Designing for Senior Living

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By 2035, older adults are projected to outnumber children for the first time in U.S. history. This demographic transformation caused by a rapidly aging population is new for the United States. With this swelling number of older adults, the country could see greater demand for healthcare, in-home caregiving, and assisted living facilities. For this reason, Universal Design (UD), a process that improves human performance, health, wellness, and social participation for a diverse population, is increasingly important.

Performance-based UD addresses usability issues for people of all abilities. UD principles include 1) equitable use, 2) flexibility in use, 3) simple and intuitive, 4) perceptible information, 5) tolerance for error, 6) low physical effort, and 7) size and space for approach.

UD can increase independence and access to care, amenities, and social opportunities, while reducing adverse effects such as fall risk and mobility issues [1].

Design Requirements

Several key standards, codes, and guidelines apply to the building and design of senior living spaces. Because the principles of UD can overlap with these requirements as shown in Figure 1, it's important to understand them.

First, healthcare and long-term care projects must follow building codes (e.g. International Building Code) and licensing codes. Building codes are regulated by the building department, while licensing codes are regulated by jurisdiction over the licensing of healthcare setting.

Adopted licensing codes vary by state and may reference design guidelines that have been developed by the Facility Guidelines Institute (FGI). The FGI provides guidance on hospital, outpatient, and residential health, care, and support facilities planning, design, and construction.

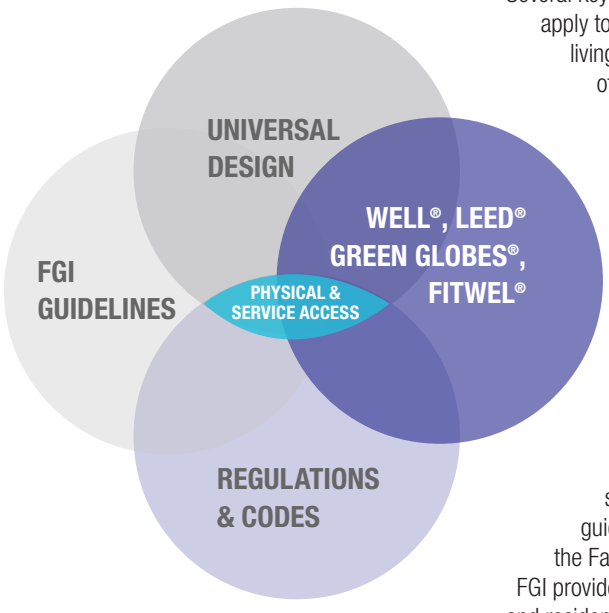

Figure 1: Senior living designs are guided by overlapping mandatory and voluntary requirements.

Functional Program

In the design process, the first stage following project initiation is the development of a Functional Program. This is an initial planning document which provides the purpose of the project and key project requirements. A well-developed thought-out Functional Program is a record of the results of evaluating the who, what, where, when, why, and how of various services and operations reflective of the Owner's Project Requirements (OPR). The Functional Program documents the physical space (e.g. sizes, adjacencies) based on the operational functions and flows; such as environmental services, nursing care, dining services, deliveries, and facilities management. It's important to understand how a building or space will be used in order to provide staff, patients, residents, and visitors an opportunity to maximize outcomes, increase safety, reduce risk, and improve users' quality of life.

Safety Risk Assessment

A safety risk assessment (SRA) is an important element of the programming and planning process. An SRA uses a multi-disciplinary team to evaluate potential risks within the built environment during the planning phase. The SRA includes evaluation of infection control, patient handling and movement, fall, medication safety, behavioral and mental health, patient immobility, and security risk assessments.

Identifying the Care Population

The design team should seek to understand and evaluate the demographic of the care population in addition to the diagnosis of the anticipated occupants. By fully understanding the residents, patients, staff backgrounds, desired outcomes, and the needs of older adults, Universal Design principles can increase occupant independence and safety. Because older patients and residents may experience impairments or limitations due to surgery, medication, and visual and auditory limitations, it is important to design to reduce and limit barriers.

Health & Wellness: Addressing of Human Comfort

As part of the design process, designers may want to evaluate and discuss with clients their plans to utilize a sustainability and/or health and wellness certification system. The sustainable building movement addresses the built environment and the health and wellbeing of the building occupant. Originally focused on the work environment, the WELL® and Fitwel® certification systems, which address human comfort, are now influencing healthcare and for Fitwel®, the senior living and multi-family segments.

Many of the criteria provided within the certification systems are items that are evaluated as part of the Functional Program and the Safety Risk Assessment (SRA). From a documentation perspective, using the Functional Programming document to include notes and potential certification system credits that apply to the various operational and building functions is one way to create a comprehensive document that includes all the information within one framework. This can be used for reference and decision-making throughout the design process. The following information specifically references lighting, acoustics, thermal comfort, and material selection.

Lighting Comfort

The criteria in the Illuminating Engineers Society (IES) Standard: ANSI/IES RP-12 *American National Standard Practice for Office Lighting* focus on user control and comfort and provide lighting levels based on a users' age. This provides designers with additional questions to ask during the planning and programming process that addresses the demographic of those utilizing work spaces, allowing low-vision requirements to become more main stream versus only referencing ANSI/IES RP-28 *Lighting and the Visual Environment for Senior Living* for long-term care and ANSI/IES RP-29 *Lighting for Hospitals and Healthcare Facilities* for other healthcare settings.

Lighting comfort also is addressed by personal control of task and ambient lighting, as some people need higher light levels than others. Another design consideration includes the access to the right type, color, and temperature of lighting that supports appropriate circadian rhythm, a natural "clock" within individuals that controls biological systems. Newer technologies contributing to health and wellness outcomes, are available with the advent of LED lighting and the utilization of systems that positively impact the reset of circadian rhythms for staff, patients, and residents. As part of lighting comfort, the specification of lighting systems includes evaluation of both artificial and natural daylighting as a focus within the Fitwel® and WELL® certification programs.

Acoustic Comfort

Acoustic comfort and speech privacy are predominantly achieved through the selection of materials and in some cases sound masking systems may be appropriate to improve indoor environmental quality and occupant outcomes. Research is available on the adverse effects of environmental noise on users of space[2].

Thermal Comfort

The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) is responsible for the on-going updates and development of Standard 55, Thermal Environmental Conditions for Human Occupancy, which specifies conditions for acceptable thermal environments and is intended for use in design, operation, and commissioning of buildings.

For individual resident or patient rooms, it is recommended to provide a range of temperature that provides individual control based upon the person occupying the room. This may be significantly warmer than staff requirements, because of the activity level of staff and the sedentary nature of residents and patients. For bathing areas, there has been some success with using radiant floors and/or radiant wall panels to increase the warmth level for a patient or resident but reduce the direct impact to the staff member.

Selection and Specification of Materials: and Building Products

The concept of including material health as an attribute is a growing trend in health and wellness certifications, and within the specifier community. Increasingly, designers and specifiers are selecting materials and products based on material health attributes.

In evaluating all aspects of material selection, it is recommended to follow the evidence, use a life cycle approach to product manufacturing and selection, and specify product based upon Owner Project Requirements (OPR). Products being evaluated and compared must have the same performance criteria (e.g. cleanability, product service life).

It is not recommended to take a single attribute approach to product selection in order to avoid unintended consequences and potential premature product and/or material failures. Ultimately, the goal is to evaluate all products that contribute to lighting, thermal, acoustic, and indoor air quality within the context of the environment being designed and the performance characteristics needed.

The FGI Guidelines include criteria for selecting surface materials related to light and contrast, glare, and pattern and texture.

Light and Contrast

The use of contrast inappropriately, such as high contrast between two flooring surfaces in the same plane versus using tonal patterns between two adjoining surfaces, can limit a user or enhance the experience, respectively. High contrast within the same surface or plane, such as a flooring surface, can be perceived as holes, wet surfaces, or a change in height of a floor surface – all contributing to fall risk for those with low vision[4]. If universally designed, using a contrast between change in surfaces/ planes; such as the edge of a chair

Photograph 1: Example of a recommended tonal transition of materials - carpet to LVT.

and the floor, provides a clear distinction in surfaces that assist with perception, further reducing fall risk. Using contrast to help identify assistive devices/components within a space is another design strategy that can reduce fall risk and enable mobility – examples include contrast between handrails and the wall surface behind the handrail, using a contrasting color behind a toilet fixture to highlight the fixture and location, and specifying grab bar colors that contrast against a wall surface.

Light Reflectance Value (LRV) is the light reflective characteristics of a surface and refers to how light or dark a color is on a scale of 1 (black) to 100 (white). LRV is used to create appropriate contrast between surfaces. A minimum of thirty (30) points difference in LRV between a horizontal surface and a vertical surface, as illustrated in Photograph 2, provides appropriate contrast that will allow users of a space to clearly identify the edges of a space and understand where a surface stops and starts. For evaluation and recommendations of Light Reflectance Values (LRV) between horizontal and vertical surfaces that support universal design principles, see the *Design Guideline for the Visual Environment* completed by the National Institute of Building Sciences (NIBS)[3].

Photograph 2: LRV is used to create appropriate contrast between surfaces. Thirty (30) points minimum difference in LRV between a horizontal surface and a vertical surface provides appropriate contrast.

Glare

Glare in any space caused by direct artificial lighting or natural daylight can contribute to fall risk, lighting discomfort, difficulty seeing clearly, and impact those with vision issues; such as cataracts, glaucoma, and macular degeneration.

Unfortunately, in some healthcare settings, shiny floors are perceived as cleaner than matte finish floors. However, with the popularity and specification of products, such as luxury vinyl tile (LVT) that do not require waxing by environmental service departments coupled with education and training, there is an advancement of busting the myth that "shiny equals clean".

Through the elimination of waxing and stripping, glare is reduced and indoor air quality improved.

Pattern and Texture

Pattern and texture can be used within universally designed spaces if the color and pattern does not create too high of a contrast. For example, if a flooring product has a busy pattern in highly contrasting colors, it can "move" or be perceived as having various depths or changes in level within a floor surface as shown in Figure 2. This can be disconcerting to anyone, but particularly those that have

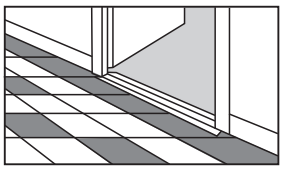

Figure 2: Example of a bad transition with a high threshold and high color contrast that can be perceived as level changes.

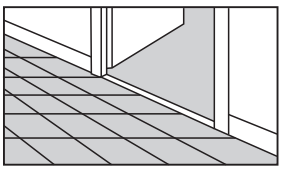

Figure 3: Example of a good transition with a low contrast floor and level threshold.

low vision or vertigo issues, and can create a fall risk. The goal is to use pattern and colors that have the same tone of finish (tonal), which means that the adjacent surfaces do not create a contrast that can be perceived as a change in surface height, as shown in Figure 3. It is recommended to use contrast change between the floor and wall plane, which assists the user to better move through a space. Using tonal patterns and materials in conjunction with zero height transitions between materials is the optimum condition when installing flooring from a universal design perspective. Experience has demonstrated that within settings designed for residents with dementia, if a corridor floor is too high contrast to a resident's room floor as shown in Figure 2, they may not enter the space – limiting their movement and ability to be as independent as possible.

Photograph 3: JSR Associates, Inc.: Easter Seals Adult Day Care Center: Tonal pattern and materials flooring example with "zero" height transition and high contrast used on vertical walls and cabinetry surfaces.

Conclusion

Thoughtful design approaches that maximize the efficient and safe use of a healthcare environment by completing a planning and programming process includes the following steps to ensure better outcomes and an enhanced experience for patients, residents, and staff:

- Evaluation and inclusion of Universal Design principles;
- Completion of a Functional Programming process and document results;
- Completion of a safety risk assessment / resident safety risk assessment and include outcomes in Functional Programming documentation;
- Identification of the care population as it relates to the geographic location, cultural impacts, and age/ability demographics in conjunction with care, services, amenities, and diagnosis of patients and residents;
- Evaluate sustainability and health and wellness certifications and/or criteria and include all attributes in the Functional Programming documentation;
- Within the Functional Program identify strategies for addressing lighting, acoustical, and thermal comfort needs, and other indoor environmental quality aspects for the care population, staff, and visitors; and
- Use the Functional Program as a basis for decision-making.

Information regarding the author:

Jane Rohde is the Founder and Principal of JSR Associates, Inc., a healthcare, senior living, and sustainability consulting and design practice located in Catonsville, Maryland. Jane is the recipient of the first Environments for Aging Changemaker Award received from the Center for Health Design in 2015 and she received the ASID Design for Humanity Award, was recognized as an Honorary Alumni of Clemson University's Architecture + Health program, and has been honored as a leader in healthcare and senior living design, by receiving the Women in Design award in 2018 with nine peers in various verticals from across the nation. The Vinyl Institute awarded her the Partner of the Year Award for her sustainability consulting and advocacy work in 2018. For more information or comments, please contact Jane Rohde at jane@jsrassociates.net or visit JSR Associates, Inc.'s website: www.jsrassociates.net.

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