

Developing and Evaluating In-Home Supportive Technology for Dementia Caregivers, Phase

IIA

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## Statistical Analysis Plan

### Primary Outcomes

All caregivers—regardless of randomized study condition—complete questionnaires on four separate occasions during this study: baseline, 3-months, 6-months, and 9-months. The four outcome measures include changes over the 9-month study period for the following scales: Zarit Burden Interview-Short Form, a questionnaire measuring caregiver burden (Zarit, Reever, & Bach-Peterson, 1980). 12 items are rated on 0-4 scale. Range: 0-48. No subscales. Higher scores represent worse outcomes; Center for Epidemiological Studies Depression Scale (CES-D), a questionnaire measuring depression (Radloff, 1977). 20 items are rated on a 0-3 scale and summed (range = 0-60). There are no subscales. Higher scores represent worse outcomes. The clinical cut-off is usually set at a score of 16; Beck Anxiety Inventory (BAI), a questionnaire measuring anxiety (Beck, Epstein, Brown, & Steer, 1988). 20 items are rated on a 0-3 scale and summed (range= 0-60). Higher scores indicate worse outcomes. There are no subscales. A score greater than 36 is considered to be clinically significant.; and Satisfaction with Life Scale, a questionnaire measuring overall life satisfaction and well-being (Diener, Emmons, Larsen, & Griffin, 1985). 5 items scored on a 1-7 scale and summed (Range = 5-35). Lower scores indicate worse outcomes. A score of 20 is considered neutral with higher scores considered increasingly more satisfied and lower scores considered increasingly more dissatisfied.

### Statistical Methods

*Design:* Caregivers will be randomized into two groups: Experimental In-Home Technology System and Limited In-Home Technology System. Subjects will be randomized 1:1. Randomization of participants in each group will be determined by members (i.e., graduate students listed in this protocol) of the research team and staff members completing the installation will not be aware of which group the caregivers are assigned to. With a total N of 80 caregivers in two conditions and measures repeated four times, a comparison between groups using ANOVA will have .80 power to detect a medium effect size at  $p=.05$ .

*Analysis:* Descriptive statistics will be used to summarize all the clinical characteristics and demographic outcomes. These will be summarized overall, by treatment group, by assessment time, and by treatment group and time. Continuous variables will be summarized using means, standard deviations, and ranges. Categorical data will be summarized by number and percent. To evaluate the treatment effects, we will use repeated measures ANCOVAs. The respective baseline measure of each outcome variable will be included as a covariate in the appropriate analysis (e.g., baseline depression scores from the baseline measurement of the CES-D, will be used as a covariate in examining treatment effects of depression). The other predictors will be treatment group, and time (baseline, 6-months, and 9- months for caregiver outcomes). To

evaluate treatment effects, an interaction term between treatment group and time will be included to examine treatment group-related differences controlling for baseline to later assessments for each outcome. Each significant interaction will be followed up with paired t-tests to examine treatment differences at each set of time points. Although this study involves 4 outcomes, we do not plan formal multiple comparison adjustments if the results fit a coherent pattern that is consistent with the context of similar studies. In this case, each result will reinforce the other, rather than detracting from one another, as required by formal multiple comparisons adjustments such as Bonferroni. Conversely, if only one or a very few measures reach statistical significance and their directions and/or magnitudes do not coherently fit with our prior expectations, then we will note that the result(s) with  $p < 0.05$  lack plausibility and could be due to chance, despite meeting the conventional cutoff for statistical significance.

*Missing Data:* If subjects either cannot or refuse to complete surveys we will use a sensitivity analysis approach in dealing with these missing data by performing analysis with 2 versions of scores: 1) with missing item interpolated using mean replacement by group, and 2) only using responses with 0% missing data. If the results differ for the two approaches, then we will report on the differences.

#### REFERENCES

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