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The Resources for Enhancing Alzheimer's Caregiver Health (REACH): Project Design and Baseline Characteristics

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Abstract

The Resources for Enhancing Alzheimer's Caregiver Health (REACH) project was designed to test promising interventions for enhancing family caregiving for persons with dementia. The purpose of this article is to describe the research design, interventions, and outcome measures used in REACH and to characterize the sample recruited for the study. Nine interventions and 2 control conditions were implemented at 6 sites; 1,222 dyads were randomly assigned to an intervention or a control condition. The caregiver sample was 18.6% male with an average age of 62.3 years (56% Caucasian, 24% Black, and 19% Hispanic). Caregivers reported high levels of depressive symptoms and moderate burden. Care recipients were older, with a mean age of 79, and were moderately to severely impaired with mean Mini-Mental State Exam scores of 13/30.

Alzheimer's disease and related disorders (ADRD) constitute a major public health problem, with at least 1.9 million Americans age 65 and over afflicted with the disease and an annual economic toll approaching \$100 billion (U.S. General Accounting Office, 1998) in the United States alone. The majority of people with ADRD are cared for in the community by family

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This article appears in the special section describing the Resources for Enhancing Alzheimer's Caregiver Health (REACH) study. The participating investigators are listed in the Appendix of the introductory article (Schulz et al., 2003).

members, and the need for care is expected to increase significantly as the population ages. The personal, social, and health impacts of dementia caregiving have been well documented (Ory, Hoffman, Yee, Tennstedt, & Schulz, 1999; Schulz, O'Brien, Bookwala, & Fleissner, 1995). These findings, in turn, have generated intervention studies aimed at addressing the burden and distress associated with dementia caregiving. However, as noted in several recent reviews (Charlesworth, 2001; Cooke et al., 2001; Pusey & Richards, 2001), the intervention literature is characterized by a host of methodological problems. First, sample sizes are often too small to detect even large effects (Cooke et al., 2001). Second, randomized controlled trial methods have been used infrequently and are often implemented inappropriately. Third, interventions are not well described, and treatment implementation data are infrequently collected or reported (Burgio et al., 2001). Finally, minority populations are not adequately represented in these studies. The Resources for Enhancing Alzheimer's Caregiver Health (REACH) program addressed all of these shortcomings and as such, represents a significant advance over existing research in this area. REACH recruited one of the largest dementia caregiver samples to date ($N = 1,222$) with substantial numbers of African American and Hispanic caregivers. The design, implementation, and analysis were modeled to a series of randomized clinical trials, and careful attention was paid to documenting the implementation of the interventions. The background and goals of REACH are described in the accompanying overview (Schulz et al., 2003). The purpose of this article is to describe the research design, interventions, and outcome measures used in REACH and to characterize the sample recruited for the study. We begin with a description of the design and measurement strategy of REACH, including the process and rationale for key decisions made in the study, followed by a detailed account of the diverse interventions implemented at each of the six sites. We conclude with a description of the sample.

Method

Research Design

REACH was funded as a cooperative agreement by the National Institute on Aging (NIA) and the National Institute on Nursing Research (NINR) of the National Institutes of Health. The intervention sites were selected following peer review of applications submitted in response to a request for applications sponsored jointly by the NIA and NINR. The research program included six intervention sites, a coordinating center, an external advisory committee, and personnel from each of the funding agencies. The study goals for REACH investigators were (a) to test diverse theory-driven caregiving interventions, (b) to develop a standardized outcome protocol to assess the impact of different strategies on caregivers and their care recipients, and (c) to create a common database that would enable the pooling of data across sites. It is important to recognize that REACH was designed to examine the feasibility and outcomes of multiple different intervention approaches rather than to provide definitive information on the one best intervention strategy for enhancing caregiver outcomes. The strength of this design feature is that it yields unique information about the effectiveness of different approaches to AD/DR caregiving. At the same time, it poses formidable obstacles to analyzing data across sites. The latter issue is addressed in three analytic reports in this issue (Belle et al., 2003; Czaja et al., 2003; Gitlin et al., 2003).

Although the interventions at each site were different by design, REACH investigators instituted a common measurement protocol across all sites. This consisted of standardized screening for eligibility using similar inclusion and exclusion criteria and a common measurement protocol administered at baseline, 6, 12, and 18 months postbaseline. All study participants were randomly assigned to either treatment or control conditions after the baseline assessment. The interventions typically lasted 6 months; however, some sites added booster sessions after the initial 6 months of active treatment. Different individuals served as

interventionists and outcomes assessors to minimize the potential of bias in outcomes assessment.

Recruitment and Eligibility Criteria

REACH recruited family caregivers of individuals with dementia from memory disorder clinics, primary care clinics, social service agencies, and physicians' offices, with special attention to enrolling diverse participants. Outreach efforts to the community at all sites included radio, television, targeted newsletters, public service announcements, and community presentations.

Eligibility criteria for caregivers included being over the age of 21 and living with and providing care for a relative with ADRD for a minimum of 4 hr per day for at least the past 6 months. Caregivers were excluded if they were involved in another caregiver intervention study or had an illness that would prevent them from participating for at least 6 months. Both sexes were recruited except at one site, Palo Alto, where only female caregivers were enrolled. Care recipients had to have a medical diagnosis of probable ADRD or a Mini-Mental State Exam (Folstein, Folstein, & McHugh, 1975) score lower than 24, which reflects moderate to severe cognitive impairment. Additionally, they had to have at least one limitation in basic activities of daily living (ADLs) or at least two dependencies in their instrumental activities of daily living (IADLs; Lawton & Brody, 1969).

The criteria were designed to ensure that caregivers were involved in daily tasks and responsibilities that could be burdensome. Other requirements were logistical and included having a telephone, planning to remain in the geographic area for at least 6 months, and competency in languages specified by each study site (i.e., either English or Spanish).

Potential participants were initially interviewed at each site by telephone using a common set of screening questions. After obtaining informed consent from those who were eligible, caregivers completed a battery of measures in person and were then randomly assigned to an active intervention or a control condition at each site. Caregivers were subsequently interviewed in person using the core battery of measures at 6, 12, and 18 months after the baseline assessment. For caregivers who were no longer actively involved in in-home caregiving at any of the follow-up assessment points because of the death or placement of their relative, the core battery was adapted to reflect their changed caregiving status.

A total of 1,222 family caregivers were randomized. Seven other caregivers were recruited into the study at one of the sites, but not randomized. Sample sizes across sites varied substantially by design, primarily because of differences in the expected detectable effect size associated with the interventions being implemented.

Interventions

A total of 15 interventions (9 active treatments and a control condition at each site) were tested across the six REACH sites. Three sites (Birmingham, Boston, and Philadelphia) tested a single active intervention against a control condition, and the remaining three sites (Memphis, Miami, and Palo Alto) implemented two active treatments and a control condition. All sites included a control condition, but two different control conditions were implemented. Three sites (Boston, Memphis, and Philadelphia) used modified usual care control groups in which caregivers received information packets only. This control condition was essentially equivalent to the services caregivers might receive if they called a local ADRD resource group for information and referral information. The investigators at the other three sites designed and implemented a control condition that offered more than usual care, a minimal support condition (MSC), which was intended to provide information and some emotional support. Caregivers

in the MSC received written educational materials through the mail at regular intervals and brief, regularly scheduled phone calls during which the trained interventionist engaged in empathic listening. The choice of specific control groups was driven by three factors: (a) cost—some sites would have opted to implement the MSC instead of usual care but felt they did not have the resources to make regular phone calls to participants; (b) ethical reasons—some sites felt that they were obligated to offer something to participants in the control condition; and (c) recruitment and retention—some sites felt that in order to recruit and retain participants in the study they had to provide a some type of service. Intended delivery characteristics of each intervention, including frequency, duration, and type (e.g., in person, group, telephone), between interventionist and caregivers are summarized in Table 1.

Recruitment, study materials, and study procedures at each site were tailored to the specific racial or ethnic group being served (e.g., Blacks/African Americans were a key focus at Birmingham, Boston, Memphis, and Philadelphia; Hispanic/Latinos at Miami and Palo Alto). Recruitment methods were tailored in a different fashion by each investigation site. For example, in Birmingham, researchers went into the community to recruit participants from area churches and community centers, whereas investigators in Miami advertised on, and participated in, public service announcements on Hispanic radio stations. A number of approaches were used to tailor study materials to specific racial or ethnic groups. All intervention materials and assessment instruments were translated into Spanish for the Hispanic participants using established techniques for forward- and back-translation and allowing for regional variation in language expression. Bilingual staff were used in Palo Alto and Miami, and an attempt was made to match the race and/or ethnicity of the interventionist to that of the caregiver. Where possible the intervention was implemented in community settings (e.g., churches for African Americans in Birmingham) appropriate to the cultural group. In addition, both interviewers and interventionists received cultural sensitivity training before entering the field. Thus, all interventions were tailored to be sensitive to the caregiver's cultural belief system, their ethnic background, socioeconomic status, and education level.

Birmingham—Birmingham's *skills-training intervention* was designed to help African American and Caucasian caregivers manage the stress and distress of their caregiving situations by combining both care-recipient-focused behavior management skill training and caregiver-focused, problem-solving training. The care-recipient-focused skill-training component teaches caregivers how to better address their family members' behavioral excesses (e.g., disruptive vocalization) and remediable deficits (e.g., excess dependence in self-care) that frequently contribute to caregiver stress. In contrast, caregiver problem-solving skills training addresses certain caregiver behaviors in order to increase the caregivers' ability to cope with caregiving stress through strategies such as increasing pleasant social activities and encouraging positive health behaviors. Skill training begins with a 3-hr group workshop offered in the community at local churches or community centers. During the workshop, caregivers participate in didactic training sessions, modeling techniques, role-plays, and performance-based feedback opportunities; they are also given training manuals and videotapes that review and reinforce the critical skills presented. After the workshop, regular home visits to caregivers help fine-tune behavior management and self-management skills by collecting behavioral logs from the caregivers and establishing individualized caregiver and care-recipient programs. Six home visits are made to participants in the first 8 weeks following the workshop, and then another five bimonthly home visits are completed during the rest of the year. These last five visits alternate with five bimonthly therapeutic telephone calls, so that the caregiver receives monthly contact either in person or by telephone from intervention staff. All skill-training workshops are co-led by African American and Caucasian program staff, and home visits are conducted by culturally sensitive interventionists.

Boston—Telephone-linked computer (TLC) is a year-long telephone-based intervention designed to reduce caregiver stress in both Caucasian and ethnic minority caregivers (particularly African American and Hispanic caregivers) and was developed with the capacity to manage large-scale use over long periods of time. The design and development of the TLC system was heavily influenced by Pearlin, Mullan, Semple, and Skaff's (1990) conceptual model of Alzheimer's caregivers' stress. The model proposes that the background and the context of caregiver stress (such as the caregivers' socioeconomic characteristics and caregiving history), as well as the caregivers' primary stressors (such as the care recipients' level of cognitive impairment and behavioral disturbances) can be mediated by the caregivers' personal and social resources to help alter the main outcomes of stress (e.g., mental health symptoms, physical health limitations, and yielding of caregiver activities). This automated telecommunication system uses a computer-controlled human voice system to speak with caregivers at home and is available to them 24 hr a day. In the TLC condition, caregivers learn to select designated keys on the touch-tone keypad of their home phone to communicate with the system and access a number of options tailored to meet their needs and preferences during their participation in the project. The TLC system houses a voicemail caregiver support network designed to reduce social isolation where caregivers can post messages on a voicemail bulletin board or send them to each other for information, support, and advice. In addition, caregivers can report into TLC on a weekly basis regarding their care recipient's behavior problems and receive information on strategies to help reduce them. During this weekly check-in, the system monitors the caregivers' stress level as well, and can make recommendations and referrals whenever appropriate. Caregivers can also access a geriatric nurse specialist's voice-mail and ask for special assistance regarding their own specific caregiving situations and concerns. Through yet another option, TLC can provide an activity/distraction conversation designed to conduct a 12-min individualized conversation with the care recipient in order to distract him or her from problem behaviors and give the caregiver a short break.

Memphis—All three interventions at the Memphis site explore the feasibility of caregiver support provision within primary care settings and share caregiving information and education material with caregivers on a one-to-one basis. The three interventions were developed within the stress and coping model of Lazarus and his colleagues (Folkman, Schaeffer, & Lazarus, 1979; Lazarus & Launeir, 1978) in which educational interventions can be viewed as helping caregivers learn to assess their ability to cope with the demands of their caregiving situations better. *Information and referral (IR)* is specifically designed to simulate the community standard of usual care for caregivers of individuals with ADRD. Upon initial entry into the study and at the conclusion of a primary care office visit, caregivers in this condition receive commercially available pamphlets on general topics about dementia and the telephone numbers of local and national ADRD organizations. Throughout their participation in the study, IR interventionists give these caregivers additional educational material on dementia-related health topics such as nutrition and safety, during regularly scheduled primary care office visits. These visits typically occur four to six times a year in accordance with usual ADRD care. However, IR materials do not address any behavioral interventions or stress-management strategies found in the other conditions offered by the Memphis site.

Behavior care builds on the usual care activities included in IR, but adds written material and individual counseling sessions that address care-recipient behavior management. These targeted counseling and education sessions not only identify specific problem behaviors a care recipient exhibits, such as wandering, but also assess specific declines in their daily activities. Initially, behavior care interventionists meet with caregivers at scheduled primary care office visits to teach them techniques to help them better manage care-recipient problem behavior. Caregivers are also taught personal strategies to help themselves cope better when problem behaviors arise. Supplemental telephone calls between office visits help extend face-to-face meetings by providing caregivers the opportunity to further review and discuss intervention

materials. These telephone calls occur every 2 weeks for the first 3 months, and then monthly thereafter whenever the caregiver is not seen in the primary care office. In accordance with usual ADRD care, these visits occur approximately four to six times a year. Finally, caregivers receive behavior-specific handouts identified through the in-person counseling sessions that are also used to reinforce material covered during the in-person and telephone contacts.

In addition to the general information and problem management material given to participants in the IR and behavior care conditions, *enhanced care* teaches specific stress and behavior management strategies for the caregivers themselves through face-to-face meetings with the interventionists at regularly scheduled primary care office visits. Enhanced care educates caregivers on successful cognitive and behavioral strategies that can help change negative thinking patterns and may also help reduce caregiver distress in caregiving situations where the course of events cannot be altered. Examples of enhanced care strategies include topics such as relaxation training and the identification of steps used in order to cope more effectively with counterproductive thoughts and feelings. As in behavior care, telephone calls help supplement face-to-face counseling sessions between office visits to the physician. These telephone calls are made every 2 weeks for the first 3 months, and then monthly thereafter whenever the caregiver is not seen at the primary care office. Thus, these conditions are hierarchical and stepped in nature, with enhanced care building on behavior care, and behavior care building on IR.

Miami—*Family-based structural multisystem in-home intervention* (FSMII) is a therapy-based intervention drawn from the work of Szapocznik, Kurtines, Perez-Vidal, Hervis, and Foote (1989) that is targeted to both Caucasian and Cuban American families. FSMII utilizes a family systems approach to enhance communication between caregivers and other family members by identifying existing problems in communication and facilitating changes in interaction patterns that encourage caregivers to gather and more effectively manage available family and community resources. Thus, the mechanisms of change in FSMII focus on transactions between the individual and his or her environment; these transactions can be subsequently viewed as embedded within larger social and cultural systems. Key goals of the FSMII embody not only the reduction of caregiver distress that is created by living with and managing a family member with dementia, but also the improvement of overall functioning of the family and the caregiver. Examples of intervention activities designed to enhance family functioning include the identification of specific caregiver problems, the assessment of family problem-solving strategies, the generation of accessible family resources, and the development of a collaboration between caregivers and their families to assist with various caregiving efforts. FSMII family members participate in in-home family therapy sessions conducted by bilingual therapists that occur weekly for the first 4 months, biweekly for the next 2 months, and then monthly for the following 6 months.

Family-based structural multisystem in-home intervention plus computer telephone integration system (FSMII + CTIS) expands the FSMII just described with a CTIS that investigates the effectiveness of using screen phones as a tool to augment the family-based therapeutic intervention. Screen phones are telephones with text display screens and enhanced functions that expand basic telephone use through the addition of various computer inputs and outputs. These features allow both voice and text to be sent and received during any interaction session. The rationale for the FSMII + CTIS intervention proposes that computer and communication plus technologies can be used effectively to facilitate communication linkages established in therapy sessions and enhance access to informal support members including therapists, family members, and other caregivers, as well as formal support programs such as information databases or services. These types of computer links and related forms of telecommunication have already been found to be helpful with other populations (Czaja, Guerrier, Nair, & Landauer, 1993; Leirer, Morrow, Tanke, & Pariente, 1991). The CTIS system

is relatively simple and easy to use because it makes use of a highly familiar technology, the telephone. It relies primarily on voice communication, accepts both Spanish and English text and voice messages, and allows individuals to place regular phone calls, develop voice-messaging systems, and participate in conference calls with as many as 8 individuals at one time. CTIS was also devised to incorporate other functions including (a) information functions with access to medication and nutrition information and linkages to formal resources; (b) orientation functions in which the system provides orientation material and memos for the care recipient; and (c) caregiver respite functions in which family members can develop vignettes with activities and material to help interest and occupy the care recipient.

Palo Alto—Palo Alto's two active interventions, the *coping with caregiving* (CWC) class and the *enhanced support group* (ESG), are both specifically targeted to Hispanic and Caucasian women. The CWC is firmly grounded in cognitive and behavioral theories that delineate the roles of thought and behavior in negative affective states (Beck, Rush, Shaw, & Emery, 1979; Lewinsohn, Sullivan, & Grosscup, 1982). CWC is a documented psychoeducational class intervention developed to teach a limited number of mood-management skills that help reduce the stress of caregiving and alleviate caregiver distress. The classes actively integrate two key instructional approaches to achieve these goals: (a) a reduction in negative affect by teaching caregivers how to relax in stressful situations, appraise their care recipients behavior more realistically, and communicate assertively; and (b) an increase in positive mood states by teaching caregivers to track and see the contingency between mood and activities, develop strategies to do more small, everyday pleasant activities, and set self-change goals and rewards for accomplishments. CWCs were designed to be small, interactive classes that foster the development of specific skills and encourage participants to practice these skills both inside and outside class to reinforce learning and receive valuable feedback.

The ESG intervention is patterned after many support groups available to caregivers in the community, and seeks to respond to the concern that although there is a great deal of clinically based literature on the helpfulness of caregiver support groups, very few well-controlled empirical studies have been conducted to date. This may be due to the fact that support groups vary widely in terms of meeting frequency, the type and amount of disclosure encouraged, and the length of time caregivers regularly attend. However, ESG is "enhanced" in nature in that it gathers together an identified group of caregivers who are encouraged to commit to regular attendance at a professionally led support group for 1 year. The rationale for support group interventions grows out of established studies showing that the quality of one's support network can have a strong effect in moderating or buffering the impact of stress for both older and younger adults (e.g., Cobb, 1976; Dean & Lin, 1977; Finch, Okun, Barrera, Zautra, & Reich, 1989).

Given the potential cultural differences in terms of social support, language preference, and group values, separate ESG groups and CWC classes are offered to the two ethnic groups. Certain other intervention aspects are consistent across the ESG and CWC conditions, too. Both ESG groups and CWC classes initially meet every week for 10 weeks and then once a month thereafter, for a total of eight additional booster sessions. For the convenience and comfort of REACH participants, all classes and support groups are held in local community agencies that many of the participants know and frequent and are co-led by two professional REACH staff. Support groups and classes for Hispanic participants are co-led by bilingual and bicultural professional staff, and are offered in both Spanish and English. Finally, caregivers in both conditions are given standardized, educational material at preestablished intervals across the project that describes caregiving concerns and specific issues related to dementia.

Philadelphia—The *environmental skill-building program* (ESP) is a standardized, 20-week program intended to educate caregivers about the impact of the environment on care recipients

with dementia. This client-driven, home-based service provides caregivers with the skills and technical support necessary to alter their home environments in order to help reduce the adverse impact of behavioral problems on AD/DR family members' ability to perform ADLs. The program is based on a competence–environment framework (Lawton & Nahemow, 1973), and an extension of this framework that describes four hierarchical layers that can be manipulated to obtain an optimal fit between a person's capabilities and environmental demands. These four layers include a physical dimension (objects), a task dimension (daily routines), a social dimension (household composition and social resources), and a cultural dimension (shared values and beliefs; Barris, Kielhofner, Levine, & Neville, 1985; Corcoran & Gitlin, 1991; Gitlin & Corcoran, 1996). The demands of unchanging objects and tasks can result in maladaptive behavior as a care recipient's competence declines, and these behaviors often involve increased resistance to ADLs. ESP provides caregivers with the tools necessary to reduce particular behavioral stressors in the environment, and to enable care recipients to function at higher levels by directing its intervention strategies at the four dimensions. Caregivers are taught to identify and prioritize problem areas encountered in the environment, and to brainstorm, generate, and introduce individualized environmental strategies such as employing assistive devices, making home alterations, simplifying tasks, and enlisting family support. These strategies can range from no-cost solutions (e.g., rearranging furniture and removing household objects), to cost solutions (e.g., installing grab bars or stair glides). ESP's rationale suggests that the use of these and similar strategies will help reduce problematic environmental factors that lead to caregiver burden and strain. ESP begins with a 5-month active phase during which the occupational therapist educates the caregiver about the impact of the environment and implements individualized environmental strategies through five home visits and one follow-up telephone contact. Over the next 6 months, the program enters a maintenance phase where these strategies are reinforced through one additional home visit and three additional telephone contacts.

Data Collection Strategy

The measurements were standardized with respect to content, timing of data collection (baseline, 6, 12, and 18 months), and method of administration (in-person interview). The timing of the interviews was chosen to reflect short, moderate, and long-term outcomes relative to the course of the disease process. For each domain of interest, the literature was searched for appropriate measures with adequate psychometric properties. If an appropriate measure could not be identified through a literature review, new measures were developed.

The measures comprising the REACH core battery can be separated into three categories: standard, modified, and new. The standard measures (ADLs [Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963], IADLs [Lawton & Brody, 1969], Revised Memory and Behavior Problems Checklist [RMBPC; Teri et al., 1992], Center for Epidemiologic Studies—Depression [CES–D; Radloff, 1977], Mini-Mental State Exam) were administered as they were originally proposed. The modified measures (Caregiver Health and Health Behaviors [Posner, Jette, Smith, & Miller, 1993], Anxiety Inventory [Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983], Social Support [Barrera, Sandler, & Ramsey, 1981; Krause, 1995; Krause & Markides, 1990; Lubben, 1988]) were altered from their initial conception by changing the response scale and/or eliminating or adding items. The new measures (Vigilance, Formal Care and Services, Positive Aspects of Caregiving, Religiosity, Social Activities) were designed specifically for the REACH project.

A delivery assessment instrument was used to quantify the delivery of each intervention to each caregiver/care-recipient dyad. The delivery assessment instrument measured the characteristics of each contact in all interventions (both active and control). This included information such as the length of the contact, the type of contact (individual, family, group),

who initiated the contact, the mode of communication, and the mechanism of delivery used in the contact.

If, after enrollment into REACH, the care-recipient's status changed prior to the next assessment (i.e., care-recipient's institutionalization or death), a modified battery was substituted based on the reason for the change. The modified batteries eliminated measures that were not relevant to the changed status of the caregiver, included new measures to assess outcomes appropriate to the situation (e.g., adding bereavement scales for individuals who lost the care recipient through death), and modified other instruments to eliminate items no longer appropriate.

All assessment instruments were translated into Spanish. This involved translating and then back-translating the instrument by a professional translation team. The instruments were then modified for dialect differences and reviewed by bilingual, bicultural experts for correctness. The instruments were pilot-tested before using them.

Intervention Group Assignment

Allocation to an intervention group occurred after administration of the baseline battery. The allocation schemes used varied by site for logistic and study design reasons. For example, four of the five sites that recruited both male and female caregivers used a randomization scheme that stratified by sex because they were interested in testing hypotheses related to gender. Some sites randomly assigned groups of caregivers to the intervention or control group, whereas others assigned individual caregivers to the intervention or control group depending on the nature of the intervention (e.g., group vs. individual). The different randomization approaches at the sites resulted in different probabilities of participants being assigned to the active interventions at each site. This is common in multisite trials and has no impact on the analytic approaches for assessing outcomes. The goal of assigning participants to an intervention group was the same for each site, assuring that the distributions of measured and unmeasured characteristics are balanced across intervention groups. A detailed description of the allocation schemes used at each site and the rationale for selecting it follows.

The Birmingham site utilized a minimization procedure (White & Freedman, 1978) to assign participants to interventions. This procedure balanced the number of caregivers using an a priori defined characteristic profile of race (White/Caucasian, African American), severity of behavior disturbance (mild, moderate, severe), and severity of cognitive impairment (mild, moderate, severe). As a participant was enrolled, the distributions of race, severity of behavior disturbance, and severity of cognitive impairment were examined across the interventions. The participant was assigned to the intervention that, upon adding that participant to the intervention group, would minimize the differences in the characteristic profile across the interventions.

At the Boston site, caregivers were stratified by sex and randomly allocated between the two intervention groups in balanced blocks of randomly selected sizes of 6 (after 6 participants were enrolled, 3 would be in each intervention) or 8 (after 8 participants were enrolled, 4 would be in each intervention). In Memphis, blocked randomization, stratified by sex, with balanced blocks of 6, was used. In addition to stratifying on the sex of the caregiver, the Miami site also stratified randomization on the ethnicity of the caregiver (Cuban or White/Caucasian).

The Palo Alto site restricted enrollment to female caregivers and stratified randomization on the ethnicity of the caregiver (Hispanic/Latino or White/Caucasian). Eligible caregivers were asked which days, times, and locations they could meet for their intervention, and their primary language (Spanish or English). Once 4 participants with the same primary language were identified who could meet at the same date, time, and location, they were randomly assigned to an active intervention (with probability .70) or the MSC (with probability .30). If the group

was assigned to an active intervention, up to 7 more participants were then recruited for that day, time, location, and language, and then the group was randomly assigned to one of the two active interventions (CWC or ESG). After monitoring the intervention assignments, an imbalance in the numbers assigned to the MSC or an active intervention was recognized, so the randomization process was switched to a biased coin approach to adjust for the imbalance by modifying the probabilities of being assigned to MSC or intervention (Efron, 1971).

At the Philadelphia site, randomization was stratified with respect to caregiver/care-recipient relationship (spouse, nonspouse) and caregiver race (White/Caucasian, non-White/Caucasian). Within each stratum, balanced blocks of random size (either 4 or 6) were randomly generated.

Participants provided informed consent under guidelines approved by the Institutional Review Boards at the intervention sites and Coordinating Center. Baseline data were collected on 1,229 caregiver/care-recipient dyads between September, 1996 and March, 2000, of which 1,222 were randomized into 15 active interventions and control conditions. The sample of 1,222 caregiver/care-recipient dyads is used for the following presentation.

Statistical Methods

Characteristics measured on a categorical scale are presented as the percentage of caregivers or care recipients with available data for each level of the specific characteristic. Summaries of the baseline variables measured on a continuous scale are presented as means and standard errors as well as medians and ranges. Algorithms for calculating summary scores for the various measures were obtained from the literature.

Sample Characteristics

Of the 1,222 dyads in REACH, 140 were recruited in Birmingham, 100 in Boston, 245 in Memphis, 225 in Miami, 257 in Palo Alto, and 255 in Philadelphia. The baseline characteristics for the caregivers and care recipients are presented in Tables 2 and 3, respectively, by site and overall.

The REACH caregiver sample was 18.6% male, with an average age of 62.3 years ($SD = 13.6$ years). Over half of the sample was Caucasian/White (56%), 24% was Black/African American, and 19% was Hispanic/Latino. Of the Hispanics, 33% were of Mexican descent and 50% were of Cuban descent. The countries of origin of the remaining 17% of the Hispanic/Latino population were spread across Central and South America, including but not limited to El Salvador, Colombia, and Nicaragua. Approximately 19% of the caregivers had less than a high school education, and nearly 57% were educated beyond high school.

Nearly all of the caregivers were either spouses (48%) or children (44%). A small percentage (2%) were siblings, and the remaining 6% of caregivers represented a combination of grandchildren, nieces, and nephews. Forty percent of the caregivers began living with the care recipient in order to provide care.

The study inclusion criteria required that caregivers had to have been providing care for at least 6 months and were currently providing at least 4 hr of care per day. The mean amount of time that the caregivers had provided care was 4.3 years ($SD = 4.2$ years) and the mean amount of time providing care during the course of a day was 8.0 hr ($SD = 5.2$ hr).

The average CES-D score in caregivers was 15.4 ($SD = 11.5$; range = 0–30, higher scores indicating greater depressive symptomatology), with 41% of the sample having a CES-D score of 16 or higher, a threshold often used to indicate being at risk for clinical depression. Unconditional burden scores (i.e., burden ratings equated to 0 for all problem behaviors that

are not reported to be present by the caregiver) was 16.7 ($SD = 13.4$). The level of depression and burden experienced by these caregivers is similar to levels reported in the majority of published caregiver intervention studies (cf. Schulz et al., 1995).

The care recipients' average age was 79.1 years ($SD = 8.2$ years). Forty-four percent of the care recipients were men; 56% of the care recipients were Caucasians/White, 25% were Black/African American, and 18% were Hispanic/Latino. Of the Hispanic/Latino caregivers, 34% were of Mexican descent and 50% were of Cuban descent. Forty-six percent of the care recipients had less than a high school education, and nearly 31% had more than a high school education.

The general physical health of the care recipients, reported by the caregivers, was 18% in poor health, 30% with fair health, 30% with good health, 14% with very good health, and only 8% with excellent health. The measures of cognitive and physical function indicated an impaired group of care recipients. Specifically, the average Mini-Mental State Exam (range = 0–30; greater cognitive impairment associated with lower score) was 12.6 ($SD = 1.3$), the mean score for the RMBPC (range = 0–24; the number of the memory and behavior problems endorsed) was 10.2 ($SD = 4.2$), and care recipients were impaired an average 3.3 ($SD = 2.1$) of 6 ADLs and an average 7.3 ($SD = 1.3$) of 8 IADLs. On the whole, caregiver and care-recipient profiles for participants in this study are similar to those reported in other caregiving studies. Caregivers were moderately distressed and burdened, and care recipients exhibited moderate to high levels of impairment.

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Table 1

Number of Contacts, Duration Time, and Total Amount of Contact by Type of Contact, Treatment, Condition, and Intervention Site

Site and treatment Condition	Type of contact	No. of contacts in Months 1-6	Duration time (in min) per contact	Total time (in min) of contact	Total contacts for treatment condition in Months 1-6
Birmingham, AL Skills training	Workshop	1	180	180	11
	Face-to-face	8	60	480	
	Phone	2	30	60	
Minimal support Boston, MA	Phone	10	20	200	10
TLC	Training	1	30	30	25
	Phone	24	10	240	
Usual care	Face-to-face	1	5	5	1
Memphis, TN	Face-to-face	3	10	30	3
IR (usual care)	Face-to-face	3	30	90	10
Behavior care	Phone	7	20	140	
Enhanced care	Face-to-face	3	60	180	10
	Phone	7	30	210	
Miami, FL	Face-to-face	20	75	1,500	20
FSMII	Face-to-face	20	75	1,500	44
FSMII + CTIS	CTIS	24	30	720	
Minimal support Palo Alto, CA	Phone	20	20	400	20
Coping	Face-to-face	12	120	1,440	12
Enhanced	Face-to-face	12	120	1,440	12
Minimal support Philadelphia, PA	Phone	12	20	240	12
ESP	Face-to-face	5	120	600	6
	Phone	1	20	20	
Usual care	Face-to-face	1	5	5	1

Note. TLC = telephone-linked computer; IR = information and referral; FSMII = family-based structural multisystem in-home intervention; CTIS = computer telephone integration system; ESP = environmental skill-building program.

Table 2

Note. Entries in *n* and % columns give subsample sizes and percentages, except where mean (*M*), median (*Mdn*), and range are indicated in first column. In some instances the percentages do not sum to 100% due to missing data. REACH = Resources for Enhancing Alzheimer's Caregiver Health; CES-D = Center for Epidemiologic Studies—Depression; RMBPC = Revised Memory and Behavior Problems Checklist.

Table 3
Descriptive Profile of Care Recipients Participating in the Interventions at the Six REACH Intervention Sites

Characteristic	REACH Sites											
	Birmingham (N = 140)			Boston (N = 100)			Memphis (N = 245)			Miami (N = 225)		
	n	%		n	%		n	%		n	%	
Age	78.9	(8.4)		78.0	(8.4)		78.2	(7.4)		80.1	(7.5)	
Mdn, range	79	51–102		78	53–99		78	57–95		81	51–95	
Sex (male)	54	38.6		52	52.0		109	44.5		108	48.0	
Marital status												
Never married	3	2.1		3	3.0		3	1.2		6	2.7	
Married/cohabiting	68	48.6		57	57.0		133	54.3		160	71.1	
Widowed	62	44.3		34	34.0		93	38.0		54	24.0	
Divorced	6	4.3		4	4.0		11	4.5		5	2.2	
Separated	1	0.7		2	2.0		5	2.0		0	0.0	
Years of formal education												
< High school	61	44.2		26	27.1		103	46.2		93	42.1	
High school diploma	30	21.7		34	35.4		43	19.3		58	26.2	
> High school	47	34.1		36	37.5		77	34.5		70	31.7	
Ethnicity												
Caucasian	79	56.4		79	79.0		141	57.6		112	49.8	
Black	60	42.9		16	16.0		99	40.4		0	0.0	
Hispanic	1	0.7		2	2.0		1	0.4		111	49.3	
Mexican	0	0.0		0	0.0		1	100		0	0.0	
Cuban	0	0.0		0	0.0		0	0.0		109	98.2	
Hispanic other	1	100		2	100		0	0.0		2	1.8	
Other	0	0.0		3	3.0		4	1.6		2	0.9	
Physical health												
Poor	17	12.1		12	12.0		46	18.8		29	12.9	
Fair	51	36.4		29	29.0		71	29.0		53	23.6	
Good	42	30.0		36	36.0		71	29.0		81	36.0	
Very good	18	12.9		11	11.0		33	13.5		41	18.2	
Excellent	12	8.6		12	12.0		24	9.8		21	9.3	
Mini-Mental State Exam (out of 30)												
M (SD)	13.0	(7.3)		11.2	(8.6)		11.1	(6.8)		13.6	(8.2)	
Mdn, range	13.0	0–29		10.5	0–27		10.0	0–28		14.0	0–29	
RMBPC (out of 24)												
M (SD)	11.0	(3.7)		8.9	(4.0)		10.1	(4.2)		10.0	(4.0)	
Mdn, range	10.6	0–22		9.0	0–22		10.0	0–21		9.4	2–23	
ADLs (out of 6)												
M (SD)	3.2	(2.0)		3.4	(2.1)		3.4	(2.0)		2.7	(2.3)	
Mdn, range	3.0	0–6		4.0	0–6		4.0	0–6		3.0	0–6	
IADLs (out of 8)												
M (SD)	7.5	(1.1)		7.4	(1.1)		7.5	(1.0)		6.5	(1.8)	
Mdn, range	8.0	3–8		8.0	3–8		8.0	2–8		7.0	1–8	

Note. Entries in *n* and % columns give subsample sizes and percentages, except where mean (*M*), standard deviation (*SD*), median (*Mdn*), and range are indicated in first column. In some instances the percentages do not sum to 100% due to missing data. REACH = Resources for Enhancing Alzheimer's Caregiver Health; CES-D = Center for Epidemiologic Studies—Depression; RMBPC = Revised Memory and Behavior Problems Checklist; ADLs = activities of daily living; IADLs = instrumental activities of daily living.