Study Title: The Effect of Smart Ambient Bright Light for Nursing Home Residents with Alzheimer's Disease and Related Dementias (Smart Lighting Study)

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Data Analysis Plan

Aim 1: Pilot test the effect of SABL in reducing agitation in ADRD.

All data will initially be assessed with descriptive techniques to determine distributions and identify outliers. Baseline to post-intervention changes in participants' CMAI, NPI-NH, and ARS scores will be used as the outcomes in all subsequent analyses. To conduct the group analysis, each participant will serve as their own control, which allows minimal use of control variables. The effect of the intervention will be analyzed using multi-level modeling to adjust for clustering of participants at the facility level. We will use the daytime and nighttime average of lighting dosages (lux and CS) from the personal light monitors as the independent variable to analyze the effect of SABL on changes in CMAI, NPI, and ARS. Although not powered for a detailed analysis, we will explore the impact of participant characteristics (sex, age, race, ethnicity, ADRD stage, and daylight exposure) on the intervention effect by adding them as covariates to the regression model.

Aim 2: Evaluate the fidelity of the SABL delivery.

All data will initially be assessed using descriptive techniques to examine underlying assumptions and detect any violations. To assess the intervention fidelity, the lux and CS data measured via manual measurements will be analyzed using one sample t-tests to analyze lighting levels during the day and nighttime, compared to the target levels. The data from personal light monitors will be analyzed similarly at individual level. Although not powered for a detailed analysis, we will explore the impact of participant characteristics (sex, age, race, ADRD stage, co-morbidity, facility, and daylight conditions) on the lighting received based on the personal light monitor.

Aim 3: Evaluate the feasibility of implementing SABL.

The data includes ratings of acceptability, feasibility, and appropriateness. All data will be analyzed using descriptive analyses.