

Age and Dementia Friendly Design Considerations for Physical Infrastructure

2022

Age and Dementia Friendly Physical Infrastructure Team of the Massachusetts
Advisory Council on Alzheimer's Disease and All Other Dementias

September 2022



Dear Reader,

Thank you for your interest in exploring age and dementia friendly design for our built environment. As chair of the [Massachusetts Advisory Council on Alzheimer's Disease and All Other Dementias](#), established in state law in Chapter 220 of the Acts of 2018, I am pleased to release this document, entitled, **Age and Dementia Friendly Design Considerations for Physical Infrastructure**. I am grateful to members of the Council, dedicated to advancing policies and practices in support of individuals and families living with dementia. I am especially grateful to the Council's Physical Infrastructure Workgroup (listed in Appendix A), who have worked together, applying their shared knowledge, to create these recommendations for your consideration.

As we age, cognitive and physical changes can make it difficult to navigate both internal and external spaces – our built environment. Dementia involves a loss of cognitive function, such as reasoning; and physical symptoms often include growing problems with movement or balance as the illness progresses. Design features described in the attached report help improve an aging person's ability to navigate both inside and outside environments, and these considerations are especially helpful for people living with dementia.

We crafted this document to assist anyone involved in designing buildings and outdoor spaces across the Commonwealth, whether you are architects, engineers, designers, builders, city/town planners, regional planners, financiers, municipal and state government officials, or Council on Aging directors. The ideas in this document just scratch the surface of the many ways our built environment can meet changing cognitive and physical abilities. As you consider the recommendations, we hope these ideas will also stimulate innovation and other examples to showcase in future publications.

Thank you for your interest in shaping a built environment so that *Massachusetts is a great place to grow up and to grow old together!*

Sincerely,

A handwritten signature in black ink, appearing to read 'Elizabeth Chen', with a long horizontal flourish extending to the right.

Elizabeth Chen, PhD, MBA, MPH
Massachusetts Executive Office of Elder Affairs

For more information about [Dementia](#) | [National Institute on Aging](#)

TABLE OF CONTENTS

TOPIC	PAGE #
Aging, Dementia, and the Physical Environment	3
Approach to Designing Infrastructure with Aging and Dementia in Mind	6
Buildings	7
Public Outdoor Spaces	11
Transportation	13
Housing Developments	14
Appendix A	18
Appendix B	19
Appendix C	20
Acknowledgements	21

Aging, Dementia, and the Physical Environment

Autonomy is fundamental to our dignity as we age. The built environment plays a principal role in impacting the health and wellbeing of older adults of all abilities. Thoughtful and inclusive design of physical spaces not only promotes independence and social connectedness among older adults, but makes all public spaces more enjoyable and accessible to everyone. [Inclusive Design](#) is age- and dementia-friendly – it builds on [Universal Design](#) principles that account for individual needs and address a wide range of capacities and functional needs across the lifespan. In contrast to a one-size-fits-all approach, inclusive design goes further by working with individuals to consider how the built environment will function for those individuals. For example, age- and dementia-friendly housing can encourage aging in place through accessibility and maintenance of social connections in the community. Age- and dementia-friendly buildings feature barrier-free design and will not require major adaptations to make them usable to people with various levels of functional needs. Age- and dementia-friendly public outdoor spaces facilitate safe and enjoyable use of outdoor spaces by older adults. Age- and dementia-friendly public transport enables older adults to get around and enhances their mobility.

Inclusive design can address functional needs arising from dementia. According to the National Institute on Aging, “Dementia is the loss of cognitive functioning (thinking, remembering, and reasoning) and behavioral abilities to such an extent that it interferes with a person’s daily life and activities.”³ Although dementia has many causes, Alzheimer’s disease is the most common cause and the vast majority of people who develop dementia are age 65 or older.

Although dementia is not a normal part of aging, there are about 130,000 people in Massachusetts diagnosed with dementia and this number is growing rapidly.⁴ For a variety of reasons, dementia often goes underdiagnosed. It is estimated that there are as many people living with undiagnosed dementia as there are individuals living with a dementia diagnosis.⁵ More than three-quarters of people living with dementia live at home and can thrive by remaining socially engaged with other community members.⁶ In the United States, Alzheimer’s and dementia-related disorders disproportionately impact people of color who are more likely to develop dementia than their white counterparts.⁷



While the symptoms experienced by people living with dementia differ from person to person, they can include:

- Memory loss, poor judgment, and confusion that interferes with daily life.
- Wandering and getting lost even in a familiar neighborhood.
- Taking longer to complete normal daily tasks.
- Loss of balance and problems with movement.
- Deterioration of visual abilities.

The physical environment plays a critical role in promoting quality of life for people living with dementia by partially compensating for lost abilities. When physical infrastructure includes design elements that are “dementia friendly,” and communities spread dementia awareness among its residents, people living with dementia and their families experience numerous benefits. Those benefits include reduced agitation and distress, improved safety, greater independence, opportunities for social engagement, and an overall improved ability to engage in activities of daily life.

Programs that promote dementia awareness among community residents, such those provided as part of **Dementia Friendly Massachusetts**, are an important complement to age- and dementia-friendly physical infrastructure. This includes the Dementia Friendly MA program that has educated more than 11,000 Dementia Friends across the Commonwealth. For example, the **Dementia Friendly Transportation Training** program offers drivers the tools to recognize signs of dementia and serve riders whose disabilities might not be immediately apparent. For additional information about Alzheimer’s Disease and other Dementias, contact the [Alzheimer’s Association](#).

Approach to Designing Infrastructure with Aging & Dementia in Mind

Commonly accepted physical traits of age and dementia friendly communities focus on design principles that incorporate:

- Inclusive design that considers many aspects of human diversity affecting a person's ability to use the environment, such as ability, gender, age, and culture.
- Easily recognizable design features that are unambiguous and meet people's expectations in terms of appearance, size, and usability.
- Design that clearly designates the purpose for which the place is intended, and uses color, contrast, and clear signage to provide clues to orientation and wayfinding.

The remainder of this document includes age and dementia friendly design considerations for each of four categories of physical infrastructure:

1. Buildings
2. Public Outdoor Spaces
3. Transportation
4. Housing Developments



Buildings

Entrances

The primary entrance is at ground level and wide enough to accommodate a mobility device. Entrances and the building's name or purpose should be immediately apparent and recognizable on approach. Consider placing a sign that says "entrance" at eye level at each entrance. By way of further distinguishing a public entrance, consider using color contrast, art, awnings or landmarks.

Consider signage that clearly indicates the building's name or purpose in locations that are visible on approach and from different angles.



Seating

Seating outside the building (such as benches) and inside (chairs) have a familiar appearance. For example, choose a recognizable shaped bench with armrests over an abstract or decorative looking bench, as the purpose of an abstract object might not be apparent.



Buildings

Entryways

Entryways and exits are obvious and unambiguous, such as framed glass sliding/automatic doors that are clearly marked as entrances or exits at eye level. Doors and gates should not require excessive pressure to maneuver. Longer lever handles instead of turn knobs are easier for gripping. Mechanisms such as door push buttons should be visible or have instructions when appropriate. Sidewalks are wide enough for a wheelchair and have curb cuts to the road level. Sidewalks are non-slip and obstruction free.

Flooring

Flooring and paths of travel are non-reflective and have colors and textures that contrast with walls and doors. Whenever possible, pathways should offer wide, flat, and smooth surfaces. For example, consider subtle patterns for your floors because contrasted patterns can cause perceptual problems. Avoid high contrasted floors as people with dementia can perceive large dark areas as holes. When you have a ramp or a step, clear markings with handrails and a non-slip, non-glare surface will ensure safety. Carpet is limited to small areas to reduce tripping. Select low-pile and easy to clean carpet.



Buildings



Wayfinding

Wayfinding and directional signage at key intersections consist of realistic visuals, with sizable fonts and which are easy to spot and read. Consider signage from your lobby to other destinations in the building such as bathrooms, composed of common, recognizable graphics or symbols that are color contrasted with their background, non-reflective, and affixed at an eye level. Signs should also be affixed to areas they represent, rather than on adjacent surfaces. Paths of travel between frequently used services (transport, home, building entrance) are continuous and do not require shortcuts through alleyways or landscape. A unique color scheme for each floor of the building can aid wayfinding while stepping out of an elevator or stairwell. Avoid forks in circulation paths that require decision making and may cause confusion.

Buildings

New construction

If you are designing a new building, consider a simple building typology and an open floor plan allowing glimpses into other areas. Alternatively, consider wide and short single banked corridors, and include windows, which can help with orientation as well as provide natural light. Artificial lighting is best if controllable to avoid glare. Further benefits can be obtained by installing tunable white circadian/biologic lighting in selected spaces – that help regulate the sleep wake cycle – for example, and including light fixtures that cast a diffuse and even light on more than one surface such as walls and ceilings, especially in corridors. If you offer parking, consider a well-lit path of travel between your public entrance and designated parking areas.

Furnishings

All spaces and rooms have obvious purposes. To accomplish this, make use of furniture such as side tables and chairs for the waiting areas, or dining tables and even art depicting food for your kitchen or dining areas. Include furniture without sharp edges and provide color contrast between furnishings and adjacent surfaces to enhance visual perception and prevent falls. While contrasting colors and surfaces between walls, floors and furniture is generally recommended, they should be used when safe and appropriate (use of contrasting patterns next to one another can cause disorientation and may not be an appropriate use of contrast). Corridors should have contrasted handrails on both sides.

Public Outdoor Spaces



Street Planning

A grid-like layout of short streets with clearly visible landmarks. This can improve spatial orientation. Consider using landmarks that can be easily spotted, such as a clock tower, water fountain, or sculpture to aid in wayfinding. Landmarks can be placed at key intersections, exits, and entrances.

Green Spaces

Parks, gardens and green spaces are available, welcoming, and safe for rest and socialization. Consider armrest and backrest seating at key locations or intervals. You may consider painting seating areas or benches in bright colors so that they serve as wayfinding landmarks.



Signage

Outdoor spaces that are easy to interpret with clear and concise signage. Consider limiting directional and wayfinding signage to only what is necessary without being overwhelming. Signage is easy to spot, includes large, easy-to-read font, glare free, and contrasted against its affixed surface. Dementia friendly signage includes symbols and graphics that are standardized for clarity in meaning. For example, consider using the word “bathroom” and a picture of a toilet together on your bathroom sign, as opposed to only using a picture of a man or a woman with a directional arrow.

Paths of Travel

Paths of travel are safe and accessible. This can encourage older adults and people with dementia to exercise and socialize. Sidewalks are pedestrian friendly to encourage travel by foot, and wide enough for side-by-side walking and mobility devices. Sidewalks are well maintained, and have curb cuts. Consider continuous pathways with contrasted edges to avoid tripping. Consider solid surfaces, avoiding patterns, shiny surfaces, and surfaces that might create glare or issues with depth perception. Consider clearly marking all level changes and provide handrails when possible.

Lighting

Well-lit streets and audio cues at crosswalks. Consider installing plenty of light along paths of travel, or other locations where people congregate (bus stops, rest areas, and parks). At crosswalks, consider installing audible cues and adjusting timers to accommodate people who need additional time.

Transportation

Wayfinding

Transit stops are conveniently located whenever possible, safe and accessible to people with mobility disabilities. When stations can't be conveniently located or limited, voluntary transportation service to stations is provided. Clearly marked signage at bus and train stops. Consider marking bus and train stops by using both icons and words, and making signs large enough to notice and read at eye level. When clear and legible signage cannot be provided, consider placing street signs at strategic locations to direct people to transportation hubs. Consider using a non-glare surface for signs and contrast between letters and the surface (dark letters on light surfaces work best).

Visibility

Adequate lighting at or near transit stops. Consider additional lighting at or near transit stops to increase a sense of safety and provide accessibility.



Sheltering

Shelter and comfortable seating at bus and train stops. At transit stops, consider providing shelters (overhead protection) and seating with armrests and backrests.

Communication and Boarding

Transit stops display fares, schedules, maps, and routes clearly, in large font, and at eye level. Bus and shuttle stops are located in areas where vehicles can pull up to passengers for easy, unobstructed boarding.



Housing Developments

There are many factors to consider when designing housing to effectively accommodate aging adults and people living with dementia. Some considerations are listed below. For additional information, please see the section of this document entitled, “Buildings.” More extensive housing design guidance is available in the document entitled, [Universal Design Guidelines Dementia Friendly Dwellings for People with Dementia, their Families and Carers](#) by the Centre for Excellence in Universal Design.

Design

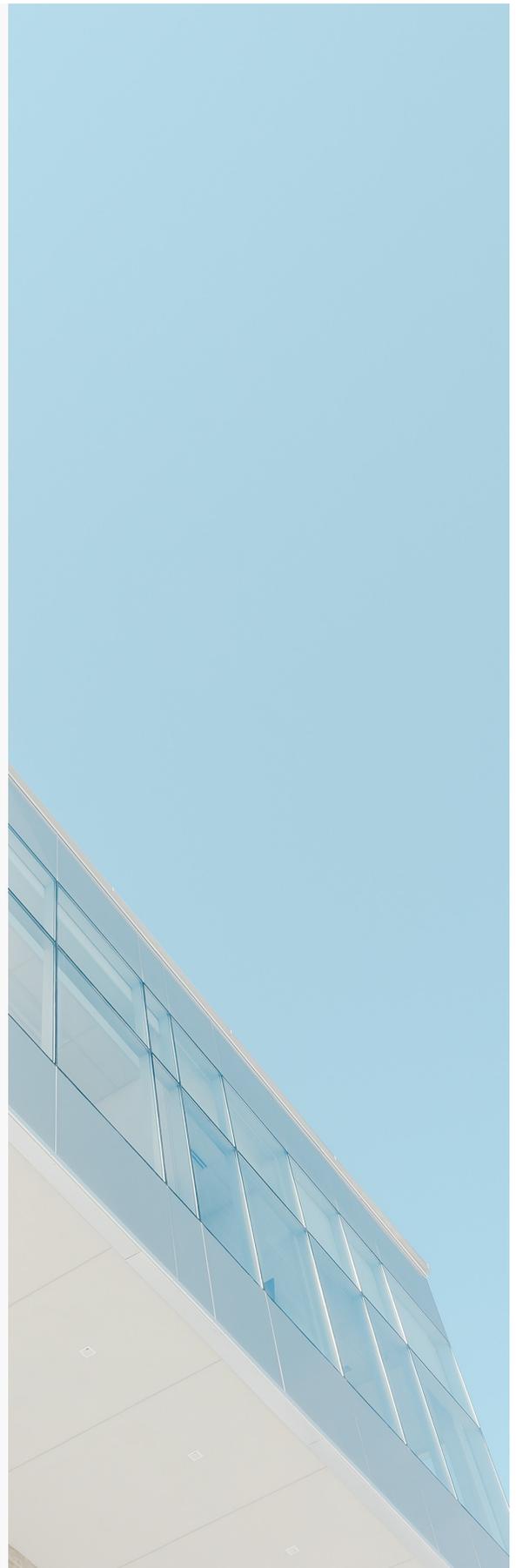
Recognizable design features. Housing developments have familiar design elements and contain recognizable features and functions. Landmarks can become useful in highlighting entrances to buildings to promote wayfinding. You may consider using color and contrast to distinguish important features of the building. For residential units, allow residents to personalize their apartment entrance for easy recognition (planters, colored entrance doors).

Wayfinding

Ample even lighting and signage. Consider providing sufficient lighting and wayfinding signage on the outside, as well as clearly marked pathways to and from an apartment or parking areas.

Accessibility

Visible and intuitive accessibility features. Provide ramps in lieu of stairs when needed but avoid complex ramp designs by using simple and intuitive paths. Handrails should be provided on either side of the ramps whenever possible; color should provide contrast to the adjacent surface. Consider installing a shelf at all exterior unit entrances for temporary placement of packages and other heavy items. Shelves can also hold familiar elements helping with wayfinding and can be a memory aid.



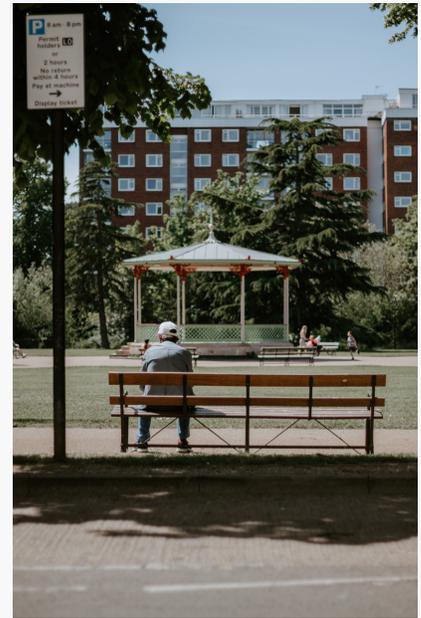
Floor Plan

Open and clear floor plans. Common areas such as lobbies should provide easy visibility to important spaces such as an elevator, mailboxes, or stairs. Open and clear floor plans are advised for common areas, avoiding dead ends and circular, convoluted hallways. Windows can be extremely helpful not only for natural light, but also to aid with orientation within the building as they can be used as landmarks.

Living Quarters

Ample visual access between rooms. Residents should have direct visual access to key rooms such as the kitchen and bathroom. Bathrooms should have grab bars, or provisions for future grab bar installations in the shower and near the toilet. Consider casement windows with an easy to operate mechanism (crank is one example). Hard and smooth flooring to reduce tripping hazards. If using carpet, a low pile carpet is best to reduce tripping and aid with mobility devices. Kitchens have drawers in lieu of lower cabinets or cabinets with sliding drawer inserts and 'lazy Susan' for corner cabinets for easy reach.





Contrast

Sufficient use of contrast to avoid perception mishaps. Distinguish walls from floors, and consider using tone and color for contrast between furniture and floor. Avoid flooring and countertops that cause glare or have a glossy finish.

Lighting

Strategic use of lighting. Install ample light in the kitchen and dining areas to aid with food preparation and prevent injuries. Diffuse lighting should be used to avoid deep pools of light which can cause glare and create depth perception problems.

Memory Aids

Features that help prompt a resident's memory. Use of images, photos, and labels throughout the home is encouraged when needed for recall.

Safety Features

Devices and materials that help keep residents safe. Consider installing safety devices or provisions for safety devices, such as alarms and automatic shut-off valves for appliances and water.

Outdoor Access

Physical and visual access to safe outdoor spaces. Access to the outdoors is recommended. Natural light and views of the outdoors help orientation and provide a sense of connection to the environment.

Appendix A

Age and Dementia Friendly Physical Infrastructure Team

Co-Leads:

Patty Sullivan, Program Manager, Dementia Friendly MA – MA Councils on Aging

James Fuccione, MPA, Senior Director – MA Healthy Aging Collaborative

Members:

Pam MacLeod, MBA, PMP, Senior Project Director – MA Executive Office of Elder Affairs and University of Massachusetts Chan Medical School

Sandra Martin, MEP, MPH, Senior Planner and Health Agent – Berkshire Public Health Alliance, Public Health Program at Berkshire Regional Planning Commission

Molly McKenna, MSW LCSW, Programs Development Manager – 2Life Communities

Maureen Mullaney, MA, Transportation and GIS Program Manager II – Franklin Regional Council of Governments

Ruth Neeman, AIA, Principal, Director of Senior Environments Studio – LWDA

Philippe Saad, AIA, LEED AP, Principal – DiMella Shaffer

Sanja Stegich, Intern

Amy Walsh, Project Manager – Institute for Healthcare Improvement

Appendix B

References

- 1, 8 Recalcati, Stefano. Rethinking Cities in an Age Friendly Way. Rocca Gallery, Feb. 2020, <http://www.rocagallery.com/rethinking-cities-in-an-age-friendly-way>. Accessed March 6, 2022.
- 2 Chau,H.-W.;Jamei,E. Age-Friendly Built Environment. Encyclopedia 2021, 1, 781–791. <https://doi.org/10.3390/encyclopedia1030060>
- 3 National Institute on Aging. Alzheimer’s Disease Fact Sheet. US. Department of Health and Human Services. <https://www.nia.nih.gov/health/alzheimers-disease-fact-sheet>. Accessed March 6, 2022.
- 4 Liesi, H., Rush University Institute on Healthy Aging; based on data from the Chicago Health and Aging Project: Weuve, J., Hebert, L.E., Scherr, P.A., Evans, D.A., Prevalence of Alzheimer disease in U.S. states. *Epidemiology* 2015;26(1): E4-6. <https://doi:10.1097/EDE.0000000000000199>. PMID: 25437325.
- 5 Boustani, M., Peterson, B., Hanson, L., Harris, R., Lohr, K. N., & U.S. Preventive Services Task Force (2003). Screening for dementia in primary care: a summary of the evidence for the U.S. Preventive Services Task Force. *Annals of internal medicine*, 138(11), 927–937. <https://doi.org/10.7326/0003-4819-138-11-200306030-00015>
- 6 RTI International, Living Arrangements of People With Alzheimer’s Disease and Related Dementias: Implications for Services and Supports, Issue Brief, October 11, 2017.
- 7 U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, Racial and Ethnic Disparities: A Literature Review, 2014.

Appendix C

Bibliography

Commission for Architecture and the Built Environment: The Principles of Inclusive Design (They Include You).

<https://www.designcouncil.org.uk/sites/default/files/asset/document/the-principles-of-inclusive-design.pdf>. Accessed March 6, 2022.

Robert Piccolo. Inclusive Design Guidelines (second edition). New York City Mayor's Office for People with Disabilities.

University of Cambridge. Inclusive Design Toolkit.

<https://inclusivedesigntoolkit.com/whatis/whatis.html>. Accessed March 6, 2022.

Massachusetts Executive Office of Elder Affairs: [Massachusetts Age and Dementia Friendly Integration Toolkit](#)

Checklist for Dementia Friendly Environments (Plymouth, England) (https://www.dementiaaction.org.uk/assets/0001/0392/1_Dementia_Friendly_Plymouth_Checklist_WEB.pdf)

Dementia Friendly Environment Checklist (UK)

https://www.metrofamily.org/wp-content/uploads/2019/12/DUP_Dementia-Friendly-Environment_Checklist.pdf

Guidelines for Aging in Community:

(https://www.2lifecommunities.org/sites/default/files/2019-03/2Life_Design_Guide_lines_for_Aging_in_Community.pdf)

Creating a Supportive Environment using Cues for Wayfinding:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5358323/>

[Checklist for Designing Dementia Friendly Environments](#), Housing Learning and Improvement Network, 2012

[8 Infrastructure Improvements to Help Older Adults Age in Community](#), WalkBoston, 2020

[Dementia Friendly Dwellings](#), Centre for Excellence in Universal Design and NDA, 2015

Acknowledgements

This document reflects a collaborative effort among all members of the Age and Dementia Friendly Physical Infrastructure Team (listed in Appendix A). We sincerely appreciate their valued time, expertise, and commitment to improving the quality of life of the Commonwealth's residents as they age. We are especially grateful to Sanja Stegich, whose research and writing skills were instrumental in producing this document. Additionally, we would like to express our gratitude to the team's co-leads, Patty Sullivan and James Fuccione, for their leadership and insightful advice. Eleanor (Ellie) Romano's design and editing skills were essential in making the document readable and flow easily. Finally, we thank Elizabeth Chen, Secretary of the Executive Office of Elder Affairs for her ongoing support and unwavering commitment to the Commonwealth's age and dementia friendly efforts.

BUMP