

# Development of the Risk Appraisal Measure: A Brief Screen to Identify Risk Areas and Guide Interventions for Dementia Caregivers

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**OBJECTIVES:** To develop and validate a brief screening measure for use in research, healthcare, and community settings to systematically assess well-being and identify needed areas of support for caregivers of patients with dementia.

**DESIGN:** This study used data from Resources for Enhancing Alzheimer's Caregiver Health (REACH II), a multisite randomized clinical trial of a behavioral intervention designed to improve the quality of life of caregivers in multiple domains.

**SETTING:** REACH II.

**PARTICIPANTS:** Two hundred twelve Hispanic, 211 black, and 219 white family caregivers providing in-home care to patients with dementia.

**MEASUREMENT:** Based on conceptual and psychometric analyses, a 16-item measure was developed that assesses six domains linked to caregiver risk and amenable to intervention: depression, burden, self-care and health behaviors, social support, safety, and patient problem behaviors. The reliability and validity of the instrument was evaluated with 642 dementia caregiver dyads from the REACH II program.

**RESULTS:** The measure was found to have acceptable internal consistency for a multidimensional scale and similar measurement properties for each of the racial and ethnic

groups. Concurrent validity was also demonstrated for the measure.

**CONCLUSION:** The REACH Risk Appraisal Measure developed in this study shows promise as an assessment tool that can be used in research, clinical, and community settings to guide, prioritize, and target needed areas of support for caregivers of patients with dementia. *J Am Geriatr Soc* 57:1064–1072, 2009.

**Key words:** dementia; caregiver; risk assessment

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Family caregivers play a pivotal role in the management of the health and care of patients with dementia. Although caregiving may be rewarding, providing care to a family member is stressful, contributes to psychiatric and physical morbidity, and increases the risk of mortality.<sup>1,2</sup> These negative consequences can affect the quality of care and quality of life of the patient and increase the likelihood of institutionalization.<sup>3</sup> Despite recognition of the caregiver's critical role, the multiple needs of caregivers are not always systematically assessed. Most assessments focus on the patient, assess one aspect of caregiving (such as burden), or view caregiver needs in terms of capacity to provide care.<sup>4</sup>

Systematic assessment of family caregivers can contribute to clinical practice in significant ways. Assessment can efficiently identify problems in a caregiving situation, guide development and implementation of effective care plans, and be used to evaluate program effectiveness. The assessment process itself can be therapeutic and help caregivers feel recognized and valued.<sup>5</sup> Finally, assessment information can be used to identify new directions for research and policy.

Although understanding the needs and situations of family caregivers is valuable and necessary for developing effective patient care plans, few state or community-based

service programs systematically assess caregiver needs.<sup>6</sup> Within the clinical arena, the American Medical Association<sup>7</sup> published a brief caregiver self-assessment questionnaire to encourage physicians and health practitioners to recognize the needs of caregivers. Although this measure is valuable for general use, it is not targeted to dementia caregivers and does not link needs of caregivers to specific interventions, nor was it developed and tested with a racially and ethnically diverse sample of caregivers. Recently, the Carers Assessment of Difficulties Index<sup>8</sup> was developed as a clinical tool for assessing multiple dimensions of burden in caregivers of patients with dementia. This tool may not be feasible for use in clinical settings because it is lengthy, and items are phrased negatively, making it difficult to develop a treatment plan. Current consensus guidelines suggest that caregiver assessment should be multidimensional (reflecting areas that place caregivers at most risk), driven by a conceptual framework, culturally relevant, and easy to administer.<sup>4</sup>

The purpose of this study was to develop and test a brief and easy-to-administer measure to identify risk areas that are modifiable and amenable to intervention for families caring for patients with dementia. The measure is designed for use by clinicians and service providers to evaluate the specific needs of dementia caregivers providing care at home. Practitioners and researchers can also use it to evaluate the effect of caregiver intervention programs. The psychometric properties of the measure were evaluated using a diverse sample of caregivers enrolled in the Resources for Enhancing Caregiver Health (REACH II) program. This article describes the development of the measure, its underlying structure, and its clinical utility.

## OVERVIEW OF THE REACH II PROGRAM

REACH II was a controlled randomized clinical trial of an intervention for family caregivers of patients with Alzheimer's disease or related disorders funded by the National Institute on Aging and the National Institute of Nursing Research. The intervention was designed to systematically target areas associated with caregiver risk (depression, burden, self-care and healthy behaviors, social support, and problem behaviors).<sup>9</sup> Five sites (Birmingham, AL; Memphis, TN; Miami, FL; Palo Alto, CA; and Philadelphia, PA) and a coordinating center in Pittsburgh participated. After written informed consent and baseline assessment, dyads were randomly assigned to the intervention or the information-only control condition. A battery of measures was administered at baseline and the 6-month follow-up assessment. All measures were translated into Spanish for the Hispanic participants using established techniques for forward and back translation and allowing for regional variation in language expression.

Because of the variability inherent in the caregiving situation, the intervention was tailored to meet the specific needs of the caregiver based on individual risk profiles obtained from a Risk Appraisal Questionnaire (RAQ) and other items included in the baseline assessment battery.

## METHOD

### Sample

#### *Inclusion/Exclusion Criteria*

Caregivers were aged 21 and older, lived with or shared cooking facilities with the patient, had provided care for a minimum of 4 hours per day for at least the past 6 months, and reported distress associated with caregiving. Other requirements included having a telephone, planning to remain in the geographic area, and keeping their relative home for at least 6 months, and competency in English or Spanish (participants were queried about language fluency during telephone screening). Patients had to have a physician diagnosis of Alzheimer's disease or dementia or a Mini-Mental State Examination (MMSE)<sup>10</sup> score less than 24 and have a limitation in at least one activity of daily living (ADL)<sup>11</sup> or two instrumental activities of daily living (IADLs).<sup>12</sup>

Dyads were excluded if they were involved in another caregiver intervention study, the caregiver or patient had an illness or disability that would prohibit participation, or the patient had an MMSE score of 0 and was bedbound.<sup>9</sup>

#### *Sample Characteristics*

The sample included 642 Hispanic or Latino ( $n = 212$ ), white ( $n = 219$ ), or black ( $n = 211$ ) caregivers recruited from five geographical areas in the United States who ranged in age from 22 to 89 (mean  $\pm$  standard deviation  $60.6 \pm 13.3$ ). Approximately 20% were male; the majority of African-American and Latino caregivers were adult children; for Caucasians, spouses were the majority (Tables 1 and 2). The initial assessment indicated that patients had severe cognitive deficits and substantial functional impairments (Table 2).

## DEVELOPMENT OF THE REACH II RISK APPRAISAL MEASURE

Upon completion of REACH II, a working group consisting of REACH investigators from each site and the coordinating center and a project statistician (SJC, LNG, RS, SZ, LDB, ABS, LON, DG-T) was formed to develop a brief, easy-to-administer Risk Appraisal Measure (RAM) for use by clinicians and service providers to identify dementia caregivers at risk for adverse outcomes. Based on a systematic review of existing assessment instruments, prior research that identified factors that place caregivers at risk, and data from REACH I,<sup>13–18</sup> six target domains of risk were identified for representation in the RAM: depressive symptomatology, caregiver burden, self-care and healthy behaviors, social support, safety, and patient problem behaviors. The safety domain included safety related to the patient's impairment (e.g., driving, wandering) and the caregiver (e.g., feel like yelling at patient) because both aspects are important areas of risk for this population.

Initially, 59 items were identified from the RAQ and the REACH II baseline assessment battery that represented the six domains. From this initial pool of items, those to be included in the RAM had to meet four criteria: represent areas that placed caregivers at risk, were modifiable and amenable to intervention, had face validity, and were relevant across diverse ethnic and cultural groups.

**Table 1. Caregiver Characteristics According to Race or Ethnicity**

Characteristic	Hispanic n = 212	White n = 219	Black n = 211	P-Value
Age, mean $\pm$ SD; median (range)	58.8 $\pm$ 13.9; 60.1 (22–84)	63.8 $\pm$ 12.3; 63.9 (38–87)	59.0 $\pm$ 13.2; 58.5 (24–89)	
Male, n (%)	38 (17.9)	38 (17.4)	34 (16.1)	
Education, n (%)*				
< High school	85 (40.1)	18 (8.2)	23 (10.9)	
High school	43 (20.3)	38 (17.4)	64 (30.3)	
> High school	84 (39.6)	163 (74.4)	124 (58.8)	
Marital status, n (%)				
Married	135 (63.7)	175 (79.9)	118 (55.9)	
Not married	77 (36.3)	44 (20.1)	93 (44.1)	
Caregiver relationship to patient, n (%)				
Spouse	83 (39.2)	126 (57.5)	63 (29.9)	
Nonspouse	129 (60.8)	93 (42.5)	148 (70.1)	
Child	109 (51.9)	85 (39.0)	113 (53.6)	
Sibling	9 (4.2)	2 (0.9)	7 (3.3)	
Other	11 (5.2)	6 (2.7)	28 (13.3)	
Caregiver income, \$, n (%) <sup>†</sup>				
< 20,000	113 (53.3)	32 (14.6)	77 (36.5)	
20,000–39,999	56 (26.4)	65 (29.7)	67 (31.8)	
$\geq$ 40,000	34 (15.9)	112 (50.9)	56 (26.4)	
Years living with patient, mean $\pm$ SD; median (range)	23.0 $\pm$ 20.8; 15 (0–70)	26.4 $\pm$ 22.1; 23.0 (0–67)	17.3 $\pm$ 19.9; 6.0 (0–67)	
Hours doing things, mean $\pm$ SD; median (range)	9.7 $\pm$ 4.9; 9.0 (2–24)	7.5 $\pm$ 4.9; 6.0 (1–21)	8.5 $\pm$ 5.0; 8.0 (1–24)	
Hours on duty, mean $\pm$ SD; median (range)	19.9 $\pm$ 6.3; 24.0 (1–24)	19.4 $\pm$ 6.9; 24.0 (0–24)	18.4 $\pm$ 7.3; 24.0 (0–24)	
Employed, n (%)				
Full or part time	65 (30.7)	63 (28.8)	77 (36.5)	
Retired	61 (28.8)	99 (45.2)	77 (36.5)	
Unemployed	86 (40.6)	57 (26.0)	57 (27.0)	
Risk Appraisal Measure domains				
Safety (n = 210 Hispanic) (range 0–30)				.000 <sup>‡</sup>
Mean $\pm$ SD	2.1 $\pm$ 1.7	3.2 $\pm$ 1.7	2.8 $\pm$ 1.5	
Median	2.0	3.0	3.0	
25th, 75th percentile	1, 3	2, 4	2, 4	
Minimum, maximum	0, 7	0, 9	0, 8	
Safety subdomain				
Safety risk related to patient impairment (n = 210 Hispanics) (range 0–7)				.000 <sup>S</sup>
Mean $\pm$ SD	1.1 $\pm$ 1.1	1.9 $\pm$ 1.2	1.5 $\pm$ 1.1	
Median	1.0	2.0	1.0	
25th, 75th percentile	0, 2	1, 3	1, 2	
Minimum, maximum	0, 4	0, 5	0, 6	
Safety risk related to the home environment (range 0–6)				.001 <sup>S</sup>
Mean $\pm$ SD	1 $\pm$ 1.0	1.4 $\pm$ 1.1	1.3 $\pm$ 1	
Median	1.0	1.0	1.0	
25th, 75th percentile	0, 1	1, 2	1, 2	
Minimum, maximum	0, 5	0, 6	0, 4	
Depression (n = 210 whites) (range 0–3)				.002 <sup>S</sup>
Mean $\pm$ SD	1.3 $\pm$ 1.1	1.1 $\pm$ 1.0	1 $\pm$ 1.0	
Median	1.0	1.0	1.0	
25th, 75th percentile	0, 2	0, 2	0, 2	
Minimum, maximum	0, 3	0, 3	0, 3	
Burden (range 0–12)				.002 <sup>‡</sup>
Mean $\pm$ SD	4.4 $\pm$ 2.7	5 $\pm$ 2.6	4 $\pm$ 2.2	
Median	4.0	5.0	4.0	

(Continued)

Table 1. (Contd.)

Characteristic	Hispanic n = 212	White n = 219	Black n = 211	P-Value
25th, 75th percentile	2, 6	3, 7	2, 5	
Minimum, maximum	0, 12	0, 12	0, 11	
Self-care and health behaviors (range 0–6)				.10 <sup>§</sup>
Mean ± SD	3.4 ± 1.5	2.9 ± 1.4	3.1 ± 1.2	
Median	4.0	3.0	3.0	
25th, 75th percentile	2, 5	2, 4	2, 4	
Minimum, maximum	0, 6	0, 6	0, 6	
Social support (range 0–6)				.23 <sup>§</sup>
N	209	216	210	
Mean ± SD	3.3 ± 2.0	3.7 ± 1.9	3.5 ± 1.9	
Median	3.0	4.0	4.0	
25th, 75th percentile	2, 5	2, 6	2, 5	
Minimum, maximum	0, 6	0, 6	0, 6	
Patient problem behaviors (n = 210 Hispanics) (range 0–3)				.77 <sup>§</sup>
Mean ± SD	0.9 ± 0.8	0.7 ± 0.8	0.9 ± 0.8	
Median	1.0	1.0	1.0	
25th, 75th percentile	0, 1	0, 1	0, 1	
Minimum, maximum	0, 3	0, 3	0, 3	

\* Using Mann-Whitney test. Hispanic < black < white;  $P < .001$ .

† Using Mann-Whitney test. Hispanic < black < white;  $P < .001$ .

‡ From Kruskal-Wallis test.

§ From Jonckheere-Terpstra test.

SD = standard deviation.

The distributional properties of the 59 items were examined to evaluate variability in baseline responses across the three racial and ethnic groups from the REACH II sample. Items with little or no variability in response were eliminated, resulting in a pool of 28 items. Next, based on clinical judgment and a process of consensus agreement in the working group, 16 items were selected that met the specified criteria and represented good indicators of each of the six target domains to form the RAM. The strategy was to select a few key items from the baseline battery that represented each domain.

The 16-item RAM was then subjected to several statistical procedures to assess reliability and concurrent va-

lidity. Cronbach alpha was used to assess internal consistency for the instrument for the overall sample and each racial and ethnic group. Concurrent validity was assessed using Pearson correlation coefficients. Each domain of the RAM was correlated with other measures from the REACH II battery (baseline scores) that assessed a similar construct. Finally, distributions and summary statistics for the six domains were computed and compared for each racial and ethnic group using chi-square tests (Table 1).

Test-retest reliability was not assessed because participants were enrolled in an intervention study, and therefore results before and after intervention are viewed as reflecting the intervention's effect rather than the measure's stability.

Table 2. Patient Characteristics According to Race or Ethnicity

Characteristic	Hispanic (n = 212)	White (n = 219)	Black (n = 211)
Age, mean ± SD; median (range)	78.2 ± 9.5; 79.2 (52–100)	78.9 ± 8.9; 79.8 (47–99)	80.3 ± 8.7; 81.2 (51–98)
Male, n (%)	77 (36.3)	114 (52.1)	78 (37.0)
Education, n (%)			
< High school	147 (72.4)	56 (25.8)	111 (55.8)
High school	25 (12.3)	57 (26.3)	36 (18.1)
> High school	31 (15.3)	104 (47.9)	52 (26.1)
Number of activity of daily living limitations, (mean ± SD); median (range) (range 0–6)	3.5 (2.1); 4.0 (0–6)	3.3 (2.1); 3.0 (0–6)	3.4 (2.0); 4.0 (0–6)
Number of instrumental activity of daily living limitations, (mean ± SD); median (range) (range 0–8)	6.8 (1.8); 8.0 (0–8)	6.9 (1.8); 8.0 (1–8)	6.8 (1.6); 7.0 (1–8)
Mini-Mental State Examination score, (mean ± SD); median (range) (range 0–30)	11.4 (7.0); 11.0 (0–27)	14.4 (7.5); 15.0 (0–29)	11.5 (7.2); 12.0 (0–26)

SD = standard deviation.

## Measures Used in the Concurrent Validity Analyses

### *Cognitive Impairment*

The MMSE<sup>10</sup> is an 11-item measure that evaluates cognitive function. The maximum score is 30. A score of 23 or lower (corrected for age and education) indicates cognitive impairment.

### *Depression*

The 10-item version of the Center for Epidemiologic Studies Depression Scale (CES-D)<sup>19,20</sup> was used to assess symptoms of depression. Scores range from 0 through 30, with higher scores indicating more depressive symptoms; a score of 8 (equivalent to 16 on the full 20-item scale) reflects depressive symptomatology<sup>20</sup> (Cronbach alpha = 0.83).

### *Caregiver Burden*

The brief (12-item) version of the Caregiver Burden Interview<sup>21,22</sup> was used. Because one item was not relevant if the patient was placed, we used 11 items. Each item was rated on a 5-point scale (0 = never to 4 = nearly always), yielding a range of 0 to 44. Higher values indicate greater levels of burden (Cronbach alpha = 0.85).

### *Self-Care*

Caregivers' diligence in looking after their own health was assessed using 11 items, such as getting enough rest when sick and seeing a doctor when needed. Items were scored 0 or 1 (no or yes), yielding a range from 0 to 11.<sup>9</sup> Higher scores indicate greater attention to one's health (Cronbach alpha = 0.62).

### *Social Support*

The social support measure assessed three domains: received support (3 items),<sup>23,24</sup> satisfaction (3 items),<sup>24,25</sup> and negative interactions or support (4 items).<sup>24</sup> Responses were scored on a 4-point scale (0 = never to 3 = very often). Scores could range from 0 to 30, with higher scores indicating increased social support (Cronbach alpha = 0.76).

### *Problem Behaviors*

Three questions reflecting the memory, depression, and disruption domains of the Revised Memory and Behavior Problem Checklist<sup>26</sup> were used to assess patient problem behaviors. Responses were scored on a 5-point scale (1 = substantial improvement to 5 = substantial decline), yielding a range from 3 to 15, with higher scores indicating greater decline (Cronbach alpha = 0.76).

### *Functional Impairment*

Patient impairment in daily functioning was measured using a modified version of the 6-item Katz ADL scale<sup>11</sup> and the 8-item Lawton and Brody IADL scale.<sup>12</sup> For each item, a yes or no response (0 or 1) indicated whether the patient required help with a given activity over the previous week. For both scales, higher scores indicate greater impairment (IADL 0–8; ADL 0–6; Cronbach alpha = 0.81 (ADL) and 0.76 (IADL)).

### *Positive Aspects of Caregiving*

Positive aspects of caregiving were measured using nine items that assessed caregivers' subjectively perceived gains from desirable aspects of or positive affective returns from providing care (1 = disagree a lot to 5 = agree a lot).<sup>27</sup>

Scores could range from 0–36, with higher scores indicating more-positive feelings about caregiving (Cronbach alpha = 0.91).

### *Quality of Care*

Quality of care was measured using 40 items in three domains: living environment (14 items), caregiving frustrations (8 items), and exemplary caregiving (18 items).<sup>9</sup> The living environment assessed positive aspects of the environment (5 items) and environmental hazards (9 items), with scores ranging from 0 to 14 and higher scores indicating superior living conditions (Cronbach alpha = 0.46). Frustration scores range from 0 to 24, with higher scores indicating greater frustration (Cronbach alpha = 0.74). Exemplary caregiving scores range from 0 to 54, with higher scores indicating more-exemplary caregiving (Cronbach alpha = 0.83).

## RESULTS

### *Description of RAM*

The 16-item RAM taps six domains related to caregiver risk that are amenable to intervention. Table 3 describes the six domains and suggested intervention strategies for each domain. Depressive symptomatology is assessed by having caregivers rate the degree to which they felt depressed in the past week (1 item). Burden is assessed by having caregivers rate the stress associated with caregiving responsibilities and the degree to which they feel good as a result of caregiving (3 items). Self-care and healthy behaviors is assessed by asking caregivers about their own health or problems with sleep (2 items). Social support is assessed by having caregivers rate their satisfaction with support from others (2 items). Patient problem behaviors are assessed by asking caregivers if they have information about Alzheimer's disease and the degree to which difficulties are experienced helping the patient with basic activities (2 items). Two dimensions of safety are assessed: risk associated with caregiver behaviors (2 items, e.g., felt like yelling at the patient) and risk associated with patient impairment (4 items, e.g., patient drives). For the safety, depression, self-care and healthy behaviors, burden, and patient problem behaviors domains, a higher score indicates higher risk. For the social support domain, a lower score indicates less satisfaction with support and higher risk.

### *Internal Consistency and Concurrent Validity*

Cronbach alpha was 0.65 for the entire scale for the overall sample, which although relatively low, was expected, because the scale measures six distinct domains. Cronbach alpha was similar for each of the racial and ethnic groups: 0.69 for Hispanic and Latino, 0.65 for white, and 0.65 for black.

The correlation analysis indicated that each of the six domains was significantly related to at least one of the selected concurrent validity measures. For example, the depression domain was significantly correlated with the CES-D, the Burden Interview, and the bother score of the Revised Memory and Behavior Problem Checklist. The burden domain was correlated with the Burden Interview and the Positive Aspects of Caregiving scale. The burden domain

**Table 3. Overview of the Resources for Enhancing Alzheimer’s Caregiver Health II 16-Item Risk Appraisal Measure (RAM)**

Domain	Definition of Domain	RAM Items	Example of Treatment Strategies
Self-care and healthy behaviors	Caregiver’s physical well-being and self-care behaviors	Caregiver has trouble sleeping  Caregiver’s rating of physical health	Provide educational materials on self-care Provide instruction on healthy behaviors Referral to appropriate medical resources (e.g., nutritionists)
Patient problem behaviors	Difficulties in the management of patient activities and instrumental activities of daily living and behavioral problems	Caregiver has information on symptoms of dementia  Caregiver feels stress when trying to help patient with daily activities	Provide educational materials on dementia and managing problem behaviors Engage in problem solving exercises Provide a written prescription of strategies to manage behaviors
Burden	Feels stress due to caregiving responsibilities  Feels good as a result of caregiving	Caregiver feels stress trying to meet other responsibilities  Caregiver feels strain around patient Caregiver feels good as a result of caregiving	Provide educational materials on stress and stress management techniques Discuss and teach stress management techniques (e.g., breathing exercises, stretching)
Depression	Feels depressed or sad	Caregiver felt depressed in the last week	Provide information and instruction on strategies for engaging in pleasant events and mood management Referral to appropriate healthcare specialist (e.g., counselor)
Social support	Satisfaction with support from friends or family	Satisfaction with help from friends  Satisfaction with support from others	Provide information on community resources Provide education about the importance of social support and communication skills Referral to a support group
Safety	Being at risk because of caregiver’s behavior Being at risk because of patient impairment	Feel like yelling at patient Refrain from hitting patient  Dangerous objects are in the home  Patient wanders Patient drives Able to leave patient alone	Provide education and instruction on stress and anger management techniques  Remove dangerous objects from home Enroll patient in “Safe Return” program of the Alzheimer’s Association File report with local department of motor vehicles

The RAM is available from the authors.

assesses both dimensions. All relationships between the variables were as predicted (Table 4).

**Subgroup Analyses**

Significant differences were found for the safety, burden, and depression domains across racial and ethnic groups (Table 1). Hispanic caregivers were at slightly higher risk for depression than the other caregivers. Black and Hispanic caregivers reported less burden than white caregivers, and white caregivers reported more problems with safety concerns ( $P < .05$ ). There were no significant differences between caregivers for the self-care and healthy behavior, social support, or patient problem behavior domains.

Given that there were racial and ethnic differences in income and education (Table 1), the differences in the safety, burden, and depression domains were further examined using stratification analysis with income and education as strata. Within each strata, racial and ethnic differences in outcomes were examined using the Mann-Whitney *U*-test,

given the distributional properties of the data. The results for safety were unchanged; white caregivers reported more problems with safety than other caregiver groups, suggesting that income and education are not the sources of these differences. With respect to burden, black caregivers reported significantly less burden than white caregivers, but the difference between Hispanic and white caregivers for burden was not significant. This suggests that differences in income and education may drive the difference in burden between these two racial and ethnic groups. Finally, for the depression domain, the only remaining difference was between Hispanic and black caregivers, with Hispanic caregivers reporting higher depression scores.

**CONCLUSIONS AND RECOMMENDATIONS FOR CLINICAL PRACTICE**

Family caregivers play a significant role in the long-term care of patients with dementia. Although providing care can

**Table 4. Pearson Correlation Coefficient Measuring Association Between Domains from the Resources for Enhancing Alzheimer's Caregiver Health II 16-Item Risk Appraisal Measure and Proposed Validity Indicators**

Validity Indicator Domain	Years		Center for Epidemiologic Studies Depression Scale <sup>h</sup>					Unconditional Burden Interview <sup>k</sup>			Activities and Instrumental Activities of Daily Living <sup>l</sup>		Positive Aspect of Caregiver <sup>m</sup>	
	Caregiver Education	Caregiver Patient	Safety <sup>a</sup>	Positives Aspects of Environment <sup>b</sup>	Mini-Mental State Examination <sup>c</sup>	Exemplary Caregiver <sup>d</sup>	Patient Safety Risks <sup>e</sup>	Social Support <sup>f</sup>	Self-Care <sup>g</sup>	Depression Scale <sup>h</sup>	Caregiver Frustration <sup>i</sup>	Burden Interview <sup>k</sup>		Daily Living <sup>l</sup>
Safety <sup>n</sup>	0.22**	0.04	0.67**	-0.06	0.22**	-0.32**	0.17**	0.00	-0.03	0.18**	0.55**	0.33**	-0.21**	-0.30**
Safety risk related to patient impairment <sup>o</sup>	0.21**	0.07	0.77**	-0.12*	0.33**	-0.17**	0.10*	0.07	0.07	0.03	0.20**	0.14**	-0.36**	-0.22**
Safety risk related to caregiver behavior <sup>p</sup>	0.13*	-0.01	0.22**	0.05	-0.01	-0.32**	0.17**	-0.08	-0.13*	0.25**	0.67**	0.38**	0.06	-0.25**
Depression <sup>q</sup>	-0.05	0.09	0.08	0.00	0.01	-0.12*	0.12*	-0.27**	-0.25**	0.68**	0.24**	0.45**	0.02	-0.21**
Burden <sup>r</sup>	0.22**	-0.07	0.20**	0.06	0.07	-0.29**	0.12*	-0.31**	-0.28**	0.51**	0.31**	0.79**	0.01	-0.58**
Self-care and healthy behaviors <sup>s</sup>	-0.16**	0.04	-0.02	0.05	0.00	-0.09	0.07	-0.24**	-0.27**	0.49**	0.12*	0.35**	0.07	-0.07
Social support <sup>t</sup>	0.00	0.09	0.03	0.00	0.05	0.16**	-0.08	0.68**	0.21**	-0.32**	-0.10*	-0.29**	-0.01	0.16**
Problem behaviors <sup>u</sup>	-0.06	-0.08	-0.02	0.05	-0.11*	-0.15**	0.12*	-0.09	-0.21**	0.16**	0.19**	0.27**	0.17**	-0.05

$P < .01, ** .001.$

<sup>a</sup> Higher score indicates greater risk related to safety.

<sup>b</sup> Higher score indicates more positive aspects of environment in quality of care.

<sup>c</sup> Higher score indicates better cognitive function of patient.

<sup>d</sup> Higher score indicates more-exemplary caregiving.

<sup>e</sup> Higher score indicates more danger of care recipient in behavior.

<sup>f</sup> Higher score indicates higher social support.

<sup>g</sup> Higher score indicates better caregiver self-care.

<sup>h</sup> Higher score indicates more depressive symptoms.

<sup>i</sup> Higher score indicates more caregiver frustration.

<sup>j</sup> Higher score indicates more burden.

<sup>k</sup> Higher score indicates more bother with caregiving duties.

<sup>l</sup> Higher score indicates greater patient impairment.

<sup>m</sup> Higher score indicates more-positive aspect of caregiving.

<sup>n</sup> Higher score indicates higher risk in safety.

<sup>o</sup> Higher score indicates higher risk related to care recipient impairment.

<sup>p</sup> Higher score indicates higher risk from caregiver behavior.

<sup>q</sup> Higher score indicates worse depression.

<sup>r</sup> Higher score indicates more burden.

<sup>s</sup> Higher score indicates poorer self-care and healthy behaviors.

<sup>t</sup> Higher score indicates greater social support.

<sup>u</sup> Higher score indicates greater problem behaviors.

be rewarding, it often places caregivers at great risk for negative outcomes that also compromise the well-being of the patients with dementia and heighten their risk for placement in institutional settings. In most clinical and service settings, caregiver needs are overlooked, and systematic assessment is restricted to the patient, especially in racial and ethnic minorities.<sup>5</sup> Given that the success of most care plans rests largely on the caregiver, effective care outcomes depend on understanding the needs and risks of both the caregiver and patient.

The RAM developed and tested in this study has promise for identifying specific areas of caregiver risk for which appropriate interventions can be provided—directly or through a referral process. For example, the RAM can be used in primary care and geriatric physician offices, geriatric care assessment centers, and community agencies, such as the Alzheimer's Association, that provide support to caregivers of people with Alzheimer's disease. It could also be a useful assessment tool for home healthcare providers. In the span of 5 to 7 minutes, key areas of potential risk can be identified, and a targeted treatment plan can be developed so that caregivers can quickly and efficiently receive the help they need (Table 3). A strength of the RAM is that it assesses multiple dimensions that have known links to caregiver risk and adverse outcomes in six areas: depression, burden, self-care and healthy behaviors, social support, safety, and patient problem behaviors. As shown in REACH II,<sup>9</sup> evidenced-based strategies exist to improve caregiver outcomes within each of these areas, and each risk area maps onto an evidence-based intervention program.<sup>28,29</sup>

For example, if a caregiver reports frequent problems with depression, this may signal a need for referral for further evaluation to determine the severity of the problem and whether services from a trained mental health professional are warranted. If caregivers experience problems with depression only occasionally, the intervention might involve instruction on strategies to increase involvement in everyday pleasant events. Caregivers who report being "burdened" can be referred to a support group or taught stress management techniques. If a caregiver indicates problems with self-care, a wide range of strategies such as helping the caregiver obtain respite to attend medical appointments or other medically based interventions could be initiated. Interventions to help caregivers manage health issues are different from interventions to address depression or lack of social support. Effective caregiver treatment plans cannot be algorithmic and rest solely on the basis of the RAM but require more in-depth probing once a problem area is identified.

The data also indicate that the RAM has similar measurement properties across ethnic and racial groups. This is important, given the increasing number of minority caregivers and recent findings that intervention needs vary between racial and ethnic groups because of differences in attitudes, patterns of caregiving, levels of support, coping strategies, and distress.<sup>30</sup>

In sum, the RAM is an efficient and easily administered tool that can provide a "road map" for intervention and increase the likelihood that a caregiver will receive the specific forms of assistance needed to effectively maintain the caregiving role. From a public health perspective, early identification and intervention for caregivers at risk may

prevent or delay costly institutional placement and conserve long-term care resources. The RAM can also be used as an outcome to assess the effectiveness of intervention or treatment strategies.

A limitation of the RAM is that it does not assess other domains such as financial strain or social activities that can also be sources of stress for caregivers.<sup>5</sup> Areas for inclusion were selected that are most often highlighted in the caregiving literature as placing a caregiver at risk for adverse outcomes or affecting the patient with dementia and for which evidence-based interventions are available.<sup>9</sup> Future studies are needed to examine the reliability and validity of the RAM with other ethnic groups and to evaluate the effect of the caregiver risk assessment on caregiver and patient quality of life. Studies are also needed to further identify links between risk domains and effective intervention programs.

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## REFERENCES

- Schulz R, Martire L. Family caregiving of persons with dementia: Prevalence, health effects, and support strategies. *Am J Geriatr Psychiatry* 2004;12: 240–249.
- Schulz R, Beach S. Caregiving as a risk factor for mortality: The Caregiver Health Effects Study. *JAMA* 1999;282:2215–2219.
- Gaugler JE, Kane RA, Langlois J. Assessment of family caregivers of older adults. In: Kane RL, Kane RA, editors. *Assessing Older Persons: Measures, Meaning and Practical Applications*. New York: Oxford University Press, 2000, pp 320–359.
- Family Caregiver Alliance. *Caregiver Assessment: Voices and Views from the Field*. Report from a National Consensus Development Conference (Vol. II). San Francisco: Author, 2006.
- Zarit SH. Assessment of Family Caregivers: A Research Perspective. In: *Caregiver Assessment: Voices and Views from the Field*. San Francisco: Family Caregiver Alliance, 2006, pp 12–37.



6. Feinberg LF, Newman SA. A study of 10 states since passage of the National Family Caregiver Support Program: Policies, perceptions and program development. *Gerontologist* 2004;44:760-769.
7. American Medical Association Caregiver Self-Assessment Tool [on-line]. Available at <http://www.ama-assn.org/ama/pub/category/5037.html> Accessed February 2, 2008.
8. Charlesworth GM, Tzimoula XM, Newman SP. Carers assessment of difficulties index (CADII): Psychometric properties for use with carers of people with dementia. *Aging Ment Health* 2007;11:218-225.
9. Belle SH, Burgio L, Burns R et al. Enhancing the quality of life of dementia caregivers from different ethnic or racial groups. *Ann Intern Med* 2006;145:727-738.
10. Folstein MF, Folstein SE, McHugh PR. Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975;12:189-198.
11. Katz S, Ford AB, Moskowitz RW et al. Studies of illness in the aged. The index of ADL: A standardized measure of biological and psychosocial function. *JAMA* 1963;185:914-919.
12. Lawton MP, Brody E. Assessment of older people: Self-maintaining and instrumental activities of daily living. *Gerontologist* 1969;9:179-186.
13. Eisdorfer C, Czaja SJ, Loewenstein DA et al. The effect of a family therapy and technology-based intervention on caregiver depression. *Gerontologist* 2003;43:521-531.
14. Gitlin LN, Winter L, Corcoran M et al. Effects of the home environmental skill-building program on the caregiver-care recipient dyad: 6-month outcomes from the Philadelphia REACH initiative. *Gerontologist* 2003;43:532-546.
15. Burns R, Nichols LO, Martindale-Adams J et al. Primary care interventions for dementia caregivers: 2-year outcomes from the REACH study. *Gerontologist* 2003;43:547-555.
16. Mahoney DE, Tarlow BJ, Jones RN. Effects of an automated telephone support system on caregiver burden and anxiety: Findings from the REACH for TLC intervention study. *Gerontologist* 2003;43:556-567.
17. Burgio L, Stevens A, Guy D et al. Impact of two psychosocial interventions on white and African American family caregivers of individuals with dementia. *Gerontologist* 2003;43:568-579.
18. Gallaher-Thompson D, Coon DW, Solano N et al. Change in indices of distress among Latino and Anglo female caregivers of elderly relatives with dementia: Site-specific results from the REACH national collaborative study. *Gerontologist* 2003;43:580-591.
19. Radloff L. The CES-D scale: A self-report depression scale for research in the general population. *Appl Psychol Meas* 1977;1:385-401.
20. Irwin M, Artin KH, Oxman MN. Screening for depression in the older adult: Criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). *Arch Intern Med* 1999;159:1701-1704.
21. Zarit SH, Orr NK, Zarit JM. The Hidden Victims of Alzheimer's Disease: Families Under Stress. New York: New York University Press, 1985.
22. Bedard M, Molloy DW, Squire L et al. The Zarit burden interview: A new short version and screening version. *Gerontologist* 2001;41:652-657.
23. Barrera M, Sandler I, Ramsay T. Preliminary development of a scale of social support: Studies on college students. *Am J Commun Psychol* 1981;9:435-441.
24. Krause N. Negative interaction and satisfaction with social support among older adults. *J Gerontol B Psychol Sci Soc Sci* 1995;50B:59-73.
25. Krause N, Markides K. Measuring social support among older adults. *Int J Aging Hum Dev* 1990;30:37-53.
26. Teri L, Truax P, Logsdon R et al. Assessment of behavioral problems in dementia: The Revised Memory and Behavior Problems Checklist. *Psychol Aging* 1992;7:622-631.
27. Tarlow BT, Wisniewski SR, Belle SH et al. Positive aspects of caregiving: Contributions of the REACH project to the development of new measures of Alzheimer's caregiving. *Res Aging* 2004;26:429-453.
28. Gallaher-Thompson D, Coon DW. Evidence-based psychological treatments for distress in family caregivers of older adults. *Psychol Aging* 2007;22:37-51.
29. Schulz R, Martire L, Klinger J. Evidence-based caregiver interventions in geriatric psychiatry. *Psychiatry Clin North Am* 2005;28:1007-1038.
30. Pinquart M, Sorensen S. Ethnic differences in stressors, resources, and psychological outcomes of family caregiving: A meta-analysis. *Gerontologist* 2005;45:90-106.