Midwest Lighting Institute: New study shows innovative LED lighting system cuts risk of seniors falling in long-term care facilities by 43 percent

Posted on Friday, Aug 12, 2022

Published in JAMDA, research is the first-ever study to evaluate a tunable solid-state (LED) lighting system as an intervention to reduce falls

COTTAGE GROVE, Wis., Aug. 11, 2022 /PRNewswire/ — A first-of-its-kind, two-year study conducted by investigators at Brigham and Women's Hospital and the Midwest Lighting Institute (MLI), showed a significant 43 percent reduction in the rate of falls in residents at long-term care facilities that utilized a tunable LED lighting system compared to control facilities that maintained standard lighting. The lighting was operated on a schedule developed by Midwest Light Institute that implements specific spectrum and intensity levels timed to regularize sleep-wake cycles and boost the daytime alerting effects of light. The results were published in the *Journal of the American Medical Directors Association* (JAMDA).

"Falls among care home residents have major health and economic implications, and this study is the first of its kind to translate the known beneficial effects of tunable lighting on neurocognitive responses into a real-world setting and examine if changes in lighting spectrum and intensity throughout the day can reduce the risk of falls in the elderly," said Shadab Rahman, Ph.D. MPH, Investigator in the Division of Sleep and Circadian Disorders at Brigham and Women's Hospital and Assistant Professor of Medicine at Harvard Medical School. "We found that upgrading ambient

lighting is a safe, effective, low-cost, low-burden preventative strategy to reduce fall risk in long-term care settings, one that has tremendous potential to save lives and improve patients' health and well-being."

New Study Shows Innovative LED Lighting System Cuts Risk of Seniors Falling in Long-term Care Facilities by 43 Percent

Tweet this

Falls are the leading cause of injury-related death in U.S. adults aged 65 and older[i] , and the economic impact of falls is immense, with fatal falls estimated to cost $754 million, and non-fatal falls $50 billion annually[ii]. Research has shown that blue-enriched, higher intensity light exposure during the day can improve alertness, cognition, and subsequent nighttime sleep, while blue-depleted lower intensity light exposure at night can help facilitate sleep. Implementing new lighting systems to determine if these improvements could impact patient outcomes had not previously been evaluated in a head-to-head study.

"Fall prevention is a major public health priority given our aging population, and we know that the right lighting at the right time of day can improve alertness, cognition, and sleep, leading to fewer falls," said Rodney Heller, President of MLI and partner at Energy Performance Lighting. "We believe that utilizing modern lighting technology to regularize circadian rhythm could have an enormous impact on a range of health-related outcomes, and we plan to continue our research across other healthcare settings and into specific therapeutic areas."

Study Design and Results

The study, initiated by MLI and supported by the State of Wisconsin Department of Health Services, was designed to assess the impact of a tunable lighting schedule on the rate of falls in long-term care home residents. The observational study examined two pairs of care homes (four sites total) with 758 residents. One site from each pair was selected for a solid-state tunable lighting system upgrade throughout the facility, while the other site served as a control. Energy Performance Lighting completed the installation at each of the experimental study sites.

At the experimental sites, the intensity and spectrum were changed throughout the day to increase exposure to short-wavelength (blue light) during the day (6 a.m. to 6 p.m.) and decrease it overnight (6 p.m. to 6 a.m.). Intensity and spectrum did not change throughout the day at the control sites with standard lighting. The number of falls was aggregated from medical records covering approximately 126,000 resident days to compare the rate of falls per 1,000 resident days between the experimental and control conditions.

Results indicated a similar rate of falls between experimental and control sites before the lighting upgrade (6.94 vs. 6.62 per 1,000 resident days; p=0.82), whereas following the upgrade, the rate of falls was significantly reduced by 43 percent at the experimental sites compared to the control sites (4.82 vs. 8.44 per 1,000 resident days; p=0.004).

Midwest Lighting Institute's lighting system and its application is patented (US 11,109,467) by the United States Patent and Trademark office.

About Midwest Lighting Institute

Midwest Lighting Institute (MLI) is a 501(c)(3) non-profit organization dedicated to transferring laboratory research on light and human physiological response into real-world environments with the goal of speeding up the adoption of lighting methods that deliver healthier environments and lower operating costs. Through investments in research, studies, and patents, MLI believes that proper lighting can improve human health, productivity, and safety while creating an immediate positive impact on the adopting company's bottom line. MLI's mission is to take existing scientific findings about light and well-being and put those into practice in real buildings to benefit people's lives.