**Rejuvenate Activities Program (RAP) & ROCK (It's Never 2 Late (IN2L) :
Comparing Three Activities Strategies for Effects on Outcomes of Residents with
Dementia**

Study Objectives

CMS reports that close to 40% of NH residents who had cognitive impairments and behavior problems, but no diagnosis of psychosis, received antipsychotic drugs. This high use exists even though the federal NH Law limits the use of antipsychotic drugs for this population. Facilities are encouraged to use non-pharmacological alternatives, even though limited research on alternatives exists. The objectives of this study are:

1. Compare the effects of 3 non-pharmacological alternative approaches (Rejuvenate Program (RAP); *Its Never 2 Late* (IN2L), and standard activities programming (standard)) on select outcomes (cognition, ADLs, behavior problems, and use of antipsychotic drugs) among NH residents.
2. Describe the cost of the alternative approaches to attributable gains in outcomes.

Research Question
The question guiding this report was: What is the comparative effectiveness of the 3 programs (RAP, IN2L, standard) for enhancing outcomes of NH residents with early to moderate dementia?   Outcomes addressed in this report are cognitive status and psychotropic drug use.

Research Design
Quasi-experimental pre- and post- test design was used with measures at baseline and after 4 and 8 weeks of participation in the various interventions. While effort was made to match groups on GDS scores (GDS 2.5 to 5.0), this proved infeasible. Thus, newly recruited participants were randomly assigned to either IN2L or standard activities. The standard activities group also was waitlisted to IN2L. The RAP group reported on last year was used for comparison.

Sample
In total, 29 NH residents with moderate to severe dementia (GDS 2.5 to 5.0) who participate in activities programming were recruited and studied. New participants were recruited for the IN2L (n = 10) and standard activities groups (n = 8); the RAP group (n = 11, completed last year) was included in analyses for comparison purposes on outcome variables.

Group	Participants in Group	Number of Females	Number of Males	Age at Intervention
RAP	11	9	2	77,79,85,86,87,87,88,89,89,96,98
IN2L	10	8	2	62,79,79,80,81,84,87,89,93,94
Standard	8	8	0	78, 84, 88,89,94,94,91,99
Total	**29**	**25**	**4**	

Interventions

All participants were assigned to one of the three interventions which were delivered over an eight week-period. RAP was offered five days per week; IN2L and standard activities were provided seven days per week. RAP and IN2L were each delivered in a dedicated room; standard activities were delivered wither in the activities room or in the resident's room, at their choosing.

RAP: Program was designed to provide intellectual and physical stimulation to nursing home residents and promote their overall health by enhancing physical, mental, and emotional well being. Evidence based activities integrated included listening to soothing music, sitting under a bright light source (10,000 lux), watching videos that bring good memories, drinking adequate water and relaxation with massage and aroma. Activities were customized according to cognition and personal preferences as documented in the Life History Profile (LHP).

IN2L: is an interactive computer-based system for delivery of either solitary, 1:1 or group activities across a wide range of topical areas and appropriate to a range of cognitive and physical abilities. For each participant in this group, IN2L activities were tailored to their profile of MOCA category scores; IN2L activities that addressed their weakest performance were prescribed. We also used the LHP to assist them in selecting IN2L activities relative to their interests. During each session, each participant was prescribed 30 minutes of solitary or 1:1 activities, with half of the time dedicated to cognitive skill building and half to leisure activity, over an eight week period.

Standard: Usual standard activities (group and individual) that are age-appropriate and based on input from the resident and/or responsible party, as well as on information obtained in the initial assessment were provided. .

Measures

The table below summarizes the measures obtained in this study. At the time of this report, we are awaiting extraction of behavior and ADL data from the electronic record maintained by the nursing home. We are reporting on cognition and psychotropic medication use. Cost data is available and will be analyzed is efficacy results warrant it.

Outcomes	Measure	Data collection interval
Cognition	Montreal Cognitive Assessment Test (MoCA)	Baseline, 4-weeks, 8-

	(BIMS derived from MoCA to enable comparison to RAP group)	weeks
Behavior	Daily CNRA charting on behavior	
ADL	Daily CNRA charting on ADL	
Psychotropic Medications	Chart review (drug, dosage, frequency of administration for scheduled and prn psychotropic medications)	
Confounds		
Fluctuations in Cognition	Chart review for episodes of new illness onset, exacerbation of chronic illness	**Weekly,** baseline through week 8
Intervention Fidelity	Track frequency, duration, and reasons for non-receipt of intervention for each intervention component for each participant	For each scheduled activity session
Cost		
Staff time	Track by participant and intervention component	For each scheduled activity session

Data Analysis

Data analysis of cognitive outcomes was done using ANOVA. First, between group differences were evaluated at baseline. Then separate ANOVAs were computed for each intervention group.

Data analysis for psychotropic drug use was compiled from chart review data for IN2L and standard activities groups only. The average number of psychotropic medications taken per group was calculated at baseline, 4th week, and 8th week. Because descriptive statistics for each group at each time point had little variance, ANOVAs were not performed.

Results

Cognitive outcomes. The table below shows means for the BIMS for the overall sample and for each intervention group by time point. ANOVA comparing groups at baseline was significant (df 2, 24; F = 3.56, p = 0.04), indicating that groups were unequal on the BIMS, with the IN2L group having the best cognitive ability and the RAP group having the least.

		Baseline BIMS		Week 4 BIMS		Week 8 BIMS	
Group		Mean	S.D.	Mean	S.D.	Mean	S.D.
Overall Sample	(N = 27- 29)	4.63	3.23	5.83	4.02	5.41	3.67
RAP	(n = 11-12)	3.25	2.14	3.55	2.77	3.82	3.06
IN2L	(n = 8-10)	6.88	3.44	8.30	4.24	6.90	3.07
Standard Activities	(n = 7-8)	4.43	3.55	5.88	3.68	5.75	4.59

The graph below depicts the trajectory of BIM scores for the overall sample and for each intervention group. All groups showed an improvement at Week 4. However, the IN2L and standard activities groups showed decline at Week 8, although of differing amounts. Only the RAP group showed improvement at Week 8.
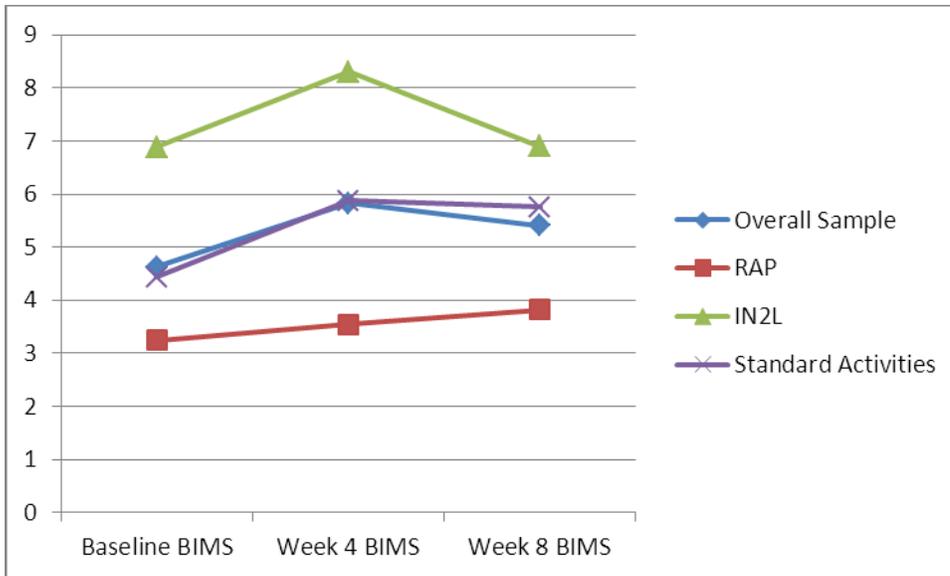
The next table shows results of ANOVAs for each intervention group; While changes in the BIM scores were shown at each time point measured, none of the ANOVAs were significant. Post hoc comparisons approached significance for comparisons of baseline and Week 4 BIM scores for the IN2L (df = 7; t = -1.688; p = .13) and Standard Activities (df = 6; t = -1.922; p = .10) groups

Group	df	F	R-Sq (adj.)	p value
RAP	2	0.13	0.00%	0.878
IN2L	2	0.49	0.00%	0.621
Standard Activities	2	0.30	0.00%	0.748

Psychotropic Drug Use: The table below contains the average number of prescribed psychotropic drugs for the IN2L and Standard Activities groups at all time points. While no test of significance was performed, those in the IN2L group received an overall reduction in psychotropic drugs prescribed while those in the Standard Activities group received an overall increase.

Group	Baseline	Week 4	Week 8
IN2L	1.400	1.200	1.200
Standard Activities	1.125	1.625	1.625

Discussion
In this analysis, we compared outcomes for three non-pharmacological approaches that have the potential to reduce the use of inappropriate antipsychotics among nursing home residents with mild to moderate dementia.

Though changes in BIM scores were not significant overall, all approaches to intervention demonstrated some level of improvement in cognitive ability at Week 4; only the RAP group continued to improve at Week 8. Given that the RAP group had the most severe cognitive impairment, it is encouraging to see any gain at any measurement point. Both the IN2L and Standard Activities showed sharper gains in cognitive functioning at Week 4 than did the RAP group. Even with these very small sample sizes, these gains approached significance. Future studies powered by an adequate sample are warranted. Though we cannot reject the null hypothesis, there remains a high likelihood of Type2 error.

That the Standard Activities group was able to sustain improvements in cognitive performance with only a slight decline at Week 8, while the IN2L group showed a regression to their baseline level, is intriguing and warrants further investigation. We plan to look further at confounds which may explain this finding as well as differences that may exist between responders and non-responders to these two approaches.
Finally, the data show that psychotropic drug prescriptions were reduced within the IN2L group by Week 4, yet they were increased for the Standard Activities group. We did not manipulate drugs for any participant in this study; physicians prescribing for participating residents were either unaware of their participation in the study or blind to group assignment. Again, comparing psychotropic drug use among responders and non-responders, as well as examining the potential role of other confounders that we tracked may clarify this finding.

Conclusions
This QI study provided evidence that nonpharmocolcogical approaches to dementia management can produce modest improvements in cognitive performance among NH residents with moderate to severe dementia. Further, for at least one group of participants, reductions in psychotropic drug prescriptions also ensued.

While the analyses presented here do not fully explain these findings, further investigation with the present data, as well as future studies with larger samples are warranted.