

# 24-Hour Lighting Scheme for Older Adults

The LRC proposed a 24-hour lighting scheme for older adults that can positively impact the aging visual, circadian and perceptual systems. The proposed lighting scheme was designed to provide:

- high circadian stimulation (CS) during the day and low stimulation at night,
- good visual conditions during waking hours, and
- night lights that provide perceptual cues to increase postural control and stability.

High CS by light can be achieved by providing at least 400 lux at the cornea of a circadian-effective white light source (i.e., more short-wavelength energy) during the daytime. Light levels recommended here are high enough and long enough to assure an effect on the circadian system of older adults, based on a model of human circadian phototransduction by



Proposed lighting scheme with high CS by day and low CS at night.

Rea and colleagues (2005). The recommended dose also considers the normal changes to the aging eye and was based on estimated melatonin suppression as a function of CS after one hour exposure. No more than 100 lux at the cornea of a less circadian-effective white light source (i.e., less short wavelength energy), such as a 2700 K lamp, is recommended for evening hours.

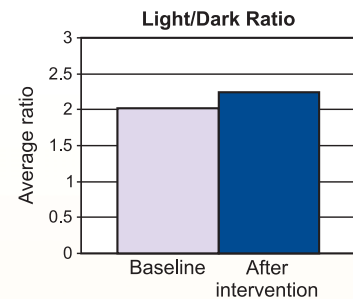
## Sponsor

American Institute of Architects



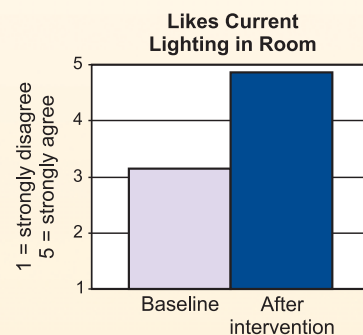
View LRC Project Sheets at  
[www.lrc.rpi.edu/resources/newsroom/projectsheets.asp](http://www.lrc.rpi.edu/resources/newsroom/projectsheets.asp)

To test the effectiveness of this proposed lighting scheme on sleep efficiency of older adults, new lighting was installed in eight private rooms in an assisted living facility. Residents' sleep quality and circadian rest-activity patterns were measured before and after the new lighting was installed.



Increased light/dark ratio after new lighting suggests improved sleep quality for the subjects. Light/dark ratio is the ratio of activity in the light period compared to the dark period. The higher the ratio, the more active subjects were during the day and more asleep at night.

Consistent with previous research results, the four subjects who completed the study showed an improvement in sleep quality and rest/activity rhythms under the new 24-hour lighting scheme. In addition, all eight study participants reported a strong preference for the 24-hour lighting. The new lighting scheme appears to have important practical implications for improving the quality of life for seniors and will hopefully be adopted by architects, lighting specifiers and engineers.



Study participants preferred the new lighting.

Lighting  
Research Center