

Translating the REACH Caregiver Intervention for Use by Area Agency on Aging Personnel: the REACH OUT Program

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Purpose: The aim of this study was to translate the evidence-based Resources for Enhancing Alzheimer's Caregiver Health (REACH) II intervention for use in 4 Area Agencies on Aging (AAAs). A secondary aim was to examine possible moderators of treatment outcome. **Design and Methods:** We used a quasi-experimental pre-post treatment design with no control group. A partnership was formed between the Alabama Department of Senior Services and the University of Alabama. The partnership trimmed the REACH II intervention used in the clinical trial for feasible use in a social service agency. The condensed REACH intervention, termed REACH OUT, was delivered to 272 dementia caregivers during 4 home visits and 3 phone calls for a period of 4 months. The assessment examined pre-post treatment effects on a number of outcomes, including care recipient risk, mood, memory, and behavior problems; caregiver stress and emotional well-being; caregiver health; and program satisfaction. All aspects of the program except for training, periodic consultation, and data analysis were controlled by the AAA staff. **Results:** Analyses were conducted on the 236 dyads that completed at least 3 of the 4 planned sessions. Significant positive pre-post effects were found on caregiver subjective burden, social support, caregiver frustration, depression, caregiver health, care recipient behavior problems and mood, and 2 of 4 care recipient risk behaviors. Site of intervention

and certain participant characteristics (e.g., caregiver relationship) moderated several pre-post differences. A caregiver survey and interventionist focus group reported high acceptability of the program. **Implications:** This project suggests that the REACH II intervention can be modified for feasible and effective use in AAAs. The next step is to integrate the intervention into usual service delivery to achieve sustainability.

Key Words: Community-university partnership, Treatment, Caregiving, Dementia, Translation

It is well documented that the results of most behavioral and health promotion studies have not been translated into practice (National Advisory Mental Health Council, 1999). Successful translation into practice requires researchers to focus explicitly on the interactions between an intervention, the systems in which it is implemented, and the stakeholders of the intervention (from patient to provider to purchasers, insurers, and policymakers). Thus, translational research builds bridges among efficacy, effectiveness, practice, and service systems research.

In the dementia caregiver intervention literature, there are two notable exceptions. Teri and colleagues have developed the STAR-C (Staff Training in Assisted-living Residences—Caregivers) program wherein paid community consultants were trained to teach family members a systematic behavioral approach for reducing mood and behavior problems in individuals with dementia (Logsdon, McCurry, & Teri, 2005; Teri, McCurry, Logsdon, & Gibbons, 2005). These paid community consultants were masters-prepared professionals (counseling, psychology, or social work) who held 8 weekly

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sessions in caregivers' homes. The consultants were supervised closely by three doctoral-level clinical geropsychologists. The study yielded multiple positive effects, including reduction in burden, depression, and care recipient quality of life (as measured by proxy report).

The second exception is the Savvy Caregiver Program, a transportable psychoeducational program conducted in group format (Hepburn, Lewis, Sherman, & Tornatore, 2003; Hepburn, Lewis, Tornatore, Sherman, & Bremer, 2007). This packaged intervention includes a detailed manual to orient the workshop facilitator, slides, handouts, and homework assignments for the caregivers. Finally, a caregiver manual and CD-ROM are included to further assist the caregiver. Outcome data revealed that caregivers receiving the intervention showed reduced burden and improved caregiver well-being.

The primary aim of this article was to describe the REACH OUT Program (Resources for Enhancing Alzheimer's Caregiver Health: Offering Useful Treatments) whose purpose was to modify the treatment package used in the REACH II clinical trial for feasible and effective use in Area Agencies on Aging (AAAs). A secondary aim was to investigate possible moderators of outcome, such as specific AAA site and race.

REACH Background

In 1995, it was recognized by the National Institutes of Health (NIH) that although the scientific community had acquired considerable knowledge about dementia caregivers and their burdens, our knowledge about interventions to ease caregivers' burdens lagged far behind. Consequently, the National Institute on Aging and the National Institute for Nursing Research funded the first of two multisite trials to examine strategies for assisting dementia caregivers in managing the stress and burden of caregiving.

In the first trial (commonly referred to as REACH I), six sites were funded in a cooperative agreement to investigate different interventions to ease caregivers' burdens. In this study, a different intervention was tested at each site using common outcome measures.

Through a meta-analysis (Belle et al., 2003), conclusions from the findings of the six sites were generated. These findings, together with the group's 5 years of experience, assisted the REACH group in developing an intervention that

was tested across five sites in a randomized clinical trial (REACH II) that was funded by the institutes in 2001. The premise of the REACH II intervention was that caregiver stress and burden are rarely a result of a single problem. Rather, they are the result of multiple problems of varying degrees of severity. These problems include reduced emotional well-being (e.g., depression); lack of knowledge about dementia and the effects of caregiving; lack of knowledge, skills, and strategies for managing the burdens of care; deficits in caregiver self-care and physical well-being; lack of social support with caregiving activities; safety problems in the physical environment and lack of ability to manage care recipient's activities of daily living (ADLs) and instrumental activities of daily living (IADLs); and behavior problems.

To address these problems, all caregivers received education on dementia and caregiving, "active" skills training on pleasant events or relaxation techniques, guidance in making the physical environment safer, guidance and encouragement in caregiver physical self-care, skills for accessing social support, and written "behavioral prescriptions" for managing various ADL, IADL, and behavior problems. A risk appraisal was administered to prioritize the order of intervention components and the intensity of their application.

The intervention was delivered through 12 in-home and telephone sessions for a period of 6 months. Results of this trial were published in the *Annals of Internal Medicine* (Belle et al., 2006). Results from the clinical trial showed significantly greater improvements in quality of life and depression in the intervention group. These results were true for African American, Caucasian, and Hispanic samples.

REACH OUT (Offering Useful Treatments) PROGRAM

In 2004, the Administration on Aging became aware of the success of the NIH-funded REACH trials and generated a program announcement informing the states of funding made available for the development and implementation of community dementia services and encouraging the use of "REACH-like" programs for dementia caregiver-care recipient dyads. Alabama's Commissioner on Aging (Irene B. Collins) for the Alabama Department of Senior Services (ADSS) was aware that the University of Alabama (UA) was one of the

REACH study sites and contacted Louis D. Burgio, PhD, principal investigator, to propose a partnership between ADSS and the university to develop a community intervention based on REACH. In July 2004, ADSS received an Alzheimer's Disease Demonstration Grant to States award. The specific goal was to adapt the REACH II clinical trial for use in Alabama's AAAs.

The four pilot sites were selected by ADSS staff after reviewing data collected through an annual state survey. The decision to include the four selected AAAs was based on a high prevalence of death due to dementia in these counties (range = 14.6–42.5 per 100,000; $M = 26.5$). It was considered likely that these were underestimates of death due to dementia; moreover, they were considered reasonable proxies for the number of patients with dementia living in the community and being cared for by family and friends. Also, two of the AAAs were in rural areas and two were in urban areas, as defined by preexisting AAA criteria for these classifications.

During the “partnering for translation” phase of the project, the full REACH II clinical trial intervention was presented to the advisory board (see below). It was agreed that the intensive REACH II intervention used in the clinical trial was not feasible for use in the AAAs. The AAA case managers and supervisors were near saturation with the services already being provided. The intervention needed to be modified significantly, but in a way that caregivers and care recipients would still benefit from participation.

An advisory committee was formed that included the commissioner on aging, AAA directors and case managers, and the principle investigator and project manager from the university. The goal of the advisory committee was to modify the intervention for feasibility. This included a reduction in available treatment components, a reduced number of home visits, and a shortened time span of the intervention. The advisory committee also developed strategies for program evaluation. The resulting program was called REACH OUT (Offering Useful Treatments).

Although the REACH OUT program was controlled by the AAAs, UA's Center for Mental Health and Aging (CMHA) provided materials, training, and consultation for the case managers (interventionists) in each of the four AAAs chosen for participation in the project. It was also CMHA's responsibility to manage and analyze the outcome data collected by the AAAs.

Partnering for Translation

During the first 4 months of the project, the advisory committee held a series of face-to-face meetings and conference calls to select REACH treatment components in response to unmet needs of their dementia caregiver clients and the available human and financial resources within the participating organizations. In the following 5-month period, CMHA staff, with consultation from the advisory committee, adapted materials from REACH II to create a tailored community intervention program including trainer and caregiver manuals.

Case managers and their supervisors assured the advisory committee that there was an overwhelming need for REACH-like services. Until this time, if a case manager came in contact with a dementia dyad, the services provided were limited to providing pamphlets with general suggestions for dealing with patients with dementia.

Dyads were recruited by the AAAs. To receive AAA services, the care recipient or the caregiver had to be older than the age of 60. Referrals to AAAs came from home health organizations, hospitals, physicians, caseworkers, self-referral (e.g., families calling about respite services or financial assistance), and outreach (e.g., advertising, health fairs). In recruiting the dyads for the REACH OUT Program, the case managers were provided much leeway in choosing dyads to invite to participate in the project. Case managers were already familiar with their current clients' basic needs.

To qualify for REACH services (a) the care recipient or caregiver had to be at least 60 years old, (b) the care recipient had to be living in the community and receiving care from a family member or fictive kin who lived in the home or the local area, (c) the caregiver reported that a physician had diagnosed the care recipient with dementia (formal confirmation of the diagnosis was not required), and (d) the caregiver reported significant burden associated with the caregiving role (not quantified). The primary caregiver was defined as the family member or fictive kin who spent the most time assisting or caring for the care recipient (e.g., preparing meals, dispensing medication, providing transportation; levels of care varied depending on the needs of the care recipient). The AAA case managers reported that the care recipients enrolled in the study ranged from mild to severe dementia, and in most cases, the primary caregiver lived in the home with the care recipient. Unfortunately, data are not available to confirm these reports.

Outcome measures of both effectiveness and extent of treatment implementation (TI) were chosen to evaluate the program, including caregiver stress and emotional well-being; perceived change in caregiver health; extent of improvement in care recipient memory, mood, and behavior problems and risk behaviors; caregiver implementation of the therapeutic procedures; and both caregiver and AAA staff satisfaction with the program.

To facilitate community implementation by AAAs, the advisory committee made a number of modifications to the REACH II clinical trial protocol. Two of the seven REACH II components were dropped by the advisory committee: (a) specialized telephones with display screens linked to a computer-integrated telephone system to provide information and facilitate group support conference calling and (b) explicitly teaching caregivers to elicit additional social support in an effort to reduce their burden. It is important to note that these components were not dropped because they were considered less efficacious than the treatment components retained. In fact, it is the opinion of the authors that the specialized telephones described in Belle and colleagues (2006) hold great promise as a medium for intervention delivery, particularly in states with large rural regions.

The decision was made that four home visits and three telephone contacts would be feasible. The advisory committee chose to include a risk appraisal (REACH OUT risk appraisal) and five intervention components that are described in the following.

REACH OUT Risk Appraisal.—This clinical tool was used to fine-tune the intervention. It queried caregivers about 21 common sources of stress and burden, such as behavioral disturbances, presence of dangerous objects in the home, and level of caregiver depression. Because 13 items on the risk appraisal were used to assess outcome of the intervention, this measure is described in more detail in the Measurement section.

As in REACH II, all caregivers received training in all treatment components; however, responses on the risk appraisal assisted the case manager in deciding the amount of time to assist with long-standing and emergent problems.

Education About Dementia, Caregiving, and Stress.—A substantial amount of information was provided to caregivers about the nature of demen-

tia (e.g., progression, expected deficits), the caregiving role, stress associated with intensive caregiving, and the adverse effects of stress on the human body.

Caregiver Health.—It has been established that highly stressed and burdened dementia caregivers often neglect their own health in their endeavor to provide for the needs of their care recipient. A caregiver who neglects his or her own health is often not able to provide optimal care to the care recipient. Case managers taught caregivers how to use a booklet, *America's Health Guide for Seniors and Caregivers* (Securitec Publications, 2006), commonly called the "Health Passport" (available at www.securitec.com/products). The passport-sized booklet provided caregivers information about health maintenance activities (such as annual physical examinations) and a tool to record health information and health appointments for both themselves and the care recipients.

Home Safety.—With the caregiver's permission, the case manager toured the physical environment noting safety concerns, including such risks as the availability of weapons and sharp objects, excessive clutter, and types of shoes worn by the care recipient (e.g., rubber soles are preferable). At each subsequent contact, the case manager would "check in" to ascertain whether caregivers followed through with suggested changes.

Behavior Management.—Because behavioral disturbance is a major determinant of the decision to place a care recipient in an institution (Balestrieri, Grossberg, & Grossberg, 2000; Chenoweth & Spencer, 1986; Colerick & George, 1986), special care was taken to help caregivers gain proficiency in behavior management skills. The ABC approach (Teri, Logsdon, Uomoto, & McCurry, 1997), which emphasizes the placement of behavior management procedures within a problem-solving rubric, was used. A standard written form was used for all behavioral prescriptions, emphasizing specific definition of the problem, the goal of the prescription, strategies for preventing the behavior, and therapeutic responses when the problem occurred. In designing this material, dozens of generic prescriptions were available from REACH II for behaviors such as wandering, aggression, and difficulty with personal hygiene. These prescriptions were tailored to the specific

needs of the dyad based on information from the risk appraisal.

Stress Management.—Dementia caregiving can be extremely stressful; however, caregivers can learn to reduce their level of stress even in the most difficult situations. There are many empirically supported stress reduction techniques. In fact, the REACH II clinical trial allowed caregivers to choose among three techniques: breathing exercises (signal breath), listening to music, and stretching exercises. To simplify the teaching of stress management, and because one technique in the clinical trial appeared most efficacious, all caregivers in the translation project were taught a controlled breathing technique called “signal breath.” (The signal breath technique was originally designed by Dr. Richard L. Hanson at the Long Beach VA Medical Center in his work with chronic pain patients and has been adapted for use with caregivers of persons with dementia by Jocelyn Shealy McGee, MSG, MA, at the Palo Alto VA Health Care System. Although our clinical impression was that signal breath was most efficacious, we cannot offer any empirical support for this impression.) The technique is simple to learn and do. Caregivers were taught to take a deep breath, hold it for a few seconds, and exhale while relaxing their muscles. They were taught to develop this skill by practicing this strategy on a daily basis and to apply it during particularly stressful caregiving situations.

The University of Alabama CMHA provided training in the intervention and project procedures to 13 AAA case managers and their supervisors in a 2-day (12-hr) workshop at CMHA. It is critical to note that the material was presented didactically, but the emphasis was on active learning. Active learning is defined as including the audience in all aspects of training. Questions were encouraged, and both workshop leaders’ modeling and participants’ role-playing were used extensively. Training was repeated as new case managers were hired due to staff turnover. Detailed case manager training manuals and caregiver notebooks were provided to participants so that they could be used during the intervention sessions. The manuals can be downloaded from <http://cmha.ua.edu/resources.html>.

The case managers were asked to conduct four hour-long home visits to introduce the treatment components to caregivers for a 3- to 4-month period. The home visits were supplemented by three therapeutic phone calls interspersed between each of the home visits.

A CMHA-run “hotline” was made available to case managers 2.5 days per week. During these times, either the UA project manager or the principal investigator was available to discuss unusual or difficult cases. Additionally, a project director at ADSS facilitated monthly conference calls attended by the case managers, UA staff (principal investigator and project manager), and ADSS staff (commissioner, grants specialist, and division chief). The conference calls were intended primarily to play a trans-project coordinating role; however, approximately half of each call was devoted to consultation on difficult cases in the field.

Methods

Design

We used a quasi-experimental pre-post treatment design. We did not have the option of including a control group in this demonstration program.

Evaluation of the Program

The case managers administered a brief assessment package to the caregivers, which included the following measures:

REACH Demographic Form.—This measure includes information on age, gender, income, race, and so forth, of the caregiver and care recipient. The demographic form was administered only during baseline.

Zarit Burden Scale (short version).—Subjective caregiver burden was measured using the 12-item modified Zarit Burden Inventory (Bedard et al., 2001; Zarit, Orr, & Zarit, 1985). Caregivers were asked to respond to items that measure emotional and physical strain using a 5-point scale ranging from 0 (*never*) through 4 (*nearly always*). Scores range from 0 to 44, with high scores indicating greater levels of subjective caregiver burden. For this study sample, Cronbach’s alpha was 0.85.

REACH OUT Caregiver Questionnaire.—This measure, derived from REACH II, included the five following questions:

1. In general, would you say your health is: (self-reported health; *excellent* to *poor*; 5 points)
2. Compared with 4 months ago, how would you rate your health in general now? (*much better now* to *much worse now*; 5 points)

3. In the past 4 months, have you seen any overall memory improvement in the care recipient? (*no/yes*)
4. In the past 4 months, have you seen any overall improvement in behavioral problems in the care recipient? (*no/yes*)
5. In the past 4 months, have you seen any overall improvement in the care recipient's mood? (*no/yes*)

REACH OUT Risk Appraisal.—This measure included 21 items from the original 51-item REACH II risk appraisal. The 21-item version emerged from the REACH II team's efforts to streamline the measure for community use. Thirty items were deleted because the REACH team's analysis indicated that they showed little to no variability. After the present study started, the REACH team continued to streamline the measure and ended up with a 16-item version (Czaja et al., in press). Although psychometrics is not available for our 21-item version, the 16-item version had a Cronbach's alpha of 0.65. The final measure also showed good convergent validity with measures of self-care, depression (Center for Epidemiological Studies–Depression scale), caregiver frustration, behavioral bother (Revised Memory and Behavior Problem Checklist), and positive aspects of caregiving.

The 21-item version used in this study included 16 items assessing caregiver burden and strain (e.g., How bothered are you about the care recipient's memory problems?), 1 item assessing positive aspects of caregiving (PAC), and 4 items relating to care recipient risk (care recipient smoking, wandering, driving, and lack of supervision). Our analyses included 7 items associated with caregiver stress and well-being: a composite of 2 items assessing caregiver frustration (How often in the past 6 months have you felt like screaming or yelling at [care recipient] because of the way he or she behaved? and How often in the past 6 months have you had to keep yourself from hitting or slapping [care recipient] because of the way he or she behaved?), and items on sleeping problems, satisfaction with social support, frequency of depressed mood, stress associated with providing assistance with ADLs, and behavioral bother. All the items were measured on a 4-point Likert scale except behavioral bother (5-point Likert). We also included the PAC item ("Providing help to [care recipient] has made me feel good about myself"), which was rated on a 5-point Likert-type scale ranging from 1 (*disagree a lot*) to 5 (*agree a lot*).

The four care recipient risk behaviors were also included in our analyses. They were rated on a 3-point Likert-type scale measuring the degree to which the behavior occurred ranging from 1 (*never*) to 3 (*always*), and the caregivers were not asked to consider a specific time frame.

The Zarit burden scale, REACH OUT caregiver questionnaire, and the REACH OUT risk appraisal were administered at baseline and immediately after the last intervention session.

Treatment Fidelity Form.—This form allowed the case manager to record the number of home visits and therapeutic phone calls, and also listed all treatment components to be "checked off" if used during a visit.

REACH OUT Satisfaction Questionnaire.—This 23-item questionnaire was administered to the caregiver at the postassessment. It included questions regarding satisfaction with types (i.e., specific components) and quality of service.

Focus Group.—A focus group was conducted by an independent researcher to gather qualitative data from case managers regarding the project's success in achieving its goals and its ease of implementation. The focus group had a total of 6 participants from the four study sites. All participants had experience as REACH case managers and had been with the program for at least a year (at least one of them had been with the program since its initiation). The group discussion, which lasted approximately 1.5 hr, was guided by a series of questions focusing on three broad issues related to the implementation and effectiveness of the REACH OUT Program: overall experience, treatment model, and advice. The discussion was audiotaped and a notetaker was also present.

Considering that this was a preliminary translational trial, all the measures listed in the Methods section—quantitative (e.g., the Zarit burden scale), process (treatment fidelity form), and qualitative (focus group)—were considered primary outcome measures.

Results

Demographics

Demographics data for this study were well balanced. Certain demographic variables have a low number of observations because some information

was not entered onto the demographic forms. Based on our baseline sample of 272 dyads, 55% of the sample was rural and 45% urban; 60% of the sample was Caucasian and 39% African American. There were more female caregivers than male caregivers (77%). The mean age of caregivers (of 74 families reporting caregiver age in this sample) was 61 years (range: 23–93 years), and the mean age of care recipients (of 74 families reporting care recipient age in this sample) was 81 years (range: 58–101 years). The participating families were primarily spouses caring for their partner (48%), or children caring for parents (46%), according to the 150 families reporting this information.

Attrition

Two hundred seventy-two dyads completed enrollment forms and were present at the first home visit. Of the 272 dyads present at the first home visit, 99% attended the second home visit, 98% attended the third home visit, and 97% attended all four home visits. Of the 265 caregivers who completed all four home visits, 29 did not complete the post-treatment assessment, for a total discontinuation rate of 13%. The reasons for discontinuation were nursing home placement (12), care recipient death (7), and reason unknown (17). It is the AAA staff's opinion that many of the "unknowns" were related to migration related to Hurricane Katrina in 2005. Due to some problems in transferring data from the AAAs to CMHA, data are available for 236 dyads.

Primary Aim: Through Partnership With a Community Service Delivery Agency, Can the REACH II Intervention Be Modified for Feasible and Effective Use in the Community?

Treatment Intervention.—On average, 95.2% of the caregivers received all the treatment components during at least one session. The range by treatment component was 88.6% for the caregiver passport to 98.5% for the safety walk-through.

Treatment Effects on General Status of Care Recipient.—During the initial assessment, the caregivers were each asked to report whether they had seen improvement in the care recipients' memory, behavior problems, and mood during the previous 4 months. After receiving the intervention, caregivers were asked to report whether they observed improvement in the care recipients' memory, be-

havior problems, and mood during the 4 months of the intervention. These were dichotomous (yes/no) items from the caregiver questionnaire. McNemar chi-square tests indicate that caregivers were significantly more likely to report greater improvement during the intervention period for care recipient behavior problems, 11.8% versus 28.2%, $\chi^2(1) = 25.14, p < .001$, and care recipient mood, 15.8% versus 28.0%, $\chi^2(1) = 17.11, p < .001$. Improvement for care recipient memory was not significant, 6.3% versus 27.2%, $\chi^2(1) = 3.36, p = .07$.

Treatment Effects on Caregiver Stress and Emotional Well-being.—The Zarit burden scale was used to evaluate level of subjective burden on caregivers. Social support, depression, positive aspects of caregiving, ADL stress, caregiver behavioral bother, and caregiver frustration were assessed using individual items from the risk appraisal. Caregiver frustration (feeling like screaming/yelling or hitting/slapping the care recipient) was evaluated using a composite score from two items on the risk appraisal. The measures were administered pre- and postintervention, and analyses eliminated participants list wise, leaving only those who had both pre- and postassessments included in the data. Results are seen in Table 1. For each of these variables, except ADL stress and behavioral bother, caregivers showed more positive outcomes following the intervention.

Treatment Effects on Risk Behaviors.—We examined four risk behaviors from the REACH OUT risk appraisal: care recipient smoking, absence of supervision of the care recipient, care recipient wandering, and care recipient driving. Table 2 provides the changes in care recipient risk behaviors. Caregivers reported that the care recipients were less likely to be left unsupervised and were less likely to wander following the intervention.

Treatment Effects on Caregiver Health.—Participants were asked to rate three personal health items on Likert-type scales: their present health (1 = *excellent* to 5 = *poor*), perceived change in health over the past 4 months (1 = *much better now* to 5 = *much worse now*), and the presence of sleep problems (1 = *never trouble sleeping* to 3 = *often trouble sleeping*) both before and after the intervention. Table 3 provides the results of tests examining whether caregiver health changed over

Table 1. Changes in Caregiver Stress and Emotional Well-being

	<i>N</i>	Preintervention <i>M</i> (<i>SD</i>)	Postintervention <i>M</i> (<i>SD</i>)	<i>t</i>	<i>p</i>	<i>d</i>
Zarit burden scale (higher = more burden)	228	2.40 (0.74)	2.23 (0.65)	3.71	.0001	.25
Social support (higher = better support)	224	2.87 (0.98)	3.16 (0.82)	-4.52	.0001	-.30
Depression (higher = more depression)	227	2.10 (0.86)	1.91 (0.82)	3.35	.001	.22
Positive aspects of caregiving (PAC) (higher = more PAC)	229	3.94 (1.07)	4.17 (1.01)	-3.51	.001	-.23
Activities of daily living stress (higher = more stress)	230	1.97 (0.78)	1.87 (0.73)	1.84	.07	.12
Behavioral bother: caregiver bothered by care recipient memory/behavior problems (higher = more bother)	200	2.29 (1.43)	2.08 (1.29)	1.84	.07	.13
Caregiver frustration: (higher = more thoughts of engaging in abusive verbal or physical behaviors)	228	1.39 (0.46)	1.26 (0.38)	5.01	.0001	.33

the course of the intervention. Caregivers reported positive pre–post changes in all health items queried.

Satisfaction With Service.—A satisfaction survey was administered to caregivers during the last session. A summary of these results can be found in Table 4. Results from this survey indicate enthusiastic support for the information that was provided to caregivers who participated. Greater than 93% of the participants indicated positive responses to this intervention for every question on the survey. Responses were slightly less enthusiastic about some components of the intervention than others. The signal breath technique and the behavioral prescriptions did not have quite as emphatic a response as the information modules for dementia education and caregiver stress, for example. Very few people found any of the components unhelpful. The number of home visits and phone calls appears to be sufficient for delivery of this intervention. The majority of participants found the number of contacts to be “just right.”

Secondary Aim: To Examine Possible Moderating Effects of Participant Characteristics and AAA Site

Effects of Individual Differences.—We conducted a series of analyses to determine whether the intervention had equivalent effects across race, gender, caregiver–care recipient relationship (whether spousal or nonspousal), and whether the household resided in a rural or urban area, focusing on the intervention’s impact on outcomes that showed significant pre–post change, including the Zarit burden scale (subjective burden) and measures of caregiver emotional well-being that showed significant pre–post change (social support, depression, positive aspects of caregiving, and caregiver frustration). In each case, we used the general linear model (GLM) to determine whether there was a significant time (before treatment vs. after treatment, measured within subjects) by individual difference (measured between subjects) interaction effect, after controlling for the main effects of both the treatment and the individual difference. The presence of a significant interaction indicates that

Table 2. Changes in Care Recipient Risk Behaviors From Risk Appraisal

	<i>N</i>	Preintervention <i>M</i> (<i>SD</i>)	Postintervention <i>M</i> (<i>SD</i>)	<i>t</i>	<i>p</i>	<i>d</i>
Smoking (higher = more often)	228	1.05 (0.25)	1.03 (0.20)	1.16	.25	.08
Unsupervised (higher = more often)	226	1.60 (0.80)	1.42 (0.63)	4.65	.0001	.31
Wandering (higher = more often)	225	1.26 (0.51)	1.14 (0.39)	4.51	.0001	.30
Driving (higher = more often)	226	1.07 (0.27)	1.04 (0.23)	1.67	.10	.11

Table 3. Caregiver Health Changes Over Intervention

	<i>N</i>	Preintervention <i>M</i> (<i>SD</i>)	Postintervention <i>M</i> (<i>SD</i>)	<i>t</i>	<i>p</i>	<i>d</i>
Self-rated health	227	3.40 (0.96)	3.30 (0.96)	2.01	.05	.13
Perceived change in health over previous 4 months	227	3.19 (0.64)	2.95 (0.65)	4.82	.0001	.32
Sleep problems	225	2.23 (0.70)	2.11 (0.69)	2.55	.01	.17

the effect of the treatment varies across different levels of the individual difference.

The pre- and post-treatment values of subjective burden and caregiver emotional well-being broken down by the different individual difference variables are presented in Table 5. Race moderated the effect of the intervention on subjective burden, $F(1, 212) = 5.703$, $p = .02$, such that Caucasian caregivers experienced a greater reduction of subjective burden than African American caregivers. Race also moderated the effect of the intervention on positive aspects of caregiving, $F(1, 176) = 4.016$, $p = .05$, such that African American caregivers showed greater improvement than Caucasian caregivers. Caregiver race did not moderate the effect of the intervention on the other outcome measures

($ps > .20$). Caregiver gender did not moderate the effect of the intervention on any of the outcome measures ($ps > .10$). Caregiver-care recipient relationship did moderate the effect of the intervention on subjective burden, such that the intervention was more effective for nonspousal caregivers than for spousal caregivers. Caregiver-care recipient relationship did not moderate the effect of the intervention on the other outcome measures ($ps > .20$). Rural versus urban residence also moderated the effect of the intervention on subjective burden, such that the intervention was more effective for those from urban households than for those from rural households. Rural versus urban residence did not moderate the effect of the intervention on the other outcome measures ($ps > .20$).

Table 4. Summary of Satisfaction Survey

	<i>N</i>	<i>M</i> (<i>SD</i>)	Comments
General satisfaction: 1 (<i>strongly disagree</i>) to 4 (<i>strongly agree</i>)			
Type	236	3.47 (0.51)	99% responded 3–4
Quality	236	3.52 (0.43)	98% responded 3–4
Information	236	3.53 (0.42)	98% responded 3–4
Satisfaction with specific interventions: 1 (<i>very helpful</i>) to 3 (<i>not helpful</i>)			
Information about dementia	236	1.22 (0.42)	78% responded 1 22% responded 2
Information on caregiving and stress	236	1.28 (0.47)	73% responded 1 26% responded 2
Home safety	235	1.43 (0.57)	60% responded 1 36% responded 2
Health passport	234	1.46 (0.55)	57% responded 1 40% responded 2
Behavioral prescriptions	233	1.49 (0.59)	54% responded 1 43% responded 2
Signal breath relaxation	229	1.51 (0.59)	53% responded 1 41% responded 2
Satisfaction with number of contacts: 1 (<i>too many</i>) to 3 (<i>about right</i>)			
Number of home visits	236	2.78 (0.46)	81% responded 3 17% responded 2
Number of phone calls	236	2.83 (0.46)	87% responded 3 9% responded 2

Table 5. Pretreatment (T1) and Post-treatment (T2) Means by Significant Individual Difference Characteristics

	African American	Caucasian	Male	Female	Nonspouse	Spouse	Rural	Urban
T1 Zarit burden	2.26	2.53	2.25	2.48	2.50	2.47	2.41	2.45
T2 Zarit burden	2.21	2.25	2.13	2.27	2.16	2.38	2.36	2.11
T1 social support	2.97	2.77	3.02	2.78	2.600	3.12	2.88	2.80
T2 social support	3.22	3.10	3.34	3.09	2.96	3.27	3.10	3.19
T1 depression	2.15	2.06	2.00	2.14	2.02	2.23	2.21	2.00
T2 depression	2.02	1.86	1.68	1.98	1.82	2.06	2.00	1.83
T1 positive aspects of caregiving	4.18	3.98	4.02	4.07	3.87	3.90	4.18	3.94
T2 positive aspects of caregiving	4.63	4.14	4.27	4.34	4.27	4.12	4.39	4.27
T1 caregiver frustration	2.83	2.78	2.63	2.88	2.62	2.98	2.76	2.89
T2 caregiver frustration	2.51	2.59	2.39	2.63	2.27	2.75	2.55	2.60

Effects of Site.—We conducted a series of analyses to determine whether the intervention had equivalent effects across the four different Alabama sites (ATRC, Camden; TARCOG, Huntsville; SARCOA, Dothan; and SARPC, Mobile). Acronyms are used to designate these sites to maintain privacy. As with the tests of individual differences, we used GLMs to determine if there was a significant interaction between treatment and site on measures of subjective burden and caregiver emotional well-being. Site moderated the effect of the intervention only on subjective burden, $F(3, 222) = 8.43, p < .001$, and social support, $F(3, 187) = 3.99, p = .009$, but not the other measures of caregiver emotional well-being ($ps > .15$). Least significant difference post hoc analyses indicate that participant subjective burden was significantly improved at TARCOG and SARPC ($ps < .001$), but not at ATRC and SARCOA ($ps > .25$), and that social support improved at TARCOG, SARCOA, and SARPC ($ps < .05$) but not at ATRC ($p > .9$).

REACH OUT Focus Group

Overall Experience.—Key questions related to case managers' overall experience in implementing the intervention. Case managers were unanimous in their belief that the intervention was very helpful to the participants, especially people in rural areas who had no home computer, few social supports, and few community resources compared with people in urban settings. They noted that having a provider come to the home to focus on the caregiver was important, as most in-home services, such as home health care, typically focus only on the care recipient.

The case managers felt that providing education about topics such as dementia, caregiving, and

stress management was one of the most important components of the program. They shared that many clients had little or no knowledge about dementia. Additional benefits for the caregivers included decreased stress level over the course of the intervention, a greater sense of empowerment and self-efficacy, improved understanding of dementia (e.g., realizing that the care recipient was not displaying problem behaviors willfully), feeling less isolated, and acquiring a sense of hope. Once enrolled in the program, caregivers quickly grew to appreciate the services and said they would recommend the program to others.

When asked about particular burdens they experienced in conducting the intervention, the case managers' responses centered around the issue of time limitations. First, they felt they did not always have enough time to fully assess the clients' needs or to provide an in-depth response when clients called with questions or problems. They said that most caregivers needed an empathic listener, and consequently visits were sometimes quite lengthy (up to 3 hr). Some aspects of the intervention were time consuming, such as identifying and defining target behavior problems. Finally, some clients expressed a need for continued support and guidance beyond the final scheduled visit.

Treatment Model.—The focus group participants were asked how well the various components of the REACH program worked and what should be changed. Generally, the case managers felt that all the components of the intervention worked well and that there were none that should be omitted. They noted that the therapeutic telephone calls were used primarily for a check-in and reminder about the next visit rather than any specific problem solving. However, they did not suggest eliminating the telephone calls, stating that it was

beneficial for caregivers to know that the case manager would be calling, in case they did have any questions or concerns between visits. Regarding components that should be added, the case managers strongly recommended that future iterations of the REACH program include a plan for follow-up and continued support of caregivers.

The caregiver notebook, provided to family members on the first home visit, was reported to be generally helpful. However, low reading level and poor eyesight among some clients produced difficulties. It was suggested that key components of the caregiver manual should be revised to accommodate lower reading levels and that large-print materials should be made available in the future.

The safety component, consisting of home safety information and a safety-oriented walk-through of the care recipient's home, was also reported to be helpful. This activity was scheduled to take place during the first home visit; however, some case managers felt that this was too much to include in the first visit. Therefore, they sometimes delivered the safety information and walk-through on the second visit.

Several questionnaires were completed during the first home visit of the intervention, including the risk appraisal and the caregiver questionnaire. These questionnaires were helpful in identifying issues of importance to the caregiver; however, the case managers expressed reservations regarding questions that asked caregivers if they ever felt like screaming at or hitting the care recipient. Due to potential concerns of some individuals about being reported for abuse, the case managers felt that those questions were inappropriate on the first visit and should be saved for later. However, it was acknowledged that these questions served to legitimize some negative caregiver feelings. Case managers agreed it was important to establish good rapport before administering the surveys, particularly before asking these sensitive questions. The questionnaires were typically saved for the end of the visit.

When asked what they would do differently if designing the program, the case managers first identified several issues that warranted additional training and educational materials for the care recipients. These included information on doctor-patient communication, advocacy with health care workers, bereavement, decision making regarding placement of the care recipient, and information appropriate for young family members such as

grandchildren and great-grandchildren to help them understand dementia. Second, case managers discussed the need to support and empower older female caregivers whom they described as showing denial and experiencing difficulty with the level of responsibility placed upon them as caregivers. Third, they noted that case managers need to be flexible and sensitive to family dynamics when working with more than one caregiver in a family; they suggested at least one meeting with all involved caregivers concurrently. None of these suggestions constituted changes to the basic intervention model—rather they indicated additional content that might be included. The case managers reported that the availability of experts at UA for consultation was helpful with problems that were not addressed in the initial training.

Advice.—Case managers were asked about advice they would give to other professionals who might use this intervention. They underscored the importance of using organizational skills to track each family as they progress through the program (large calendar, spreadsheet, etc.). They also advised that it would be best to have case managers dedicated solely to the REACH program rather than spread across several programs. Case managers with multiple responsibilities felt that they were not giving caregivers enough time because they were overextended. If dedicated solely to REACH, they could schedule their appointments more effectively without having to work around meetings and events related to other duties. This would increase their ability to allocate adequate time to each visit. The case manager among the AAAs who worked solely on REACH (albeit part time) expressed the least amount of stress regarding time constraints.

Discussion

Primary Aim: Translating REACH II for Use in the Community

We believe that this is one of the first caregiver intervention programs designed from an empirically based treatment (Belle et al., 2006) and transferred to a social service agency. It is important to note that almost all aspects of the program were controlled by the AAAs with input from the ADSS. The University of Alabama collaborated in a genuine partnership with the AAAs and ADSS to modify the REACH II materials and intervention procedures so that they were feasible for use in the community. In addition

to data management and analysis, the university conducted the 12-hr case manager training workshop and was available for phone consultation twice weekly. We believe that the university activities can be easily transferred to the AAA staff.

Can AAA Case Managers Learn and Perform the REACH Intervention in the Community?—We can infer reasonably from two sources of data that the case managers actually learned and delivered the REACH OUT intervention as trained. As reported previously, case managers reported delivering 95.2% of the treatment components to the sample at least once. Also, although we did not use a formal checklist during the workshops, all participants were required to demonstrate each skill component to the university trainer prior to moving on to the next training module.

In our analyses for possible AAA site differences in treatment effectiveness, we found that most of the pre–post treatment outcomes were observed in all four sites. However, there were two important site differences. First, the important outcome of subjective burden improved in only two of the four sites. Second, the increase in social support was found in three of the four AAA sites.

There are several possible explanations for the differential outcomes across sites on 2 of the 10 outcomes that showed a positive change. It was noted previously that, different from the REACH II clinical trial, an informal process of assessing skill acquisition was used in this study. Also, the TI process measure used by the AAAs was a gross measure of TI compared with the tracking system used in the clinical trial. Perhaps it is necessary to use more formal measures of skills learned to criterion and TI in translational studies to assure skill acquisition and to prevent interventionist drift. Another possibility is that the degree of problem severity differed across sites, thus resulting in differential effectiveness on these two outcomes. We did not include a measure of problem severity in this study.

Effects of the Intervention.—The pre–post analyses on our outcome measures suggest that the case managers were able to conduct the intervention effectively. Results suggest positive changes in traditional caregiver outcome measures and on care recipient risk behaviors. Specifically, after intervention, caregivers reported significantly less subjective burden on the Zarit burden scale, increased

social support, less depression, and fewer feelings of frustration toward care recipients. Interestingly, although caregivers reported improvement in behavior problems and care recipient mood at post-treatment, behavioral burden remained unchanged. A possible explanation for these results is that the extent of reduction in behavior problems was not sufficient to reduce burden. Another possibility is measurement error. Almost all studies that report a reduction in both behavioral frequency and bother use standardized measures such as the Revised Memory and Behavior Problems Checklist (Teri et al., 1992). In this translational study, both frequency and burden were measured by single items that might not have been sufficiently sensitive to measure change.

Caregivers also reported improved self-rated health, greater perception of change in health over the previous 4 months in a positive direction, and fewer sleep problems. Finally, caregivers reported significantly fewer risk behaviors such as leaving the care recipient unsupervised and wandering.

Caregiver Satisfaction and Acceptability.—Table 4 shows a very high degree of satisfaction and acceptability of the program, including evaluations of individual treatment components and number of treatment visits and phone calls.

Secondary Aim: To Assess Possible Moderating Effects of Participant Characteristics

We examined the possible moderating effects of race, gender of caregiver, caregiver–care recipient relationship (spouse vs. nonspouse), and whether the household resided in a rural or urban area. We restricted our analysis to the significant pre–post outcomes of subjective burden (the Zarit burden scale) and the variables within caregiver emotional well-being that reached statistical significance. We found race to be a significant moderator of both subjective burden and PAC, in that Caucasians showed more improvement in subjective burden and African Americans showed greater improvement in PAC. Both findings are consistent with the clinical trials literature. In their meta-analysis, Sörensen, Pinquart, and Duberstein (2002) reported that greater subjective burden, as measured by the Zarit burden scale, at pretest was associated with greater improvement during intervention on burden. Table 5 shows that the Caucasians in our study reported markedly greater burden at pretest. Regarding PAC, the REACH I study from our

Alabama site also showed differentially greater improvement in PAC due to intervention for African Americans than Caucasians (Burgio, Stevens, Guy, Roth, & Haley, 2003).

Our finding that nonspouses improved their subjective burden more than spouses also appears to be supported by Sørensen and colleagues (2002). These authors report that studies with greater percentages of nonspouse caregivers than spouse caregivers showed greater improvements in subjective burden. They hypothesized that nonspouses (specifically adult children) probably derive greater advantages from the interventions because they are often less prepared for the strains of caregiving than spouses. The crucial information conveyed by interventionists is more novel to nonspouses and, therefore, more effective in reducing their burden. Finally, we found no published studies examining differential effectiveness of caregiver interventions in urban and rural areas. However, our AAA case managers did report that along with their REACH OUT intervention activities, time allowing, they continued their usual case management activities with their clients, specifically referral to services in the community. One possible explanation for our urban caregivers showing greater changes in subjective burden is that urban caregivers are more likely to respond to case management by utilizing more community services (e.g., respite care; Sun, Kosberg, Leeper, Kaufman, & Burgio, 2007).

Limitations and Future Directions

Clinical scientists hold high standards, most gleaned from clinical trials methodology, for generating confidence in treatment outcome data. It is those very guidelines that often need to be violated or at least relaxed in translational studies. The methodological guidelines violated in this study include lack of random dyad selection, absence of a control group, data collection by interventionists, and an analysis that included multiple comparisons with probable inflation of alpha error.

One of the more notable shortcomings in this study is the amount of missing data. Although we were fortunate to have a highly motivated group of case managers, it is unrealistic to expect busy service agency personnel to collect data with the compulsive care that we expect from research assistants. The case managers recognized this problem and, during the focus group, expressed a desire for a formal tracking system to help them track

clients' sessions and data collection. In an ongoing study by our group, we have devised a simplified tracking system that is now being used in the field.

Although these limitations dictate caution when drawing conclusions from these outcomes, the strength and consistency of the data across various domains (e.g., acceptability, traditional outcomes, risk profiles) allow some confidence in concluding that the program was learned by the AAA case managers, it was delivered to the caregivers, it was accepted by them, and it improved various aspects of their lives.

The limitations confronted in this study, and additional limitations, will continue to plague researchers as we move our evidence-based practices into the community. However, these limitations are the focus of translational science. Dr. Zerhouni, the former director of NIH, argues that we can no longer bring old solutions to new problems. He refers to translation as an emerging science that requires training in a wider range of skills (Culliton, 2006). To use a tired but apt metaphor, it is time to "think outside the box" and consider new procedures, methods, designs, and statistical techniques as we venture out of the laboratory and integrate our evidence-based interventions into the fabric of the health care delivery system.

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