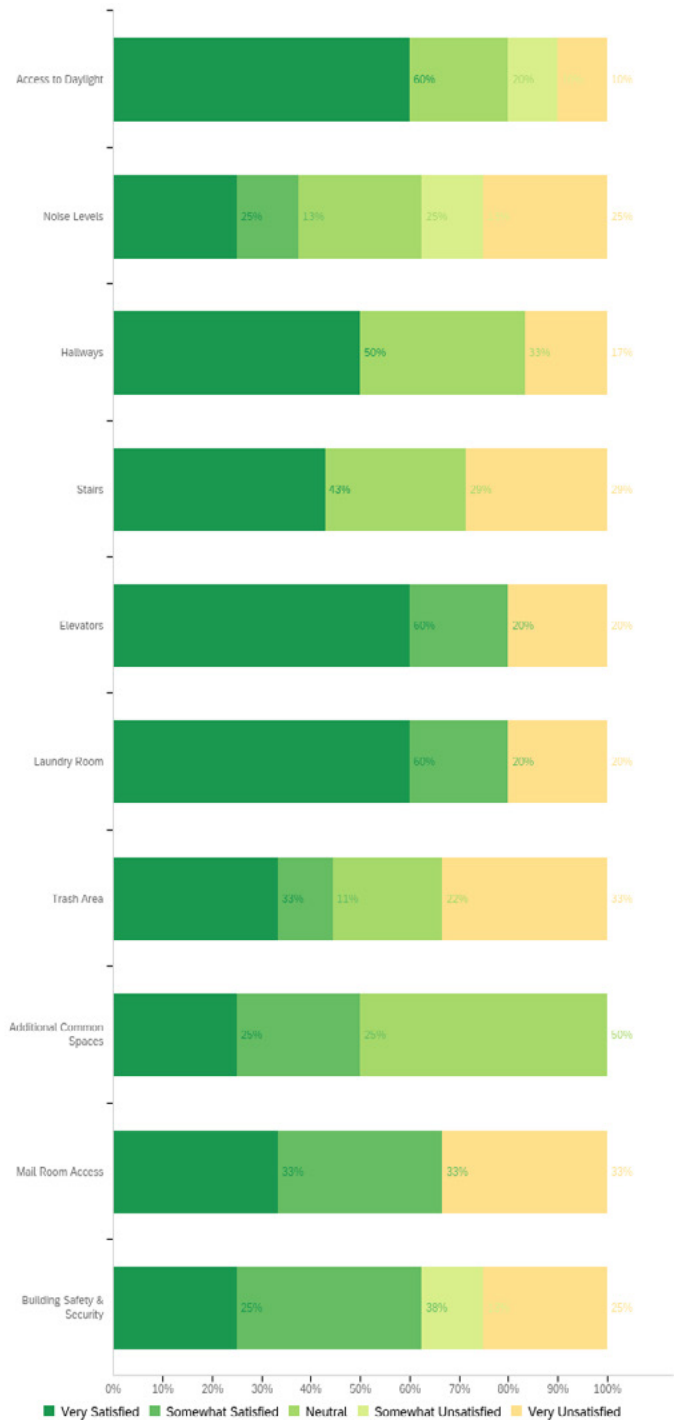
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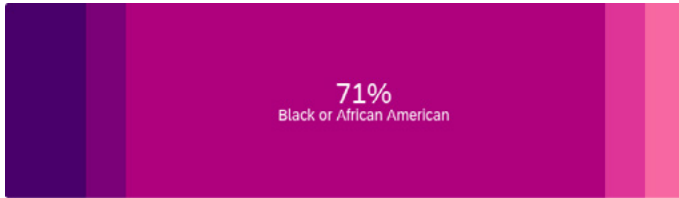
- Furniture
- Carpeting/Rugs
- Fans

CASE STUDY: LAFAYETTE TERRACE APARTMENTS

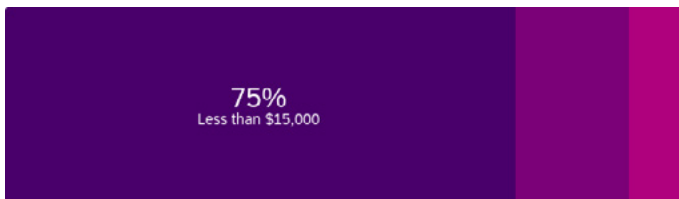
Future of Home Survey Results

During the pandemic, most residents (>50%) were satisfied with water, ventilation/air quality, mold/moisture, lighting, heating, and access to daylight. Three residents reported that they were dissatisfied with temperature control, specifically cooling in-unit. Of the overall satisfaction responses, noises levels were the most neutral. When asked if there were additional physical features that made them feel safer, happier, or more comfortable during the pandemic, responses included “good sunlight” and “a security guard.”

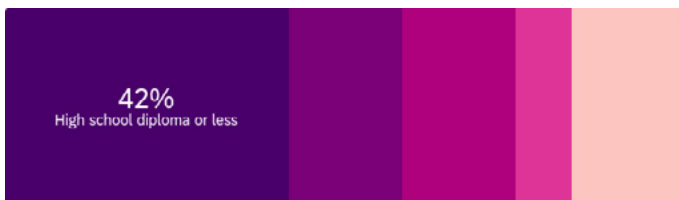




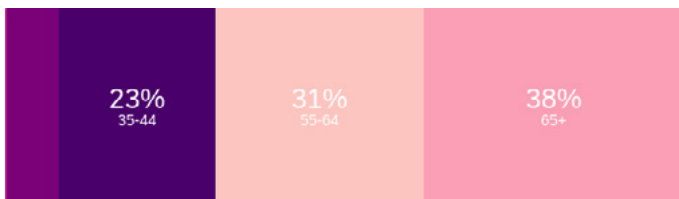
■ White / Caucasian ■ Hispanic or Latino/a ■ Black or African American
 ■ Asian / Pacific Islander ■ American Indian or Alaska Native
 ■ Other (use the blank below to describe) ■ Prefer not to answer



■ Less than \$15,000 ■ \$15,000 to \$34,999 ■ \$35,000 to \$49,999
 ■ \$50,000 to \$74,999 ■ \$75,000 to \$99,999 ■ \$100,000 or more



■ High school diploma or less ■ Some college, but no degree
 ■ Associate's degree, or two-year college degree
 ■ Bachelor's degree, or four-year college degree ■ Graduate degree
 ■ Vocational Training/Certification ■ Other (use the blank below to describe)



■ Under 18 ■ 18-24 ■ 25-34 ■ 35-44 ■ 45-54 ■ 55-64 ■ 65+
 ■ Prefer not to answer

Survey Stats

- 13 Survey Responses
- 70% of respondents were over the age of 55
- Survey respondents were educationally diverse and predominately low-income (92%) (less than \$35,000 annually), female (92%) and Black or African American (71%) respondents.
- 33% had at least one member of their household lose full or partial employment income during the pandemic.
- 56% reported at least one member of their household became ill with COVID-19.
- 11% responded that least one household member was or is employed as an essential worker (e.g., grocery store staff, medical staff, teacher).

When asked “If given the opportunity to build or redesign your home in the future to promote health and comfort, which features would you include with no cost to you?”

The top three choices were:

- High-speed internet/WiFi (85%)
- Good Temperature Control (Heating/Cooling) (69%)
- Air Purifiers (62%)

The bottom three choices included:

- Built-in Furniture (desks, table tops) (8%)
- Touchless Features at building entrances, exits & elevators (15%)
- Large Interior Common Spaces (lobby, hallways) (15%)

CASE STUDY: NORTHTOWN LIBRARY AND APARTMENTS

Northtown Library and Apartments

LOCATION:

West Ridge neighborhood;
Chicago, Illinois

NO. OF UNITS:

44

TPOLOGY:

Affordable independent senior housing,
Mixed-use building

YEAR BUILT:

2019

ARCHITECT:

Perkins&Will

GREEN CERTIFICATIONS EARNED:

LEED V4 Gold Certification Anticipation



Born out of a City of Chicago competition and partnership between Evergreen Real Estate Group, Chicago Housing Authority, and Chicago Public Library, the Northtown Library and Apartments sensitively serves one of Chicago's most diverse neighborhoods. The innovative collocation includes affordable housing with 44 apartments specifically for seniors and a public library. The goal for the library is to serve as a destination point for the local community and increase interconnectivity between public housing residents and their neighbors.

Fast Stats

- **Older adults have increasing medical costs, lower mobility, and less income that can be alleviated by lower housing costs.** As life expectancies—and therefore, the size of the elder population—grow, health challenges disproportionately impacting elders become even more urgent.
- **Designing for access to daylight improves sleep in older adults, which improves memory function.** Compared to other age groups, older adults may experience higher rates of sleep disturbance resulting from a weakening circadian system (1,2,3), but studies suggest that exposure to day light can help improve sleep, even among elders (4,5).
- **Intergenerational community spaces provide adaptability and allow the elderly to be more resilient to acute shocks.** According to a nationally representative study initiated nearly 20 years before the COVID-19 pandemic, 43% of American elders feel lonely (6). The physical distancing requirements resulting from the COVID-19 pandemic are disproportionately impacting already isolated older adults, compounding their risk for social isolation and loneliness (7). An international study found that rates of death from COVID-19 were about 8 times higher among people ages 65 and older, than among people between the ages of 55 and 64 (5).
- **Reduction of harmful environmental exposures.** Studies have shown that even low levels of exposure to air pollution (i.e., levels below the National Ambient Air Quality Standards) increases risk of mortality among older adults (8,9).

CASE STUDY: NORTHTOWN LIBRARY AND APARTMENTS

The Northtown Library and Apartments began in 2016, when former mayor Rahm Emanuel and Eugene Jones, CEO of the Chicago Housing Authority (CHA) created a competition, to collocate Chicago Public Libraries (CPL) with affordable apartments. Once built, these new community centers would feature both affordable apartments and offer programs to children and families from public housing as well as those living in the surrounding areas. For neighborhoods that felt the pressures of gentrification, the local government and developer sought to promote interaction between different socioeconomic groups by creating a destination point to lessen the isolation of public housing residents. Mayor Emanuel touted striking new civic architecture as an advertisement for the city and a source of community pride. Distinguished civic buildings in underserved neighborhoods constituted their own brand of equity. The library—a public amenity— helped sway community groups resistant to affordable housing in their neighborhoods. The competition included three sites located in the West Ridge, Little Italy, and Irving Park neighborhoods, and attracted 32 submissions.

Our firm won the competition for West Ridge location, for what would become the Northtown Library and Apartments. West Ridge is one of Chicago’s most diverse neighborhoods in terms of income, ethnicity, race, religion, and age. Residents enjoy a tapestry of cultures and ideas, but, as demographics change, many local seniors found fewer and fewer housing options they could afford. Enter this innovative co-location project, one of three in Chicago and among the first in the nation, which combines the amenities of the local library with 44 affordable apartments for seniors to encourage life-long learning.

The project required a unique development partnership between Evergreen Real Estate Group, CHA, and CPL. From the beginning the project had local political leaders and community advocates engaged to uphold community involvement. “This is an important day for West Ridge as we stand together to mark the completion of a development that will serve as a gateway to our community,” Alderman Debra L. Silverstein said when the building opened in May of 2019. “I know that the new residents of this building join the library patrons in welcoming this important neighborhood anchor that has transformed this corner into a vibrant place to live and gather.”

The total program area is comprised of 65,000 square feet. This breaks down more specifically as follows:

- 15,000 square-foot branch library including a Media room, Reading Garden, Viewing Garden, Early Learning, School Age, Teen, and Adult Reading Zones, and Quiet Rooms
- 1,500 square-foot community room (shared by library and residents)
- 44 one-bedroom units
- 500 square-foot fitness center
- 200 square-foot meeting room
- Shared laundry rooms
- Resident terrace
- Open resident lounges

“The Northtown library branch is very important to this community, used with frequency and beloved by all ages. We are thrilled to be able to provide a beautiful, state of the art building to serve as a community anchor for library patrons, housing residents and the broader West Ridge community.”

BRIAN BANNON, CHICAGO PUBLIC LIBRARY COMMISSIONER



CASE STUDY: NORTHTOWN LIBRARY AND APARTMENTS

Today, Northtown Library and Apartments is home to active seniors who are mostly in their early sixties, many of whom still volunteer and work. The building highlights the role of daylight and connection to the outdoors with ample windows, roof gardens where visitors can see the nearby public park and residential neighborhood, and communal spaces with views to the outdoors. The one-bedroom units feature open living spaces that connect the kitchen and the living room and allow the residents flexibility. Inclusive features that support an older population in their homes include components such as wheelchair accessible showers, railings near the toilet, and easy-to-navigate common areas. The design also purposefully integrates communal laundry rooms, which give residents an opportunity to interact with their apartment building neighbors.

The library offers a robust program that promotes lifelong learning with activities and skill-building for all ages. Anchored at both ends with vibrant community spaces, one side showcasing teens and technology, and a community room and lobby on the opposite side housing an artist-in-residence. All community members can access the former after regular library hours. Creating one large open space for thorough, visual connection also meant creating intuitive identities and zones for patrons. The library stacks' intuitive forms and the skylights create paths and destinations visible from any standpoint. The affordable housing residents use the shared community room and can partake in classes, attend support groups, and explore arts and crafts activities offered in the library.

During the pandemic, the property management company used several environmental and social strategies to keep residents healthy and safe.

First, Evergreen Real Estate tasked its building management staff to call residents twice a week. These “well-being checks” sought to determine how they were doing and what they might need as staff struggled to get seniors out of their homes because they were increasingly afraid of the unknown aspects of COVID-19. This extra effort proved useful because the residents missed interacting with people and voiced appreciation to the property management staff.


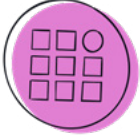

Second, property management staff also posted signage ON EACH FLOOR about social distancing and protocols to manage the spread of COVID-19. In addition, the library implemented social distancing through stickers with clearly defined instructions on the floor.

Third, frequent cleaning of surfaces and closure of communal areas was used to keep common spaces clean and lower COVID transmission risk.

Lastly, to alleviate the loneliness and isolation impacting residents' mental health, staff initiated virtual resident meetings that led to tearful reunions with neighbors. Management recognized this group of seniors was tech-savvy but could benefit from learning to use their smart phones to play games and make video calls, because many did not have access to a computer, while the library was closed between March and June of 2021. The staff said setting up the virtual meetings was “rewarding.”

Community Engagement Approach

- Interview with Evergreen Real Estate leadership responsible for Northtown property management and leadership responsible for the project's development
- Interview with the Architect, Perkins&Will
- Interview with the Mechanical, Electrical and Plumbing (MEP) engineer, dbHMS

GUIDING PRINCIPLE	RATIONALE
 <p data-bbox="134 863 427 884">REDUCES ENVIRONMENTAL EXPOSURE</p>	<ul data-bbox="496 489 1484 1073" style="list-style-type: none"> • The project used direct outdoor air (OA) to the units, to reduce moisture problems and occupants' exposure to indoor pollutants from kitchens, bathrooms, and other sources by ventilating with outdoor air. • Each unit was compartmentalized to minimize air leakage between units, which limits occupants' exposure to indoor air pollutants and has the added benefit of reducing noise transmission between units. • The project utilized air filters with a minimum efficiency reporting value (MERV) of 8, to protect occupants' health by reducing particulate matter in the air supply system. • The project incorporated low-VOC (volatile organic compound) products (flooring, adhesives/sealants, paints/coatings), to reduce occupants' exposure to airborne chemical contaminants through product selection. • The apartments feature operable windows that provide natural ventilation, and the co-benefit of providing daylight, views to the park, and psychological comfort. • The project completed a pre-occupancy fresh air flush, to reduce occupants' exposure to indoor airborne contaminants through source control and removal.
 <p data-bbox="159 1367 402 1388">INTEGRATES INTO COMMUNITY</p>	<ul data-bbox="496 1115 1471 1476" style="list-style-type: none"> • A new type of community amenity that combines a library with affordable housing for seniors to encourage life-long learning. • Double-height glazed lobbies connect the library to the senior housing, inspiring community interaction between the inside and outside, the public and private. • The project is located within a half-mile of Warren Park, a publicly accessible open space. • Local amenities including shopping centers and parks are within a half-mile of the property, which encourages daily walking. • The building is also conveniently located adjacent to a public transit route, with the Western Avenue bus stop located at the front door of the building.
 <p data-bbox="118 1755 443 1776">PROMOTES BELONGING AND ACCEPTANCE</p>	<ul data-bbox="496 1518 1471 1860" style="list-style-type: none"> • A large mixed media mural entitled "Eclectic Current," by local artist Chris Silva located in the library depicts the history the West Ridge and Rogers Park neighborhoods. • The public spaces serve the diverse needs of the neighborhood. YouMedia Lab at one end showcases teens and technology. • A community room and lobby supports community performances and houses an artist-in-residence. These public areas are available after regular library hours, further offering people of all ages the opportunity to connect, explore, and access programming. • A community engagement process that included neighborhood groups — local schools, library staff, and aldermanic offices.

CASE STUDY: NORTHTOWN LIBRARY AND APARTMENTS

Healthy Lesson 1

Large operable windows provide both mental and physical health benefits including natural daylight, fresh air, and views.

Let the Light Shine In

The Northtown Apartment's windows open a maximum of four inches, for safety reasons, but still provide residents with the opportunity for natural ventilation. During the height of the COVID-19 pandemic, many reported feeling safer or more comfortable with the ability to open windows instead of relying solely on mechanical ventilation. However, property management said that the limited openings pose a challenge because the maintenance to clean windows from the outside is a major expense for their limited means.

Residents' experience with windows varied. Some reported wanting to open their space because they want to feel like they are downtown, while others with apartments facing the busy street experienced disturbances from outside noises while they slept. Overall, the residents appreciated the large windows and views.

Implications for Future Healthy Design

- Provide operable windows that allow for access to natural ventilation, daylight, and views.
- Connect kitchen and living room space to optimize access to windows.

Healthy Lesson 2

Communal spaces create intergenerational social cohesion even during crises.

Come Together, Carefully

Northtown's ability to create community within the building is particularly special. Both the library and common spaces on every residential floor allow for residents to socialize more. Before the pandemic, the library hosted programs, computer classes, book clubs geared towards older adults, art and music programs, and intergenerational events where seniors could virtually interact with children even if their grandkids were far away.

Unfortunately, the pandemic limited access to the roof deck and lounge areas. Only recently, in August of 2021, was lawn furniture brought back to common outdoor spaces. Notably, due to fewer people convening inside, as the building reopened the staff referred to the library as “cozy” and “not overwhelming,” leading to greater psychological safety for residents who had experienced uncertainty during the pandemic. The intimacy in these communal spaces made it feel as if residents were not being exposed to different people living in other buildings while they could still socially distance.

Implications for Future Healthy Design

- Provide flexible spaces that have free-standing furniture that can be easily moved to accommodate social distancing.
- Provide access to communal outdoor spaces for residents to gather with less risk of exposure.
- Select easy-to-clean surfaces.



CASE STUDY: NORTHTOWN LIBRARY AND APARTMENTS

Healthy Lesson 3

Indoor Environmental Quality has a disproportionate impact on well-being, and should be prioritized all the time, not just in times of crisis.

Prioritize Indoor Environmental Quality

Northtown emphasizes the quality of its indoor environments. This was a long-standing value for the building, before anyone had heard of COVID-19, much less determined that it spreads via airborne particles and droplets. The Northtown project is projected to achieve LEED V4 Homes: Multifamily Midrise certification, and a large part of that accomplishment is a focus on Indoor Environmental Quality (IEQ). These features may not be visible to residents but are providing valuable benefits.

One of the LEED prerequisites is to compartmentalize each residence to minimize air leakage between units. The intent is to limit occupants' exposure to indoor air pollutants by minimizing the transfer of air between apartments by sealing voids in walls, ceilings, floors, and vertical chases, as well as weather-strip all residential doors leading to the common hallways. Effective compartmentalization also reduces sound transmission, creates better fire separation, and helps reduce pressure imbalances, resulting in more comfortable and safer buildings. The shared benefit of this design decision is that it helps reduce the transfer of airborne COVID-19 particles and droplets between units.

Another LEED prerequisite is to install on all recirculating space conditioning systems air filters with a minimum efficiency reporting value (MERV) of eight. Inadequate air filtration can have adverse health effects. Improved, properly installed air filters remove harmful particles from the supply air stream. The co-benefit of this design decision is that MERV filters can trap smaller particles, including viruses such as COVID-19.

Additionally, the LEED prerequisite for ventilation is intended to reduce moisture problems and occupants' exposure to indoor pollutants from kitchens, bathrooms, and other sources by exhausting pollutants to outside and ventilating with outdoor air. This requires that every unit include easy access to outdoor air, and cannot rely upon transferred air from pressurized hallways, corridors, or adjacent dwellings. Local exhaust removes poor-quality air from kitchens and bathrooms before it mixes with the air in the rest of the unit. As with the other design strategies, having localized exhaust and outdoor air delivered directly to the indoors helps dissipate COVID-19 particles in the air.

Implications for Future Healthy Design

- Compartmentalize each residential unit to minimize air exchange between units.
- Install MERV 13 or higher air filters to trap smaller particles.
- Provide outdoor air to each unit.
- Provide localized exhaust from kitchens and bathrooms.



CASE STUDY: THE SUGAR HILL PROJECT

The Sugar Hill Project

LOCATION:

Sugar Hill district of Harlem,
New York City

NO. OF UNITS:

124

TYOLOGY:

Affordable housing, multi-use building
(children's museum, preschool)

YEAR OPENED:

2015

ARCHITECT:

Adjaye Associates

GREEN CERTIFICATIONS EARNED:

LEED Silver



Broadway Housing Communities' (BHC) Sugar Hill Project honors the surrounding historical neighborhood in Harlem and supports its locality with a highly connected affordable housing plan. The project signifies its long-term commitment to families and younger generations by constructing an on-site preschool and children's museum within the base of the 172,000-square-foot residential building. Inside the 13-story multifamily complex, staff members and tenants intermingle through an innovative, ground floor front desk program activated by the art-adorned walls, bolstering a vibrancy for a community that has been historically underserved by the built environment.

The Sugar Hill Project's design stemmed from architecture firm Adjaye Associates' workshops and conversations with local developer, Broadway Housing Communities (BHC)—a nonprofit that specializes in integrated, supportive housing—and with community members. The architects honor the neighborhood's history and complement its 19th-century brownstones with the new building's modern textured slab façade. Located on W. 155th Street and St. Nicholas Avenue, Sugar Hill's striking exterior received mixed reviews; some applauded it as a thoughtful departure from the standard appearance of local public housing developments, while others described it as fortress-like. Perhaps the building's most significant review is signified by the 50,000 applications received for its 124 residential units; making it a desirable location within New York City's affordable housing stock.

The Sugar Hill Mixed-Use Development prioritized deep affordability. Among the building's residents, 20% previously experienced homelessness; 70% make below 50% of the area median income (AMI); and 20% make below 30% AMI. To house the lowest income members in the community, the project pursued an unprecedented combination of New Markets Tax Credits (NMTC) and Low-Income Housing Tax Credits (LIHTC) funded by 13 different lenders. The residential portion was paid by the latter, while the former paid for the other spaces ([source](#)). To promote interconnectivity, the complex also features a six-classroom preschool, children's museum, parking garage, BHC offices, community space, terrace, and rooftop garden.

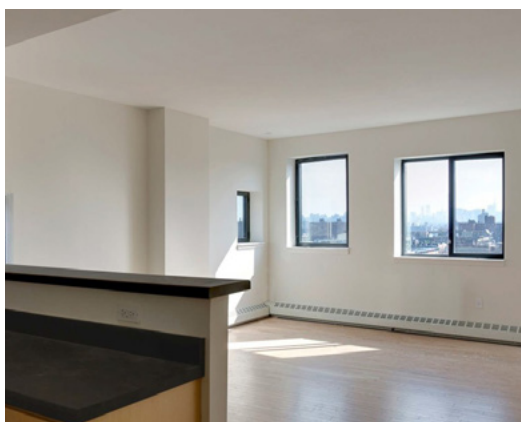
CASE STUDY: THE SUGAR HILL PROJECT






The BHC team takes pride in centering the Sugar Hill community's youngest members.

The on-site preschool serves up to 100 children from the neighborhood ranging from two- to five-years-old ([source](#)). The Sugar Hill Children's Museum of Art and Storytelling infuses the its curriculum with arts programming, creating a "school in a museum" ([source](#)). Due to the ongoing COVID-19 pandemic, the museum closed for most of the past year, per New York State guidelines. Following the government mandates required switching to and from remote learning, which was a particularly challenging task for children from the lowest income families with limited access to resources and supplies. But the school supported every family through the distribution of tablets, art kits, and books. Sugar Hill's homework club also converted to a remote format, which includes students from local colleges volunteering as tutors. Over the course of the pandemic, these teachers have given over 537 hours of free, remote instruction to 22 families.

Like other BHC properties, the Sugar Hill Mixed-Use Development innovatively fosters a collaborative and supportive residential community by employing tenants as paid, part-time members of a front desk management team. The local nonprofit's leadership praised their teenage staff members, who demonstrated maturity and respect well beyond their years towards for their building's community.



↑
The sporadic placement of windows creates unique views, described by one new resident as framing the outdoors like artwork

GUIDING PRINCIPLE	RATIONALE
 <p data-bbox="191 642 345 663">SUPPORTS ALL AGES</p>	<ul data-bbox="496 489 1463 552" style="list-style-type: none"> • Both the preschool and the children’s museum center the needs of the youngest members—who require more attention due to their developmental needs—of the surrounding community.
 <p data-bbox="110 854 435 875">PROMOTES BELONGING AND ACCEPTANCE</p>	<ul data-bbox="496 701 1463 764" style="list-style-type: none"> • BHC prioritizes creating opportunities for resident leadership and building neighborliness—from the front desk program to floor meetings.
 <p data-bbox="178 1073 358 1094">REINFORCES RESILIENCE</p>	<ul data-bbox="496 913 1390 976" style="list-style-type: none"> • The resident-led front desk program—including its teenage members—strengthened the community response to COVID-19 by providing PPE and cleaning supplies to residents.

Fast Stats

- COVID-19 hit the surrounding community especially hard. The Sugar Hill Mixed-Use Development resides in a neighborhood comprised primarily of residents who identify as Black and Latinx—the same groups who experienced disproportionately high rates of hospitalization and death due to COVID-19 illness (Hinterland et al., 2018).
- Affordable housing meets a critical, community need. As of 2018, nearly a quarter of households in Manhattan Community District 9 lived in poverty, and just over half of households spent more than 30% of their income on rent, making them rent-burdened (Hinterland et al., 2018).

** The above facts come from the NYC Department of Health community health profile for Manhattan Community District 9, which includes Sugar Hill, Hamilton Heights, Manhattanville, West Harlem, and Morningside Heights.*

CASE STUDY: THE SUGAR HILL PROJECT

Healthy Lesson 1

Incorporate community services on site to elevate the experience of building residents.

Spotlight on a Compassionate, Collaborative Housing Provider Team: Lessons Learned

BHC leadership shared three key lessons from their experiences supporting Sugar Hill staff—a majority of which live in the building—and residents during the COVID-19 pandemic.

- **Self-care.** Staff realized they needed to slow down and take care of their friends, family, and themselves, to provide the best work for tenants. The pandemic made clear how the well-being of both staff and tenants are interconnected.
- **Giving grace to one another.** The BHC team reminded bureaucratic and government agencies seeking tenant documentation that staff needed more time to safely provide these assets during the pandemic.
- **Trust your team.** The Sugar Hill team stepped up to support tenants and each other during the unprecedented challenges brought on by COVID-19 pandemic—which many people are still struggling with despite increasing vaccination efforts. Tenants offered support to staff, too, which included older adults who offer younger staff valuable advice.

Expand Home's Offerings

The children's museum and preschool are both located in the apartment building's ground floor. This placement allows the broader community access with separate entrances from the residential area of the building. Future affordable developments might evolve beyond this already innovative partnership between housing and services by prioritizing even more specialized services for tenants' benefit and consistent access. A few noteworthy opportunities for tenants to utilize the Sugar Hill Children's Museum of Art & Storytelling included its gallery space housing the aforementioned volunteer-led homework club (until it transitioned online), and early summer '21 physically distanced social gatherings for tenants. At one event, tenants were so thrilled to be together again that the event continued until midnight.

Implications for Future Healthy Design

- Build spaces on-site for local service providers to create a direct access for building residents.
- Incorporate multi-purpose, communal spaces into service providers' areas that can transform or transition between use by providers and by tenants.
- Provide clear accessibility points for residents to use community services as often as possible.
- Large, open spaces provide optimal air circulation and flexibility for a range of possible uses.

Healthy Lesson 2

Provide consistent access to the outdoors, while also prioritizing maintenance and resident safety.

Share the Outdoors (Safely)

The COVID-19 pandemic highlighted the importance of access to outdoor spaces for their potential to improve mental and physical health, and social opportunities (Braubach et al., 2017). Outdoor space is especially precious given the density of New York City, and future developments should strive to maximize and prioritize outdoor space for residents' use. Sugar Hill includes a variety of outdoor spaces—a rooftop garden, interior courtyards, and terraces—and empowers its residents to establish their own rules for safe and respectful use of the communal terrace space.

While the ninth-floor terrace is not available for tenants' general use, BHC staff provide temporary access for tenants while their units are undergoing maintenance. Similarly, the courtyard between the museum and preschool is not generally accessible by residents, but BHC staff will host events for tenants there, like a Teen Bash, in collaboration with the preschool and local youth services organization Brotherhood Sister Sol, and included games for all ages such as oversized Jenga.

Implications for Future Healthy Design

- Create safe outdoor spaces, in the case that children are left temporarily unattended.
- Consider incorporating design features that allow outdoor spaces to be utilized comfortably and semi-privately by multiple groups and individuals at one time.
- Outdoor spaces should be easily maintained by residents who want to do their part to keep the building clean.
- The more outdoor space, the better. So that tenants regularly access outdoor spaces, the designs should make them accessible.

CASE STUDY: THE SUGAR HILL PROJECT

Healthy Lesson 3

Facilitate opportunities for resident leadership and cooperation—and create spaces in which to exercise these.

Promote Ownership by Renters

Sugar Hill's tenant-run front desk team positions its members to positively shape their building's culture. During the pandemic, this hands-on involvement strengthened the BHC staff response to resident needs by checking in with fellow residents who did not pick up meals or medication at their usual time. Front desk also assisted tenants in the transition to virtual communication, showing them how to set up Zoom or Google Hangouts. The team's teens, in particular, "stepped in" to support the building's COVID-19 response—from helping to distribute masks, to printing and posting announcements.

Resident floor meetings are another important programmatic feature, allowing residents to build connections and work through conflicts. While these meetings transitioned online during the pandemic, they had previously benefited from the Sugar Hill Project's wide, art-filled hallways.

Implications for future healthy design

- Hallways have the potential to build community. Consider creating a hallway space that is wide enough to allow residents to congregate comfortably. Other welcoming details such as natural light may encourage this.
- The front desk area near the entrance of a building will likely need to be multi-purpose. Consider the potential for residents to use this space for more than just walking to the elevators. In addition to creating a welcoming atmosphere, this space should be practical for private or sensitive conversations, as well as for group tutorials on things like Zoom application use.

Healthy Lesson 4

Encourage staff availability and productivity, while respecting their work-life balance.

Support Staff Balance

BHC staff offices occupy half of the Sugar Hill Project's ninth floor, which is otherwise occupied by residential units. Residents benefit from having staff on site to answer questions, provide connections to services, and offer general support—both during and outside of crises like the COVID-19 pandemic.

During the pandemic, BHC staff maintained effective and efficient communications, and had greater potential to work remotely due to the already existing integration of their work into Google Drive, Meets, and Hangouts, as well as the GroupMe mobile application. When not fully off-site to maximize physical distancing, the Sugar Hill Project team would regularly work remotely together at Riverbank State Park and would use the ninth-floor terrace as an extension of their offices.

Implications for future healthy design

- Consider incorporating offices on site for building staff to maximize availability and approachability for residents.
- Increase internet and electricity connectivity in common and outdoor spaces throughout the building.
- Consider other ways to design outdoor spaces to function as office space (in addition to adding outlets) by building in ledges that double as standing desk space.
- Consider creating a separate staff entrance to the building, for easily entering and leaving as well as more privacy for residents.

CASE STUDY: BEACH GREEN DUNES PHASE II

Beach Green Dunes Phase II

LOCATION:

Far Rockaway, New York

NO. OF UNITS:

127

TYOLOGY:

Mixed-Use Housing

YEAR BUILT:

2019

ARCHITECT:

Curtis + Ginsberg Architects LLP

GREEN CERTIFICATIONS EARNED:

Passive House Institute in the United States (PHIUS)

AFFORDABILITY:

10% Affordable at 30-80% AMI



Beach Green Dunes II responds to Superstorm Sandy, the strongest storm to make landfall in the 21st century in the Northeast, which greatly affected residents' health and well-being. Built to meet Passive House Standards, this independent affordable housing facility provides energy savings and comfort. The project's outstanding staff support tenants with access to food, mental health, and services.

From the outside in, Beach Green Dunes II addresses both climate adaptation and mitigation strategies—a reflection of its beachfront location and history. In 2012, Superstorm Sandy devastated the Far Rockaway community, destroying or damaging more than a thousand buildings and leaving residents without heat, light, and in conditions prone to mold and mildew growth for months (Pereira, 2020). This building responded by achieving Passive House Institute in the United States (PHIUS) certification.

To fund this affordable housing project, L+M Development Partners secured permanent financing to a \$13.9M tax credit through Red Stone Equity Partners, and a \$940,000 grant from the NYC Department of Housing Preservation and Development (Coen, 2021). Throughout the pandemic, the building actively leased apartments. To do so, the building superintendent acted as a leasing coordinator by photographing apartments, providing in-person support, and key handover. All paperwork was signed electronically. The building houses a diverse population of residents including seniors, young individuals, and families, with the largest apartment including a three-bedroom, two-bathroom layout. Additionally, they opened a café space on the main floor in partnership with Campaign Against Hunger, an emergency food and community support organization (L+M Development Partners, 2021).

Fast Stats

- Overall, Passive House is not more expensive. The Passive House Standard costs an estimated 10% more to build than traditional buildings. However, the operational and lifecycle costs, including fuel bills, maintenance, and repairs, are lower (Price & Brown, 2014).
- Past and future environmental emergencies inform design. According to a report by the Regional Plan Association, Beach Green Dunes II lies in an area of Far Rockaway projected to experience more than six feet of sea level rise by 2050. This will threaten thousands of public housing units, a wastewater facility, and a nearby powerplant (RPA, 2016). Estimates predict up to 3.5 meters (11.5 feet) of the Rockaway beaches could be lost due to sea level rise and beach erosion by 2050, which narrows the beach and reduces the defenses to storm surge (NASA, 2002).

CASE STUDY: BEACH GREEN DUNES PHASE II

Healthy Lesson 1

Pay it Forward with Passive House



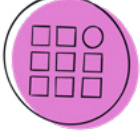
Affordable housing projects rarely meet the sustainability levels of Beach Green Dunes II, but the energy cost savings can have meaningful impacts to residents trying to make ends meet. For example, New York City landlords must provide heat and hot water, but air conditioning or cooling costs do not fall under the landlord's responsibilities (Gonzalez, 2016). Due to these energy-efficient efforts, residents at Beach Dunes II pay approximately \$10 per month for cooling compared to \$100 or more in other NYC buildings (Sisson, 2020). Additionally, geothermal heating and cooling provide comfort to residents year-round. In our Future of Home survey findings, the indoor environmental quality of Beach Dunes II reported the highest satisfaction for thermal comfort. Studies show that poor thermal comfort is associated with diminished cognitive function in young adults, which could influence people working and learning at home (Cedeno Laurent et al, 2018). Considering the constraints that the pandemic put on people to work and learn from home while social distancing, this feature is vital to maintaining well-being for current and future health crises.

Implications for Future Healthy Design

- Incorporate passive house features to pass along energy cost savings to residents.
- Earn indoor environmental quality credits in energy efficiency certifications to promote occupant comfort and well-being. While energy savings is a major benefit of living in Beach Dunes II, the high-efficiency thick walls also act as acoustic insulation between residential units.

Community Engagement Approach

- In-person Site Visit
- Meetings with Superintendent and Building Management
- Meeting with Building Developer

GUIDING PRINCIPLE	RATIONALE
 <p data-bbox="188 646 375 667">REINFORCES RESILIENCE</p>	<ul data-bbox="496 489 1479 653" style="list-style-type: none"> • The site includes bioswale gardens along the curb strip to treat and retain storm water. To withstand flooding, the building's mechanical systems and residences are placed higher than the ground floor. Emergency doors out from the second floor enable evacuation of residents, and wall flood vents and anti-slip flooring in the lobby help reduce flood impact. Paved surfaces use permeable materials where possible.
 <p data-bbox="155 858 407 879">PRIORITIZES ENERGY EFFICIENCY</p>	<ul data-bbox="496 703 1471 762" style="list-style-type: none"> • The building is equipped with a geothermal system to heat and cool its interiors, with additional photovoltaic panels installed on the roof, providing cost savings to the residents.
 <p data-bbox="155 1066 402 1087">INTEGRATES INTO COMMUNITY</p>	<ul data-bbox="496 917 1471 1081" style="list-style-type: none"> • The building is a transit-oriented development – directly adjacent to the Beach 44 Street - Frank Avenue Subway Station. The A train provides access to everyday needs as well as employment centers and regional destinations in Brooklyn, Manhattan, and the Bronx. Additionally, the building's proximity to the Rockaway Beach Boardwalk promotes active transportation to local destinations and promotes improved health for residents.



CASE STUDY: BEACH GREEN DUNES PHASE II

Healthy Lesson 2

Personalize Indoor Air Quality

Each apartment in Beach Green Dunes II receives fresh, filtered air and experiences negative air pressure so that air inside a unit does not flow into other apartments or common spaces. Using the Hierarchy of Controls framework (NIOSH, 2021), this engineering feature acts as an indoor air quality control, which was the most effective strategy among our case studies for mitigating the risk of inhaling very small viral particles and droplets—the leading transmission pathway for COVID-19 (CDC, 2021). Other COVID-19 protocols included signs to encourage social distancing and mask wearing in common areas. Building management also communicated via text messaging to reduce in-person interactions with potentially infected individuals. During the height of the pandemic, and in response to local guidance, the building closed amenities and spaces including playgrounds, common areas, and large gathering places. Residents coordinated elevator and laundry space policies to limit the number of occupants using these spaces at a given time.

Implications for Future Healthy Design

- Install negative-air-pressure ventilation for individual units to prevent the spread of air pollutants (e.g., smells, viral particles, allergens) between apartments.
- For existing buildings unable to have mechanical ventilation, provide portable air purifiers with HEPA filtration to improve air quality. These devices provide wide-ranging benefits such as lowering asthma rates, improving vascular function for elderly people, and exposure to outdoor air pollutants (Brauner et al., 2008, Xu et al., 2010).



Healthy Lesson 3

Increase Access to Technology

Recognizing the importance of internet accessibility for remote learning and work, the building's management prioritized fast, affordable Wi-Fi for residents (<\$35/month for 100 mbps). Through a partnership with local broadband provider Andrena Internet, Beach Green Dunes II provides internet for nearly 1,500 residents in nearby buildings. Instead of requiring each apartment to get a physical connection or personal router, each resident can connect and manage their plan through an online dashboard (Caputo, 2021).

Implications for Future Healthy Design

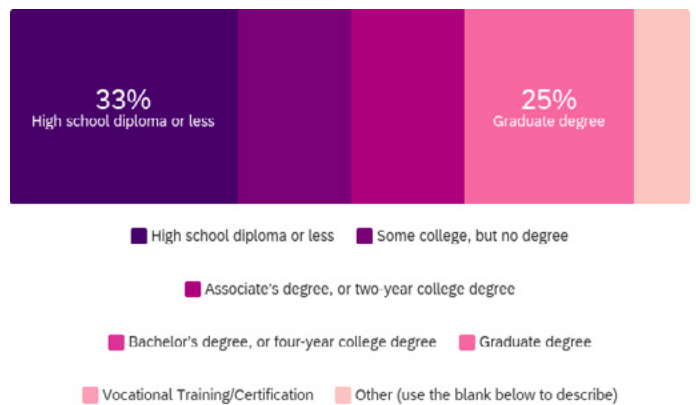
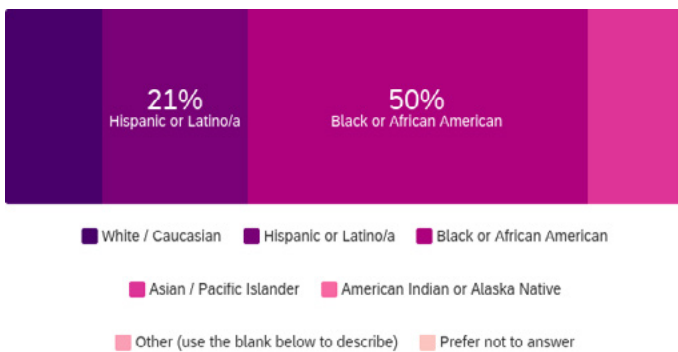
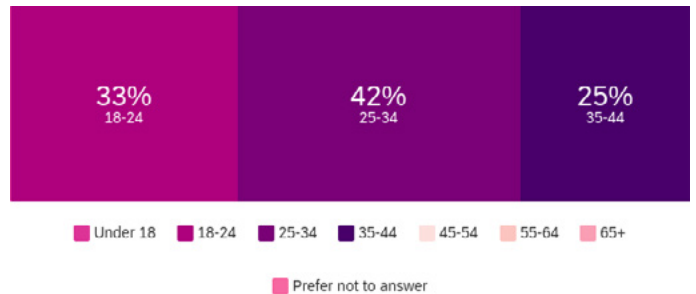
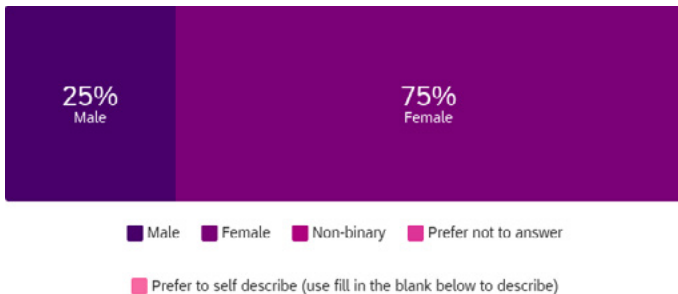
- Provide free or discounted internet to residents so people can connect to digital platforms for accessing services, education, employment, and entertainment.
- Extensive Wi-Fi coverage provides opportunity for “workplace mobility,” allowing families with people who need to work or learn remotely to spread out either within the unit or in multi-purpose areas throughout the building.

Lessons Learned from Daily Management and Operations

- Listen to the residents: You don't know what that individual is going through. A simple “how are you, good morning,” can make a difference.
- Be a Bridge: Building staff knocked door-to-door to see what residents needed and found that food insecurity was an issue. By connecting with Campaign Against Hunger, a local emergency food and community support organization, management was able to connect families with free meals throughout the pandemic.
- Know your residents better before a crisis: Staff benefited from personally connecting to residents. For instance, the building houses a number of seniors who require extra assistance for their oxygen tanks or wheelchairs. By maintaining these relationships, building management could best support vulnerable residents during shelter-in-place restrictions.
- Sustainable design promotes health: Energy efficient strategies implemented in the building provided both daily indoor comfort and safety and security during environmental and health crises.

CASE STUDY: BEACH GREEN DUNES PHASE II

Future of Home Survey Results



Diving Deeper into the Future of Home

When asked “If given the opportunity to build or redesign your home in the future to promote health and comfort, which features would you include with no cost to you?”

The top 3 choices were:

- Private Outdoor Space (e.g. personal balcony) (60%)
- Easy to Clean Surfaces (50%)
- Air Purifiers (50%)

The bottom choices were:

- Dedicated workspace in unit for working from home (WFH) or remote school (10%)
- Touchless features (building entrance/exit, elevator) (10%)
- Large interior common spaces (lobby/hallways) (10%)
- Speech & visual privacy in unit (10%)
- Ample in-unit storage (10%)
- Large windows (10%)

If you could design outdoor spaces for your building, what would you like to include that makes you feel happy, relaxed, and safe?

- More security
- Picnic tables with a garden space
- Covered seating
- Benches
- BBQ space

In your ideal building, what amenities would be most helpful to you? [Select top 3 choices]

- Gym/Fitness facilities (83%)
- Community center & play space (33%)
- Computer room (25%)

During the Pandemic

During the pandemic, what measure made you feel or would have made you feel more comfortable or safe in your hallways?

- Signs for social distancing and mask wearing
- Less people
- Communication or signs from management about cleaning practices

During the pandemic, the most added features to homes were:

- Fans
- Furniture
- Lighting/lamps
- Plants
- Storage

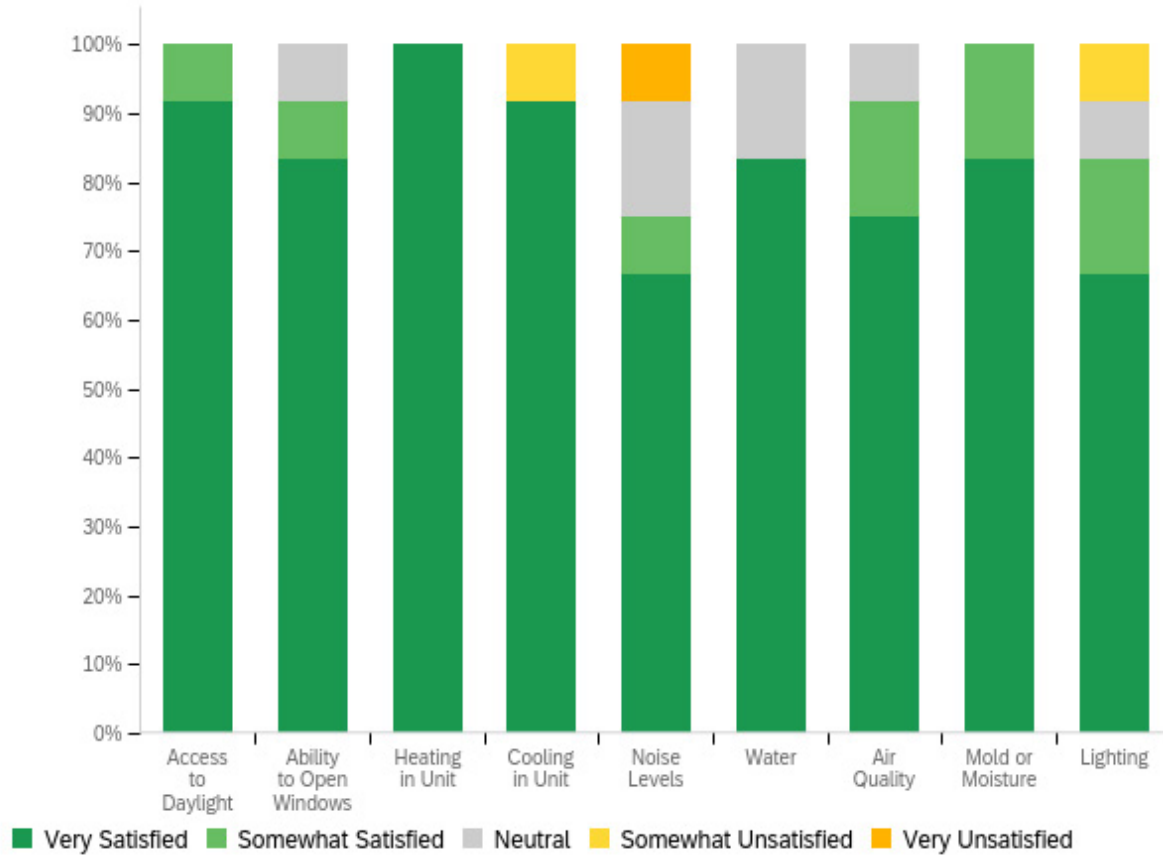
Please share any additional physical features of your home that made you feel safer, happier, or more comfortable during the pandemic?

- Good room temperature in summer and winter
- Ability to laundry in unit
- Good sunlight

WFH

For the small subset of respondents who worked from home (WFH), three people worked from their sofa, couch, or recliner, two people worked from their bed and another two reported working from a dedicated desk or table.

CASE STUDY: BEACH GREEN DUNES PHASE II

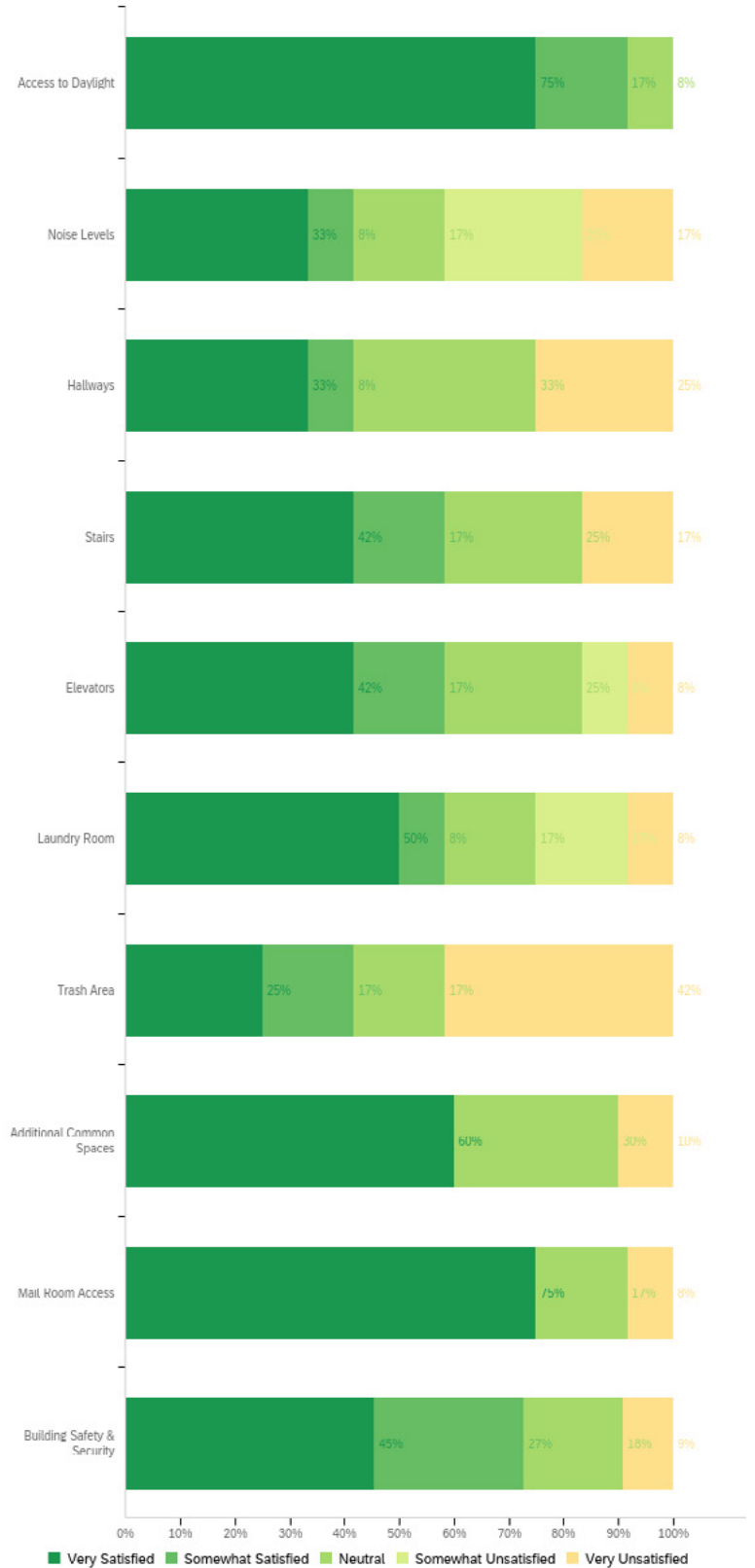


During the pandemic, please share how satisfied you were with the following aspects of your personal apartment?

*Beach Dunes II responses displayed the highest in-home satisfaction of any of our case studies. While other building respondents were dissatisfied with thermal comfort, over 90% of respondents from Beach Dunes II were 'Very Satisfied' with heating and cooling.

During the pandemic, please share how satisfied you were with the following aspects of your entire building?

With more people at home throughout the week, their takeout and plastic consumption increased, which made the trash areas fuller than pre-pandemic times—especially at the beginning when people suspected that the virus spread from surface contact (Ives, 2021).



CASE STUDY

COVID-19 Lessons: Implications for future healthy design summary

Within Unit

Place the kitchen sink near the entrance of each unit, allowing residents to immediately wash their hands upon entering their apartment and minimize infectious spread.

Integrate coat closet near the entrance of a unit to allow occupants to remove contaminated clothing and help sterilize upon entering their unit.

Unit-specific ventilation to minimize the recirculation of air between units and decrease the spread of disease.

Make communal kitchens the largest room in the house and the primary social area where everyone can comfortably cook and meal prep together.

Durability of carpeting and furnishings is critical but buying all new stuff can make the house feel sterile and inhospitable.

Take advantage of used furniture stores as this can make the environment feel more human-scaled. The funkiness of the furniture is part of the charm and familiarity of the space.

Thick, insulated walls act as acoustic mitigation between residential units and common areas and provide energy savings.

Regulate negative air pressure to prevent the spread of air pollutants (e.g. smells, viral particles, allergens) between different spaces.

For existing buildings unable to build out mechanical ventilation, provide portable air purifiers with HEPA filtration to improve air quality.

Circulation Space

Widen hallway space to allow residents to congregate comfortably and maintain physical distance.

Provide seating by elevators to give elderly somewhere to rest while they wait.

Paint each floor with a distinct color at the entry to remind older residents what floor they are on.

Incorporate large windows at the end of the hall to naturally illuminate circulation space.

In mixed-use buildings, distribute access to natural light in hallways, especially floors with residential units.

Outdoor Space

Add outlets to outdoor spaces to promote working and learning outside the building and in nature.

Design outdoor spaces to be utilized comfortably and semi-privately by multiple groups and individuals at any given time.

Prioritize outdoor spaces that can be easily maintained by tenants through cleaning or organizing.

Common Areas

Create spaces on-site for use by local service providers that will benefit building residents.

Incorporate multi-purpose, communal spaces that can transform or transition between use by service providers and tenants.

Ensure residents can physically access community services as often as possible, e.g., through interior access points.

Maximize internet and electricity connectivity in common and outdoor spaces throughout the building.

Large, open spaces provide improved air circulation and flexibility for different uses.

Multiple common living areas – a room for socializing with others around a shared activity and a quiet room to allow residents the opportunity to have space to themselves.

Living areas (both indoor and outdoor) should be connected to the kitchen, allowing for additional space where people can congregate while still being socially distant.

Install operable windows for proper ventilation and natural light for the kitchen and living areas.

Provide flexible spaces that have free-standing furniture that can be easily moved to accommodate social distancing.

Select easy-to-clean surfaces that do not require harsh chemicals.

Staff Spaces

Create a separate staff entrance to the building, for ease of staff entrance and exit, and for a greater sense of resident privacy.

Incorporate offices on-site for building staff to maximize their availability and approachability for residents.

Beyond the Building

Establish residential treatment programs in residential neighborhoods. By retrofitting large single-family homes or lower-density multi-family complexes, the design enables these programs to seamlessly blend into the neighborhood. Developers and architects should look for larger homes that can be internally converted to house around 10 people, including staff facilities, without overcrowding.

Site housing within a 10-minute walking distance from a frequent transit line.

Build or incorporate passive house features to pass along energy cost savings to residents.

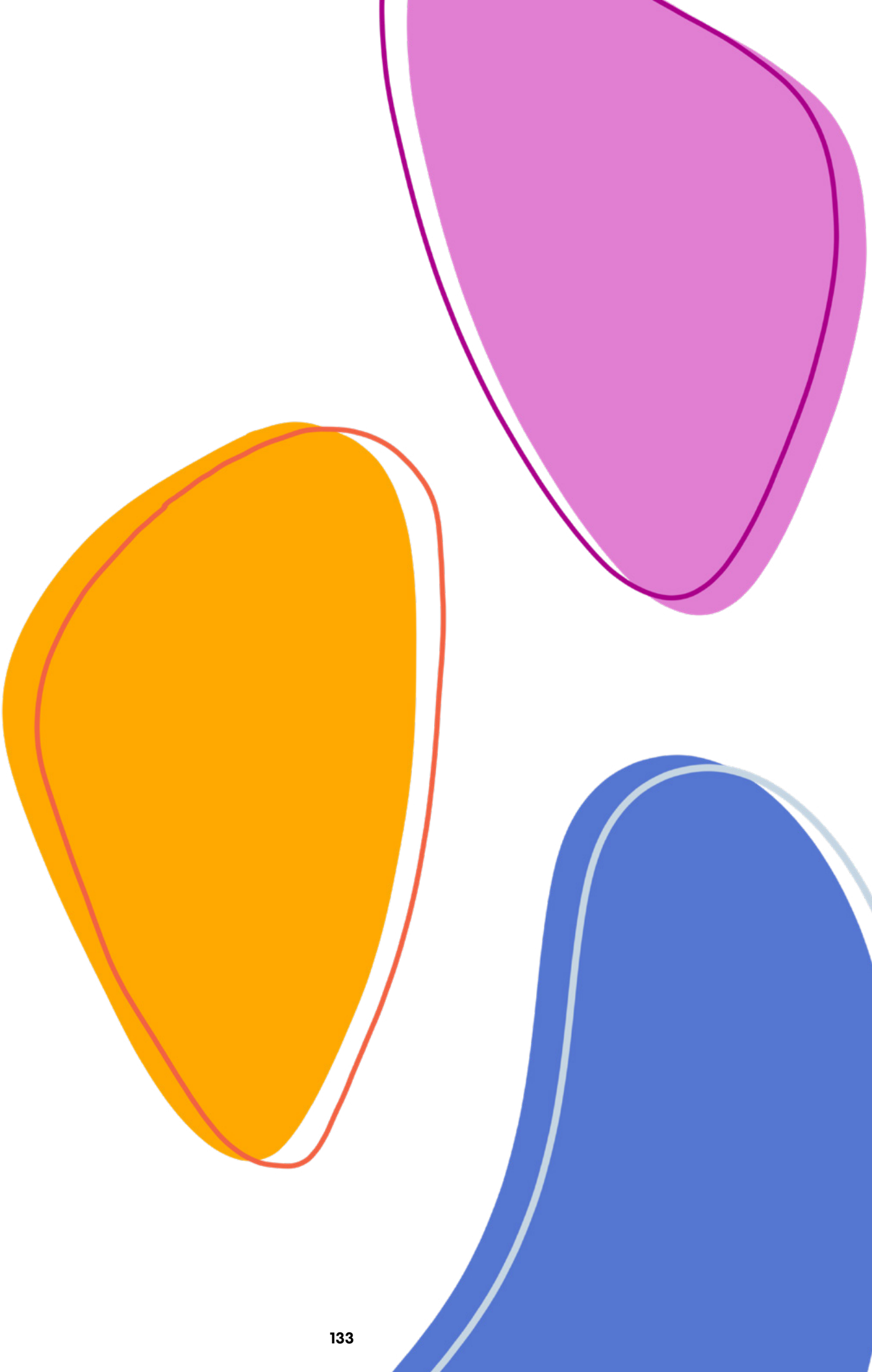
Achieve indoor environmental quality credits in energy efficiency certifications to promote occupant comfort and wellbeing.

Provide free or discounted internet to residents so they can connect to digital platforms for accessing services, education, employment, and entertainment.

Extensive wi-fi coverage provides the opportunity for “workplace mobility” in the building, allowing families with people who need to work or learn remotely to access internet either within the unit or in common areas.



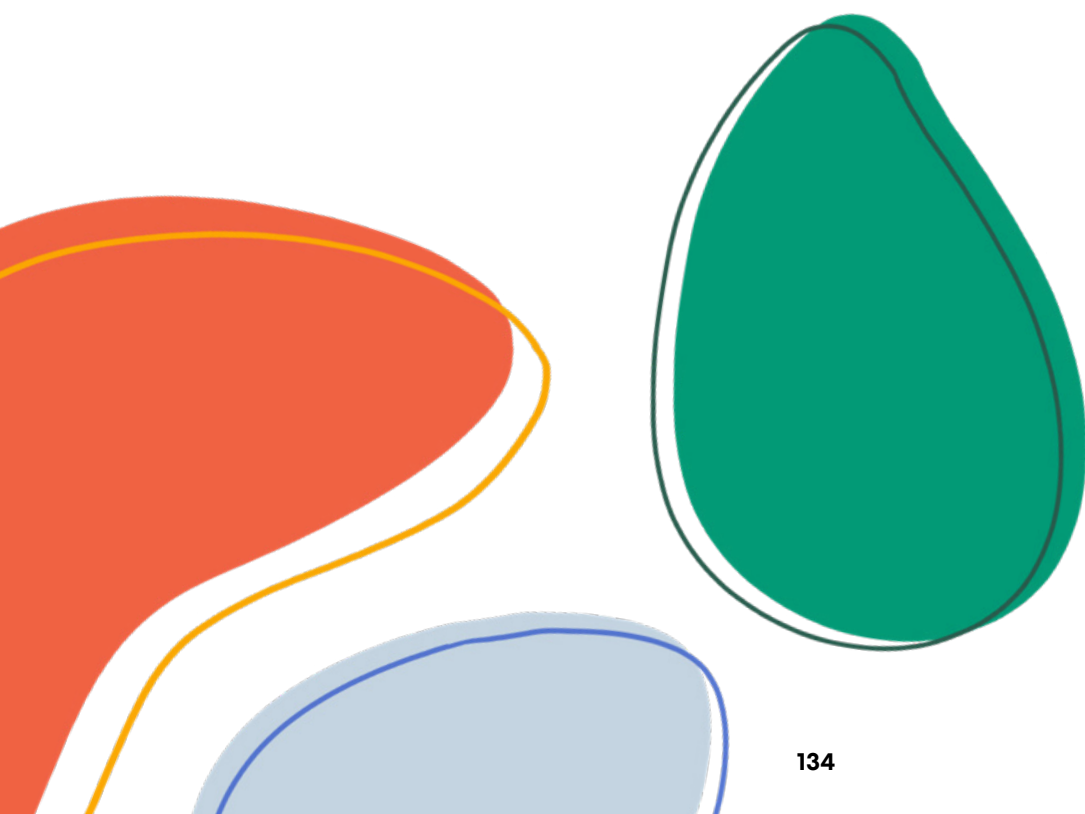
Looking Ahead



LOOKING AHEAD

Key Takeaways

PROCESS	PLACE	PEOPLE
Respond to emerging evidence and guidance in a flexible, timely manner.	Consider the larger community.	Make it personal.
Supply staff with tools and guidance during emergencies.	Prioritize thermal comfort.	Tailor building design to residents who will occupy them.
Customize communication & connection.	Give residents environmental control.	Reduce staff stress during emergency response.
Save energy, promote people.	Provide flexible multipurpose spaces.	Connect to the outdoors.
Incentivize design choices that promote health and sustainability.		



Process

Respond to emerging evidence and guidance in a flexible, timely manner. Initially, the public believed COVID-19 spread from touching infected surfaces, which prompted aggressive cleaning practices multiple times a day. However, six months after the Centers for Disease Control and Prevention (CDC) confirmed that the virus spread via aerosol transmission, residents and building staff still consistently used harsh cleaning products to disinfect frequently touched surfaces. Unfortunately, repeated, direct exposure to these chemicals can lead to indirect adverse health outcomes, which emphasizes the importance of responding to new information when it comes to protecting your health (Torborg, 2018).

Supply staff with the tools and guidance they need to support resident health and well-being during emergencies. During the pandemic, several properties enlisted operators to help beyond their daily roles to monitor residents' mental and physical health needs without training or guidance. If operators continue to do so, then building workers need clear guidance to successfully support resident health needs. According to our study findings, the senior residents in this study valued this more personal communication and would like it to continue in the future.

Customize communication and connection. Diverse, intergenerational residents may require different types of spatial and interpersonal communication strategies with building operators and staff. During the pandemic, while residents preferred in-person communication, staff could not always accommodate this due to social distancing guidelines. But through access to wi-fi, digital dashboards, group text threads, bulletin boards along highly visible routes, kiosks, decals, and signage at the entrances and exits, residents received necessary information about protocols and changes. Buildings with ground floor offices and reception desks reported more in-person check-ins and resident support.

Save energy, promote people. Highly energy-efficient buildings currently cost more to build than traditional buildings. However, sustainable design strategies, such as passive house standards, that promote energy efficiency and indoor environmental quality, can support multiple benefits to residents, such as lower energy costs, improved air quality, and better insulation to combat noise pollution (e.g., traffic, construction, aircraft noise, other residents).

Incentivize design choices that promote health and sustainability. Many states have incentives for energy-efficient buildings. In the Wyoming case study, we found that the Wyoming Community Development Authority (WCDA) controls the purse strings and applies a scoring system for health and sustainability to proposed initiatives to determine which projects get funding—creating the opportunity for residents to benefit from these measures.

LOOKING AHEAD

Place

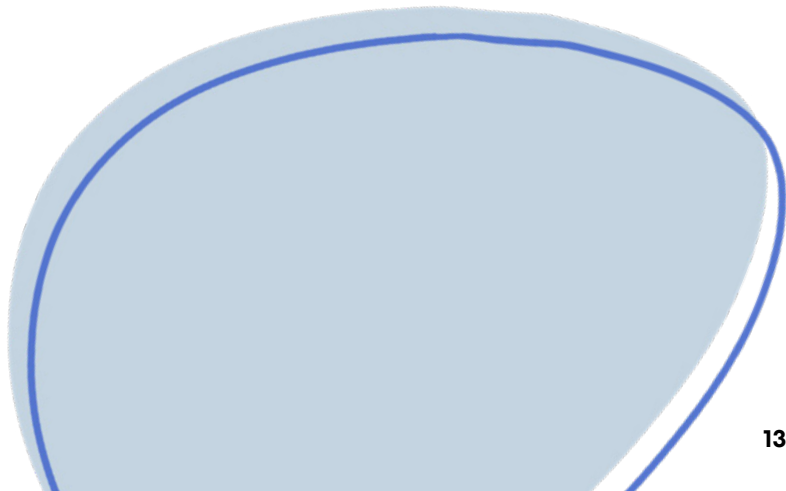
Consider the larger community. Affordable housing is part of a larger ecosystem and not an isolated element. Health and well-being can inform where affordable housing gets developed, such as within a food desert versus an amenity-rich community. Across our case studies, we found deliberate efforts to connect residents with everyday resources.

Different modes included access to public transit (Progress Foundation, Beach Green Dunes II), pedestrian- and transit-friendly streets leading to everyday needs (Wyoming), and nearby community anchors to strengthen social infrastructure (Northtown Library).

Provide flexible multipurpose spaces. Affordable housing projects often operate off razor thin design budgets, so every inch is accounted for in the program. But reducing the footprint to its smallest possible configuration often requires removing space types that are not considered fundamental. It is imperative that the design team and stakeholders drive to include spaces that allow for flexibility and adaptability and serve a potentially wide variety of uses. These multipurpose space solutions could be small and simple, such as widening the corridor to allow for safe spontaneous congregation, or larger and more complex, like common areas designated for laundry, cooking, or other active uses.

Prioritize thermal comfort. Survey findings showed that thermal comfort (heating and cooling) consistently came up as one of the top features that residents would include in the future redesign of their home. People spent more time indoors during the pandemic, indoor environmental quality became increasingly important. Additionally, studies show that poor thermal comfort is associated with diminished cognitive function, which could influence people working and learning at home (Cedeno Laurent et al, 2018) —a new normal in the aftermath of the COVID-19 pandemic.

Give residents environmental control. By giving control over temperature, air quality, dimmable lighting, and shades and flexible furniture layouts, residents can experience improved psychological and physiological well-being.



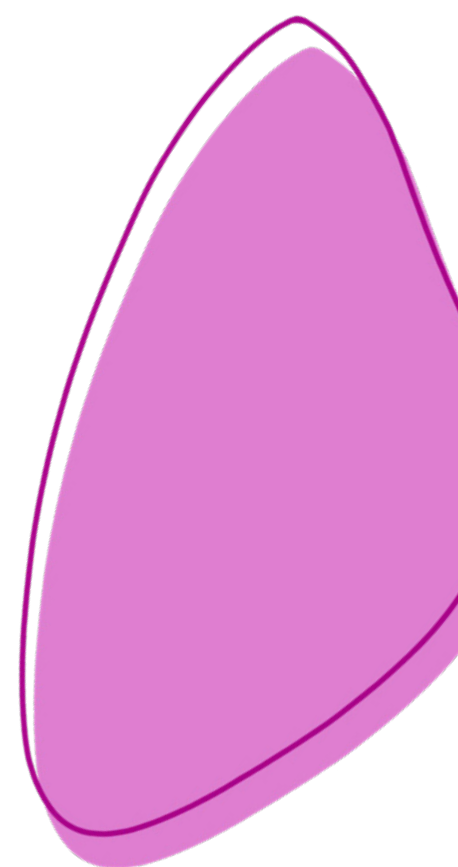
People

Make it personal. The external and internal appearance of an affordable housing building can lead to stigma for residents, a lack of self-worth or ownership, or lower integration into the surrounding community. Case studies that created a sense of home and pride combatted sterile, one-size-fits-all approaches. For Northtown Library, a large mural by local artists reflected the community's identity. While at the Progress Foundation, its thrift store furniture made the interiors feel more like a shared living room than a clinical facility.

Tailor building design to residents who will occupy them. Responsive design that considers residents' health as well as age-related and cultural needs benefits all, especially those people who are acutely and chronically experiencing mental and physical health conditions. However, in our research, we did not find a case study that effectively highlighted the adoption of universal design practices, thus limiting the benefits to the most vulnerable residents of affordable housing (e.g., individuals with mobility, visual, auditory, or cognitive impairments). More design work and community engagement is needed to create an inclusive environment. Spaces can be adaptable to unknown circumstances, specifically wider circulation corridors and ground level multi-purpose spaces, which can create opportunities for population-appropriate risk mitigation strategies.

Reduce staff stress during emergency response. The building staff interviewed during this study were the first line of defense for many residents seeking crisis-related support, which included food, COVID-19 guidance, and services. Providing staff with adequate administrative support, supplies, space, and time for respite can alleviate increased pressures during an emergency, which ultimately affects resident health, satisfaction, and well-being.

Connect to the outdoors. In our case studies, residents repeatedly highlighted the importance of surrounding green space, shared garden spaces, the desire for private balconies, and shaded outdoor seating. During emotionally stressful and socially isolated times, the benefits of outdoor views and biophilic environments may have measurable impacts on residents. Studies have shown that access to the outdoors is associated with lower blood pressure, reduced heart rate, lower levels of depression, and improved short-term memory (Shanahan et al, 2016; Tomasso et al., 2021).



Conclusion

With tools at our fingertips and lessons learned during an ongoing pandemic, this report connects the public health evidence with design solutions for the future of healthy, affordable housing. To support individuals and communities in their collective dignity, agency, and well-being, we need to respect the distinct populations across the affordable housing spectrum, which includes supportive, supported, and independent projects.

Our Eight Guiding Principles act as a North Star for designers and architects during early decision-making so they can optimize tenants' health and energy benefits when living within these buildings. In this resource, the design community will find an array of existing research, tools for practitioners, and building certifications to put public health into action.

Everyone deserves a safe place to live. But for many families in affordable housing, they do not have a choice on where they call home. If we are up to the challenge, our development, design, and operations decisions act as opportunities to promote health and resiliency among the most vulnerable populations.

Throughout the COVID-19 pandemic, we've witnessed the fragility of human life and how buildings—and more specifically, our homes—can affect both our physical and mental health. And while this will not be the last crisis we face, learning from some of our country's hardest-hit households and most innovative affordable properties will set residents up to better withstand any challenges they may face.

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Key Takeaways

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