eye on THE BOOMERS

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In prior articles of "Eye on the Boomers," we have discussed the sensory loss that is common to the normal aging process and the gradual changes to the eyes. Appropriate light sources and luminaires for older adults need to minimize the impact of age-related vision changes by providing high-quality lighting, including higher light levels without glare, uniformity and greater contrast in the visual environment.

In addition to meeting visual needs, we must also address maintenance or lamp life of the lighting system and light for health—specifically circadian rhythm. With 10,000 Americans turning 65 every day starting in 2012, we need solutions that meet their needs while we also diligently pursue the equally demanding issue of energy conservation.

The following factors should play in part in selecting sources.

Lamp life. The short life of incandescent lamps results in a hazardous dark area until the lamp is replaced and requires older home owners to climb on ladders to replace burned-out lamps. Every precaution should be taken to minimize the number of times that lamp replacement is required, since fall-related hip fractures result in death within six months for one-third of those with hip fractures and another one-third never regain their former level of mobility.

Glare. Fixtures must shield light sources from direct view due to the brightness of the light sources and the glare they produce. Glare may be annoying for a younger person yet blinding to an older person. One common problem are CFLs that are installed in a recessed fixture designed for an incandescent lamp, which leaves a few inches of the bright lamp exposed to the viewer.

Sunlight. Greater utilization of daylighting in homes and offices will not only provide higher light levels for aging vision, but also light for health. Without sufficient exposure to bright light during the day for entrainment (stimulation) of the biological clock, older people experience a high degree of circadian disruption, problems with sleep being the most observable aspect. Sleep disorders are a problem for many older people. In fact, only 20 percent of older people report that they have no sleep problems.

Color Temperature. The day/night cycle of light—warm in the early morning, bright cool light during the day, warm in the evening, darkness at night—provides the cues to our body clock to maintain a healthy circadian rhythm. The age-related changes to the eye that reduce the light on the retina impact both vision and circadian rhythm. In addition, age-related changes to the body clock require a stronger and consistent light input. As people age and their mobility decreases, they experience less bright daylight exposure. This is particularly true for people living in retirement or care settings. Most lighting budgets for these do not allow for a dual lighting system that mimics Mother Nature. By taking full advantage of daylighting in the common areas of the facility, the higher color temperature during the day is provided by daylight (except for northern regions during the winter), leaving only the lower color temperatures for early morning, evening and nighttime to be supplied by the lighting system. If daylighting is not possible, then higher light levels with higher color temperature lighting must be supplied by the lighting system during the day.

Geographic considerations will determine the appropriate daylighting techniques, but there are basic principles that apply everywhere. Keeping the light levels balanced within the space is one important consideration. How many times have you visited the home of an older person and found that the draperies/blinds are closed during the day? Most often the brightness of the daylight from a window is so much greater than the general room light that the daylight is perceived as glare.

To correct this problem, the following steps should be taken:

- Use a woven or sheer window covering to diffuse the daylight.
- Provide daylight from more than one direction (opposing walls or skylights). Diffused glazing material in skylights will eliminate the glare and shadows associated with direct beams of sunlight.
- Install lightshelves that divide the window into two segments. The

upper segment is used to bring in daylight which bounces off the upper surface of the lightshelf onto the ceiling, thus distributing the daylight deeper into the room. The lower segment or view window will be shaded by the lightshelf, thus blocking the brightness of the heavens.

Ambient Electric Lighting. Older eyes need even and consistent light levels due to their slower rate of adaptation. Consider throwing out the recessed can lights. Recessed downlights create bright spots on the floor, scalloped patterns on the walls and no light on the ceiling—not a good solution. But, if the devil makes you use a recessed light anyway, please make certain that it has a diffuser to minimize the glare and distribute the light more evenly. Indirect/direct linear sources (fluorescent tube lamps), rather than point source incandescent and LEDs, lend themselves to providing the uniform lighting for both homes and offices. The design of a residential luminaire is critical to its acceptance by the homeowner (and the adult children of the aging parent). The T8 fluorescent tube combined with a low-ballast factor transformer is also very energy efficient.

Task Lighting. Task lighting is one of the few applications where we recommend LEDs. The LED does not produce a great amount of heat and is a point source useful for focusing the light on a given task. Incandescent lamps (especially halogen) produce a great amount of heat and should not be used in close proximity to the user. Older people lose their sense of touch and may not realize that they are getting burned by the lamp or fixture. Their skin is also very thin, delicate and slow to heal.

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Task lights with CFLs also work well as long as the lamp is shielded with a diffuser. The location and type of control switch for the task light is very important. The control should be in easy reach of the user, possibly on the head of the task light. Rocker or toggle switches serve the abilities of older adults better than knobs that turn. Arthritis is the number one chronic condition of older adults, making it difficult to twist a small object or even a door knob. Daylight is an excellent source of high light levels needed for mending, reading or working a puzzle.

SENSITIVITY AND KNOWLEDGE

Lighting for older people is more complex than lighting for younger people. The many age-related changes to the body, eyes and brain require more sensitivity and knowledge from a lighting designer. For vision, the design must provide higher light levels without glare, uniform lighting and greater contrast in the visual environment. Although most lighting designers do not select interior colors and materials, they have the opportunity to share their concern about light reflectance values and contrast with other members of the design team.

With the changes in mobility and reduction of bright daylight exposure for older adults, we need to regard the lighted environment as an important factor in maintaining the health of the older person by including the spectrum and intensity of the day/night cycle of light within the interior environment.

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