

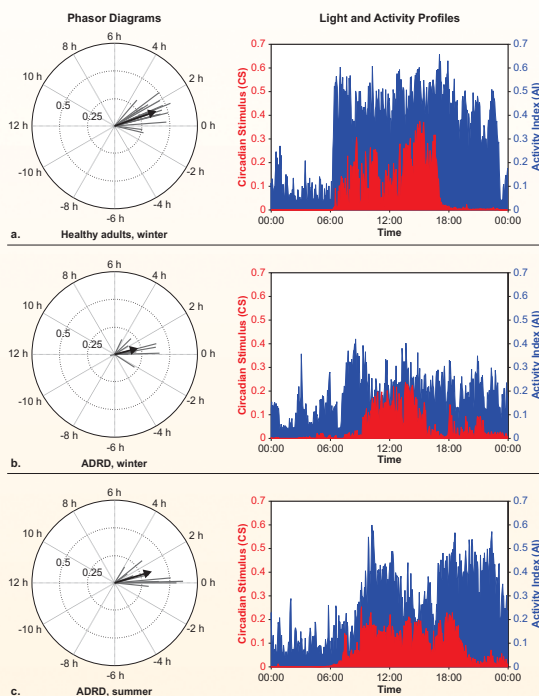
# Exposure to Light Could Help Alzheimer's Patients Sleep Better

Individuals with Alzheimer's disease and related dementias (ADRD) exhibit irregular sleep schedule and night wandering, which is a primary reason they are placed in more controlled environments such as nursing homes. In a recent study, LRC researchers were the first to collect circadian light/dark and activity/rest patterns in individuals with ADRD and compare them to healthy older adults.

## Methods

Sixteen healthy older adults and 21 adults with ADRD wore a Dimesimeter on their wrists for one week.

The Dimesimeter is a small, calibrated light meter developed by the LRC that continuously records light and activity levels. From the resulting data, the researchers calculated two metrics for each subject: relative activity (RA) and phasor magnitude. RA is a "contrast" calculation based upon the most and least active periods in a day; a higher value suggests less circadian disruption. Phasor magnitude measures the resonance between the 24-hour light-dark pattern and the 24-hour activity-rest pattern. The higher the resonance, measured by the phasor magnitude, the greater the circadian entrainment.



Phasor diagrams with light and activity profiles. Individual phasors (gray lines) are shown with the average phasors (arrows) for each of the three groups. (a) healthy adult subjects studied during winter, (b) a group of subjects with ADRD studied during winter, and (c) another group of ADRD subjects studied during summer. Representative 5-day average light (CS, red) and activity (AI, blue) profiles are shown for a selected individual from each group (a-c). The representative individuals are those having the median phasor magnitude within each group.

## Results

Results of the quantitative study showed that:

- Adults with ADRD studied in winter were exposed to less light than healthy adults in winter and ADRD adults in summer.
- During winter, those with ADRD exhibited more circadian disruption than healthy adults as reflected by their significantly shorter phasor magnitudes and lower RA values.
- Adults with ADRD had significantly shorter phasor magnitudes in the winter than in summer.
- Adults with ADRD were less active during waking hours than healthy adults.

## Publication

Figueiro MG, Hamner R, Higgins P, Hornick T, Rea MS. 2012. Field measurements of light exposures and circadian disruption in two populations of older adults. *Journal of Alzheimer's Disease* 31:4.

## Sponsor

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## Conclusion

Looking forward, the Dimesimeter could one day allow physicians to predict the optimum timing of the light therapy necessary to resynchronize the circadian phase with the solar day.

