Primary Care Physicians’ Dementia Care Practices: Evidence of Geographic Variation

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Purpose: This article explores primary care physicians’ (PCPs) self-reported approaches and barriers to management of patients with dementia, with a focus on comparisons in dementia care practices between PCPs in 2 states. Design and Methods: In this cross-sectional study, questionnaires were mailed to 600 randomly selected licensed PCPs in Connecticut and to all 1,017 licensed PCPs in Maine. Results: A total of 422 eligible PCPs responded. Nearly 90% of PCPs prescribed donepezil in the previous year for their dementia patients. Connecticut PCPs were more likely to prescribe several other therapeutics than their Maine counterparts. Connecticut PCPs were more likely to refer dementia patients to adult day care (85% vs. 59%) but less likely to refer to Area Agencies on Aging (21% vs. 44%; both ps < .05); referral rates to Alzheimer’s Association chapters were low in both states (30%). A greater proportion of Connecticut PCPs reported barriers to optimal dementia care, including time constraints (54% vs. 31% of Maine PCPs), unfamiliarity with community resources (46% vs. 30%), and reimbursement constraints (45% vs. 23%; all ps ≤ .05). Two thirds of PCPs were “very” or “somewhat” interested in using information technology to assist in dementia diagnosis and management; controlling for other variables, youngest PCPs were more than twice as likely as oldest to profess such interest (adjusted odds ratio = 2.04; 95% confidence interval [CI] = 1.02–4.08). Implications: Geographic variations are evident in PCP medication prescription patterns, community resource referral patterns, and reported barriers to optimal dementia care. Younger PCPs are more likely to adopt information technology to assist in dementia diagnosis and management.

Key Words: Alzheimer’s disease, Primary care, Geographic variations, Health information technology

Dementia is a health problem of growing importance for primary care physicians (PCPs) who see older patients in ambulatory care settings. The proportion of the population aged 65 years and older will continue to increase substantially as will the number of people with age-associated illnesses such as Alzheimer’s disease and related dementia (Alzheimer’s Association, 2009; Alzheimer’s Society, 2007). These trends will have a large impact on the health and health care needs of both developed and developing countries. Worldwide, 24 million people have dementia today and this amount is expected to double every 20 years to 42 million by 2020 and 81 million by 2040, assuming no changes in mortality and no effective prevention strategies or curative treatments (Ferri et al., 2003). In addition, the World Health Organization points out that Alzheimer’s disease will most likely become one of the leading causes of disability in the elderly adults (Essink-Bot, Pereira, Packer, Schwarzinger, & Burstrom, 2002). In the United States, an estimated 5.3 million Americans already have Alzheimer’s disease; this number is projected to grow to between 14 and 16 million by midcentury (Alzheimer’s Association, 2009; Hebert, Scherr, Bienias, Bennett, & Evans, 2003).

The economic cost of Alzheimer’s disease is already substantial and projected to rise steadily. Recent costs have been estimated at $67–100 billion annually in the United States (Cummings & Cole, 2002; Ernst & Hay, 1994; Ernst, Hay, Fenn, Tinklenberg, & Yesavage, 1997) and $104 billion...
in Europe (Zbrozek, 2004). In 2005, the United States spent an estimated $100 billion providing care for 3 million patients affected by dementia and their caregivers (Xie, Brayne, & Matthews, 2008). Costs are expected to continue rising due to anticipated demographic shifts in all countries (Bloom, de Pouvourville, & Straus, 2003).

Given the growing prevalence of dementia and its widespread economic burden, because PCPs are most often the first point of contact when memory loss is suspected (Boustani, Sachs, & Callahan, 2007; Fortinsky, 2001), there is a critical need to develop primary care services that improve health-related outcomes and quality of life for these patients and their family caregivers. An improved understanding of PCPs’ self-reported practices is an important prerequisite to achieving progress in dementia care for community-dwelling older adults and their families. Previously published work has shown that PCP rates of dementia patient referral to many community-based services is quite low and that unfamiliarity with community services is an important barrier to optimal dementia care (Fortinsky, 1998; Fortinsky, Leighton, & Wasson, 1995).

Little is known about more recent self-reported dementia care practices among PCPs, particularly when respondents are drawn from statewide populations of PCPs to maximize generalizability of results. Data from PCPs in more than one state would allow examination of geographic variations in reported dementia care practices, which could yield insights about how policies and programs might be developed to strengthen linkages between PCPs and other health and social care organizations that support people with dementia and their families. Specific aspects about PCPs’ dementia care practices about which little is known include medication prescribing patterns for cognitive symptoms that characterize dementia and level of interest in using information technology such as software based on clinical practice guidelines to help with diagnosis and management of dementia.

The health care triad model of dementia care (Fortinsky, 2001) provides the conceptual framework used to examine PCPs’ dementia practice patterns in this study. This conceptual framework is centered on the quality of office-based encounters among PCPs, patients, and family caregivers in five different domains of dementia care—symptom diagnosis, symptom management, medication management, support service linkage, and emotional support. Based in part on Andersen’s behavioral model of health services utilization (Andersen, 1995), the underlying conceptual framework for this study recognizes the potential contributions of many factors to the quality of office-based encounters, including “environmental” factors such as availability of other health care providers and organizations in the geographic area that might specialize in dementia services and support (Fortinsky, 2001). The health care triad model also recognizes the influence of factors brought to the office-based encounter by each of the participants: PCP, patient, and family caregiver. In this study, we focus exclusively on PCP-based factors such as age, gender, primary care medical specialty, and amount of dementia experience, all of which are specified in the conceptual framework (Fortinsky, 2001). These factors are employed as independent variables in this study to examine their effects on PCPs’ reported dementia care practices.

In this study, we applied this conceptual framework to a population-based inquiry of dementia care practices by PCPs across two states. We used a cross-state comparative approach to explore the aggregate impact of environmental factors that might influence PCPs’ dementia care practices. This approach, which included the use of nearly identical data collection and measurement protocols across the two states, enabled us to determine the extent to which there might be geographic variations in dementia care practices in the primary care setting. Additionally in this study, we operationalized the broad concept of “dementia care practices” by using the framework as a conceptual guide. Dependent variables in this study represent domains of dementia care related to postdiagnosis management of patients and their families as specified in the model: symptom management, medication management, and support service linkage.

Using this conceptual framework as a guide, this article examines and compares PCPs’ dementia care practices in two New England states: Connecticut and Maine. Research objectives include comparing PCPs in these two states with respect to (a) prevalence of use of specific therapeutic agents to combat cognitive symptoms (symptom management and medication management domains), (b) community service referral patterns (support service linkage domain), (c) barriers to providing optimal dementia care across all three domains, and (d) level of interest in using computer software to assist in dementia care across all three domains, as well as within the symptom diagnosis domain specified in the conceptual model.
Background and Context

In the United States, evidence-based clinical practice guidelines for dementia diagnosis and management have been published (American Geriatrics Society, 2003; Small et al., 1997). These guidelines provide detailed diagnostic testing procedures to be used to determine whether memory loss symptoms are reversible, to help establish differential diagnoses, and to offer guidance for referring patients and family caregivers to community services for further education and support. Prior to the release of these guidelines, research based on medical record reviews and surveys of PCPs consistently found suboptimal levels of diagnostic and management performance (Callahan, Hendrie, & Tierney, 1995; Fortinsky, Leighton, & Wasson, 1995; Fortinsky & Wasson, 1997).

Since that time, research has focused on reasons why PCPs have been reluctant to adhere to dementia care clinical guidelines. Reported barriers by physicians have included the relative neglect of research and limited professional training in mental health disorders of later life; the complexity of dementia as a psychological and biologic disorder with variable signs and symptoms; futility of making a diagnosis in the absence of effective drug therapies; the risks of making an incorrect diagnosis due to the stigma of dementia; and the lack of specialists to confirm PCP suspicions, especially in rural areas (Boise, Camicioli, Morgan, Rose, & Congleton, 1999; Cody, Beck, Shue, & Pope, 2002; Iliffe & Manthorpe, 2002; Teel, 2004).

PCPs recognize their role in facilitating referrals to community support services (Cohen, 2000; C. A. Cohen et al., 2001); yet, few refer (Cody et al., 2002). Organizing social support was regarded as the most difficult task by PCPs for their dementia patients (Olafsdottir, Foldevi, & Marcusson, 2001). Results from a mail survey of spouse caregivers of dementia patients suggest that PCPs need to increase referrals to community-based services (Connell & Gallant, 1996). Clinical vignette research found that more recently trained PCPs, and PCPs reporting more patients with dementia in their own practices, were more likely than their counterparts to make community support service referrals (Fortinsky et al., 1995). A study of PCPs’ self-reported community service referral practices for dementia patients and family caregivers found that referral rates were well below 50% for services such as Alzheimer’s Association chapters and Area Agencies on Aging (AAAs) but more than 80% for home health agencies and nursing homes (Fortinsky, 1998). The most commonly reported reasons preventing physicians from doing more for patients with diagnosed dementia were lack of time, unfamiliarity with community resources, and lack of reimbursement. Physicians in practice the shortest amount of time were much more likely to be unfamiliar with available community support services, whereas physicians with greatest number of patients with dementia were most likely to refer (Fortinsky). Similar findings were identified in a recent qualitative study; interviews with 40 PCPs revealed five themes that reflected how practice constraints contribute to barriers in the health care of persons with dementia and their families. The themes were as follows: (a) insufficient time, (b) difficulty in accessing and communicating with specialists, (c) low reimbursement, (d) poor connections with community support agencies, and (e) lack of interdisciplinary teams (Hinton et al., 2007).

One of the reasons for PCPs’ difficulties managing dementia patients could be that they do not have adequate practice management resources in place to consider effective care options for patients during brief office visits. This emphasizes the need for information technology decision support tools for PCPs to help them manage patients with dementia (Iliffe et al., 2002). A recent survey of PCPs in seven countries found that those in the United States were much less likely to use information technology as clinical and administrative management tools in the office setting than any of the five European countries in the study (Schoen et al., 2006). In a randomized controlled study, Downs and colleagues (2006) demonstrated the effectiveness of decision support software in the management of dementia in PCP sites in England and Scotland. As a result of study findings, the Alzheimer’s Society in the United Kingdom has launched unique decision support software intended to improve the diagnosis and management of dementia patients and their family caregivers (Iliffe et al., 2002). In the United States, information technology might help improve PCPs’ capacity to diagnose and manage a wide range of geriatric conditions, including dementia, especially considering recent estimates that population growth and aging will increase PCPs’ workloads by 29% between 2002 and 2025 (Colwill, Culpice, & Kruse, 2008). A recent report released by the Alzheimer’s Study Group (2009), a nonpartisan expert panel, included among its highest priority recommendations the development and implementation of an...
electronic records system and quality care measures to help track the delivery of dementia care in the United States. However, no known studies have determined the level and correlates of PCP interest in using information technology such as computer software to assist in improving and tracking dementia diagnosis and management in the ambulatory care setting.

A final important and related background issue concerns the degree to which geographic variation might exist in PCPs’ dementia care practices. Evidence of geographic variations in health care delivery have been documented among physicians, hospitals, and across a range of postacute care services (Brega, Jordan, & Schlenker, 2003; M. A. Cohen & Tumlinson, 1997; Kane, Lin, & Blewett, 2002; Wennberg & McAndrew, 1996), but to date, there is no evidence about geographic variations in dementia care in the primary care setting. Knowledge of cross-state similarities and differences in PCP dementia care practices would help establish baseline markers as dementia care improvement recommendations such as those proposed by the Alzheimer’s Study Group (2009) are designed and implemented at federal, state, and local levels.

**Methods**

**Design and Sampling Strategies**

Two independent statewide surveys of PCPs were carried out: The first was in Connecticut in 2003 and the second in Maine in 2004–2005. Both surveys involved the use of mailed self-administered questionnaires, and the major purposes of both surveys were to determine PCPs’ (a) clinical practices for managing their patients living at home with memory loss and (b) level of interest in using information technology to assist them with dementia diagnosis and management. As explained subsequently, both surveys used identical questions to measure key variables; therefore, these cross-sectional studies were pooled for purposes of this study. Protocols for both surveys were approved by the Institutional Review Board at the University of Connecticut Health Center (UCHC).

**Sampling Strategy in Connecticut.**—The Connecticut survey was conducted as part of a research project in the geriatrics fellowship program of the Center on Aging, UCHC. PCP eligibility criteria for survey participation were as follows: currently licensed in Connecticut, medical specialty of general internal medicine or family practice, and actively practicing in an ambulatory care setting. The sampling frame consisted of all licensed physicians in Connecticut as of December 2002 with recorded medical specialties of family practice, or internal medicine with no recorded subspecialties; this list was obtained from the medical licensing bureau of the state Department of Public Health. A sample of 600 physicians was randomly selected from the total population of 2,100 eligible physicians using computer-generated random numbers; this sample size was selected to enable an adequate final analytic sample for multivariate analyses. Because the physician database did not identify type of practice, we requested that PCPs without an ambulatory care practice return uncompleted questionnaires. Resource constraints precluded our ability to replace ineligible PCPs in the randomly selected sample.

Questionnaires were initially mailed in May 2003. A telephone number was provided to allow PCPs the opportunity to clarify questions they might have about the purpose of the survey, two reminder letters were sent to nonrespondents at 6-week intervals to encourage their participation, and respondents were offered aggregate survey results. Responses received through October 2003 were included in reported analyses and results.

**Sampling Strategy in Maine.**—This survey was conducted by the Center on Aging, UCHC, to help several organizational partners, led by the Maine Alzheimer’s Association, enhance the capacity of PCPs in Maine to diagnose and treat patients with memory loss and help their families. Partner organizations included the Maine Medical Association, Maine Osteopathic Association, Maine Primary Care Association, and Eastern Maine Chapter of the National Gerontological Nurses Association.

A complete enumeration (100% sample) of licensed family physicians and nonsubspecialty internists on file at the Maine Division of Vital Statistics as of June 2004 were included in this survey (n = 1,017). Cover letters and questionnaires, accompanied by a laminated flyer with information about a round-the-clock information and referral service from the Maine Alzheimer’s Association for PCP office use, were mailed in December 2004; two subsequent mailings were sent to nonrespondents in January and March 2005. As in the Connecticut survey, a telephone number was provided to allow respondents the opportunity to clarify questions they might have about the purpose of the survey, and respondents were offered aggregate survey...
results. In addition, an incentive of a complementary weekend stay at a Maine resort inn was offered to PCPs who returned their completed questionnaires. Responses received through May 2005 were included in reported analyses and results.

Variable Measurement

**Dependent variables** included measures of PCPs’ dementia care practices, guided by the conceptual model domains and incorporated into the study questionnaire: (a) prescription of specific medications for patients with memory loss symptoms, (b) specific community service referrals made for patients and families, (c) barriers to providing optimal dementia care, and (d) level of interest in using computer software to help diagnose and manage patients with dementia and their families.

To measure medication prescription, Connecticut PCPs were asked, “In the past year, what medications did you prescribe for your patients living at home with diagnosed memory loss?” whereas Maine PCPs were asked, “In the past year, what did you prescribe for your patients to specifically address their memory loss?” Wording differed slightly due to requested changes by organizational partners in Maine. Responses included all prescription medications available at the time of the survey; Namenda was available at the time of the Maine survey but not at the time of the Connecticut survey. Nonprescription therapies also were listed, including *Ginkgo biloba* and vitamin E.

Question wording for the remaining dependent variable measures was identical in both state surveys. To measure community service referral patterns, PCPs were asked, “In the past year, what referrals have you made for your patients with diagnosed memory loss or for their families?” This question also was asked in a previously published study (Fortinsky, 1998). Community services listed in all surveys included adult day care programs, respite care programs, AAAs, local chapters of the Alzheimer’s Association, support groups, home health agencies, and nursing homes.

To measure barriers to optimal dementia care, PCPs were asked the same question as was asked in a previously published study (Fortinsky, 1998): “Which of the following prevent you from doing as much as you would like for your patients with diagnosed memory loss and their families?”; choices included “not enough time during office visit,” “lack of reimbursement for time spent discussing these issues,” “unfamiliar with available community services,” “lack of support staff,” “unfamiliar with advances in medications,” and “unfamiliar with nonpharmacological management of symptoms.”

To measure interest in computer software, PCPs were asked, “How interested would you be in using a computer software product to help you diagnose and manage your patients with memory loss and cognitive decline?”; four responses included “very,” “somewhat,” “a little bit,” and “not at all” interested.

**Independent variables** included PCP age, gender, and medical specialty (family practitioner vs. general internist), and the number of patients in the PCP practice with diagnosed dementia living at home. These variables were selected because of their inclusion in the guiding conceptual framework (Fortinsky, 2001), and due to their importance found in previous surveys of PCPs regarding dementia care (Fortinsky, 1998; Fortinsky et al., 1995) and cancer screening in adult ambulatory care patients (Lurie et al., 1993).

Last, state (Connecticut or Maine) was employed as an independent variable in this study to determine evidence of geographic variation in dementia care practices among PCPs.

Data Processing and Analysis

All completed questionnaires were automatically scanned using Teleform software (version 8.2; Verity Software, Topsham, ME) and transferred to a Microsoft Access database prior to analysis. Chi-square analysis was conducted to compare Connecticut and Maine PCPs on all dependent variables, with each response to medication prescription, barriers to care, and community services measured as a dichotomous (yes/no) dependent variable. Multivariate logistic regression analyses were conducted to determine independent predictors of referrals to selected community support services and to determine independent predictors of level of interest in using computer software to assist with dementia diagnosis and management. In each logistic regression model, dummy variables were constructed for each independent variable. Statistically significant differences were defined as *p* ≤ .05. Analyses were conducted using SPSS software, version 15.0.

Results

Response Rates and Analytic Sample Sizes

In the Connecticut survey, 5 of the 600 mailed questionnaires were returned undeliverable. Of a
total of 309 PCPs who responded to the survey, 134 were ineligible because they reported not having an ambulatory care practice; therefore, the 175 eligible PCPs responding with completed questionnaires comprised the Connecticut analytic sample. Response rates were calculated in two ways: first, assuming that all nonrespondents had an ambulatory care practice, thereby maximizing the denominator (175/595 = 29%); and second, assuming that the same proportion of nonrespondents as respondents had an ambulatory care practice, lowering the denominator accordingly (175/339 = 52%).

In the Maine survey, 68 questionnaires were returned undeliverable; therefore, a total of 949 PCPs received the cover letter and questionnaire. Of a total of 311 PCPs who responded to the survey, 64 were ineligible because they did not have an ambulatory care practice; therefore, 247 eligible PCPs were in the Maine analytic sample. The response rate assuming that all nonrespondents had an ambulatory care practice was 26% (247/949), whereas the response rate assuming that the same proportion of nonrespondents as respondents had an ambulatory care practice was 33% (247/750).

Pooling the two state samples, a total of 1,544 PCPs were sampled and 422 eligible PCPs responded (27%); if the same proportion of nonrespondents had an ambulatory care practice as among respondents, the pooled response rate was 39% (422/1,089).

Sample Characteristics

Characteristics of sample PCPs and their office practices are summarized in Table 1. About one third of the pooled sample were women; nearly 60% of PCPs were in the 40–54 age-group, whereas about 20% were younger and about 20% older. The number of patients with diagnosed dementia in PCPs’ practices varied widely; about 15% had 5 or fewer such patients, whereas 40% of PCPs reported more than 20 such patients. None of these characteristics varied by state. Slightly more than one half of all respondents were family practitioners; however, PCP medical specialty varied sharply by state: More than two thirds of Connecticut PCPs were general internists, whereas more than two thirds of Maine PCPs were family practitioners ($p < .05$).

### Medications and Other Therapeutic Agents Prescribed

Table 2 summarizes PCP responses regarding medications and other therapies prescribed for their patients with diagnosed dementia in the year prior to survey. Donepezil (Aricept) was the most commonly prescribed medication; nearly 90% of physicians in both states prescribed this medication. Aspirin was prescribed by one half of the total sample, followed by rivastigmine (Exelon) and galantamine (Reminyl), each prescribed by about one third of PCPs in the sample. Smaller proportions prescribed vitamin E, Ginkgo biloba, and nonsteroidal anti-inflammatory drugs (NSAIDs). Statistically significant differences were found between Connecticut and Maine PCPs in prescribing patterns for aspirin, rivastigmine, galantamine, and NSAIDs; in all cases, Connecticut PCPs were more likely to prescribe these therapies (all $p < .05$).
Nearly 60% of Maine PCPs reported prescribing memantine (Namenda); because memantine was introduced into the U.S. market after the Connecticut survey was fielded, no results are available regarding prescription of this medication by Connecticut PCPs.

**Referrals to Community Support Services**

Table 3 shows community support service referral practices of PCPs for their patients with dementia and patients’ families in the year prior to the survey. Home health agencies referrals were the most commonly reported service referral (77%), followed by adult day care programs (70%), assisted living facilities (68%), and nursing homes (58%). Other community support service referrals were considerably less common; one-third or fewer PCPs referred to AAAs, respite care programs, support groups, local Alzheimer’s Association chapters, and the national Alzheimer’s Association. State comparisons revealed that Connecticut PCPs were statistically significantly more likely to refer to home health agencies and adult day care programs, whereas Maine PCPs were statistically significantly more likely to refer to AAAs and support groups.

Multivariate analyses were conducted to determine independent predictors of the likelihood of referring dementia patients to four selected community support services: adult day care, respite care program, support group, and local Alzheimer’s Association. These four services were selected because they are consistently among the most frequently requested by family caregivers to help them manage their relatives at home. Table 4 shows adjusted odds ratios (AORs) for independent variables, compared with their noted reference groups, with each column summarizing results for each of the four community support services.

Results for adult day care service referrals indicate that Connecticut PCPs were nearly four times as likely as Maine PCPs to report referring to this service (AOR = 3.86). The number of patients with dementia in PCPs’ practices was statistically

<table>
<thead>
<tr>
<th>Community support services</th>
<th>Connecticut (n = 175), n (%)</th>
<th>Maine (n = 247), n (%)</th>
<th>Total (N = 422), n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home health agency</td>
<td>150 (85.7)</td>
<td>176 (71.3)</td>
<td>326 (77.3)</td>
</tr>
<tr>
<td>Adult day care program</td>
<td>148 (84.6)</td>
<td>146 (59.1)</td>
<td>294 (69.7)</td>
</tr>
<tr>
<td>Assisted living facility</td>
<td>120 (68.6)</td>
<td>168 (68.0)</td>
<td>288 (68.2)</td>
</tr>
<tr>
<td>Nursing home</td>
<td>108 (61.7)</td>
<td>136 (55.1)</td>
<td>244 (57.8)</td>
</tr>
<tr>
<td>Agency on aging</td>
<td>36 (20.6)</td>
<td>109 (44.1)</td>
<td>145 (34.4)</td>
</tr>
<tr>
<td>Respite care program</td>
<td>60 (34.3)</td>
<td>80 (32.4)</td>
<td>140 (33.2)</td>
</tr>
<tr>
<td>Local chapter of Alzheimer’s Association</td>
<td>51 (29.1)</td>
<td>74 (30.0)</td>
<td>125 (29.6)</td>
</tr>
<tr>
<td>Support group</td>
<td>36 (20.6)</td>
<td>76 (30.8)</td>
<td>112 (26.5)</td>
</tr>
<tr>
<td>National Alzheimer’s Association</td>
<td>28 (16.0)</td>
<td>30 (12.1)</td>
<td>58 (13.7)</td>
</tr>
</tbody>
</table>

Note: *The difference between the two states was statistically significant at p < .05.
significantly and inversely associated with the likelihood that they referred patients to adult day care; for example, PCPs with 1–5 dementia patients were 13% as likely to report referring to adult day care as PCPs with 20 or more dementia patients, and PCPs with 6–10 dementia patients were 34% as likely. PCP age, gender, and specialty were not associated with likelihood of referral to adult day care.

Results for respite care program referrals show that only the number of dementia patients in PCPs’ practices was statistically significantly associated with likelihood of referral. PCPs with fewer than 20 dementia patients were about 50% as likely as their counterparts with more than 20 dementia patients to refer to respite day care.

Results for support group referrals and referrals to local chapters of the Alzheimer’s Association are very similar to those for respite care referrals. Number of dementia patients in PCPs’ practices was the only independent predictor of referral likelihood. For support group referrals, PCPs with 5 or fewer dementia patients were only 21% as likely as those with 20 or more patients to refer. For local Alzheimer’s Association chapter referrals, PCPs with 11–20 dementia patients were 38% as likely as those with 20 or more patients to refer.

**Barriers to Optimal Dementia Care**

Reported factors preventing PCPs from doing as much as they would like for their patients with dementia are summarized in Table 5. Results reveal that lack of time during office visits and unfamiliarity with available community resources were reported as barriers to optimal dementia care by about 40% of all PCPs. About one third of PCPs mentioned lack of reimbursement as a barrier, whereas lack of support staff and unfamiliarity with symptom management using approaches other than medications were mentioned as barriers by about one fourth of PCPs. Comparing patterns of results between PCPs in each state, the rank order of reported barriers by percentage frequency is the same for both states, but percentages are statistically significantly higher among Connecticut PCPs. Nearly one half of PCPs in Connecticut and 30% of Maine PCPs reported that unfamiliarity with available community resources prevented them from providing better care for their patients with diagnosed dementia. Connecticut PCPs consistently reported barriers to a greater degree than their Maine counterparts, including lack of time, reimbursement, and office support staff (all $p < .05$).
Interest in Using Computer Software

Table 6 indicates that one third of sample PCPs reported being “very interested” in using computer software to assist in dementia diagnosis and management, one third reported being “somewhat interested,” and the remaining one third reported either “a little” or “not at all” interested. State comparisons revealed very similar response distributions to this question between Connecticut and Maine PCPs.

Multivariate logistic regression analysis was conducted to determine predictors of level of interest in using computer software to assist with dementia diagnosis and management. Level of interest was dichotomized by combining very and somewhat interested into one category and a little and not at all interested into the other category. As in the models for service referrals summarized earlier, independent variables for this analysis included state, gender, age-group, number of dementia patients, and medical specialty. Results show that the only significant predictor in this model was PCP age-group. PCPs aged 25–39 years old were twice as likely as PCPs aged 55 years or older to report being very or somewhat interested in using computer software to assist in dementia diagnosis and management (AOR = 2.04)

Discussion

This article explored self-reported approaches and barriers to management of patients living at home with diagnosed dementia and level of interest in using information technology to assist with dementia diagnosis and management among PCPs in Connecticut and Maine. In the pooled sample of 422 PCPs, respondents were divided evenly between family practitioners and general internists, although family practitioners predominated in Maine and general internists predominated in Connecticut. Several results shed light on ways to move forward in enhancing primary care services in the United States for older adults living at home with diagnosed dementia, at a time when the number of Americans projected to develop Alzheimer’s disease or other dementia over the next few decades will increase dramatically.

First, results clearly indicate that PCPs in this sample almost universally prescribe medications for their patients to address cognitive symptoms associated with diagnosed dementia such as memory loss and confusion. Fully 90% of PCPs in both states reported prescribing donepezil (Aricept) for these patients in their practices during the previous year. In Maine, 60% of PCPs also reported prescribing memantine (Namenda) soon after it became available in the U.S. market. More than one third of PCPs also reported prescribing rivastigmine (Exelon) and galantamine (Reminyl). These results strongly suggest that medication prescription has become an extremely routine component of primary care practice for ambulatory patients with diagnosed dementia. Geographic variations were evident in the prescription of rivastigmine and NSAIDs and in the recommended use of aspirin and vitamin E, all of which were used more frequently by Connecticut PCPs, suggesting that a more complex medication regimen is used to address dementia symptoms among Connecticut PCPs.
Second, results regarding community support service referral patterns found highly variable referral rates in both states across the range of services queried. Nearly 80% of PCPs referred to home health agencies and two thirds to adult day care programs and assisted living facilities, whereas only one third referred to AAAs and 30% referred to a local chapter of the Alzheimer’s Association. Geographic variations were evident in many of these referral patterns; Connecticut PCPs were considerably more likely to refer to home health agencies and adult day care programs, and Maine PCPs were more than twice as likely to refer to AAAs and also more likely to refer to support groups. These results provide greater evidence of geographic variations in PCPs’ dementia care practices during the present decade. One interpretation of these results is that community support service organizations in each state have made efforts or been more successful than in the other state to raise the awareness of PCPs about their services that could help patients with dementia and their families.

The primary importance of the number of dementia patients as a predictor of service referral likelihood in this study mirrors results from a previously published study (Fortinsky, 1998) and suggests that PCPs with fewer dementia patients remain more poorly equipped to provide adequate community service linkage assistance to the patients they do have in their practices living at home with diagnosed dementia. This finding supports the PCP level of experience factor as specified in the guiding conceptual framework for this study.

Geographic variations also were revealed in reported barriers to optimal management of dementia patients. A greater proportion of Connecticut PCPs reported all barriers except one, suggesting that more obstacles would have to be overcome in that state to improve dementia care at a population level.

Finally, results reveal great variation among PCPs in both study states in level of interest in using information technology via computer software to assist them with dementia diagnosis and management. One third of respondents were very interested, but one third were only a little bit or not at all interested. Younger PCPs were twice as likely as older PCPs to report at least some interest in using computer software. Results strongly suggest a cohort effect whereby PCPs who are earlier in their careers are more likely to adopt information technology to help them in the office setting to provide better care to their patients with dementia and their families. This age cohort effect among PCPs might be expanded to include a wide range of health problems seen in primary care.

Taken together, study results have implications for primary care delivery of dementia care. Over the past decade, several research groups have successfully developed and evaluated innovative dementia care programs targeting primarily family caregivers (Bass et al., 2003; Belle et al., 2006; Fortinsky, Kuldorff, Kleppinger, & Kenyon-Pesce, 2009; Gitlin et al., 2003; Mittelman, Roth, Coon, & Haley, 2004; Teri et al., 2003), some of which were initiated within primary care settings (Callahan et al., 2006; Chodosh et al., 2006; Vickrey et al., 2006).


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**Table 7. Multivariate Logistic Regression Analysis Predicting Likelihood of Reporting “Very” or “Somewhat” Interested in Using Computer Software to Assist With Dementia Diagnosis and Management**

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Odds ratio</th>
<th>Upper 95% CI</th>
<th>Lower 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>1.10</td>
<td>0.69</td>
<td>1.73</td>
</tr>
<tr>
<td>Gender (reference group: female)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.26</td>
<td>0.79</td>
<td>2.00</td>
</tr>
<tr>
<td>Age-group in years (reference group: 55 or older)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25–39</td>
<td>2.04</td>
<td>1.02</td>
<td>4.08</td>
</tr>
<tr>
<td>40–54</td>
<td>1.37</td>
<td>0.81</td>
<td>2.30</td>
</tr>
<tr>
<td>No. of patients with dementia (reference group: &gt;20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–5</td>
<td>1.06</td>
<td>0.55</td>
<td>2.05</td>
</tr>
<tr>
<td>6–10</td>
<td>1.01</td>
<td>0.55</td>
<td>1.83</td>
</tr>
<tr>
<td>11–20</td>
<td>1.15</td>
<td>0.66</td>
<td>1.99</td>
</tr>
<tr>
<td>Specialty (reference group: general internist)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family practitioner</td>
<td>0.84</td>
<td>0.52</td>
<td>1.35</td>
</tr>
</tbody>
</table>

*Notes: CI = confidence interval.

*Odds ratio statistically significantly different from 1.0 at p < .05.*
These programs offer a flexible and comprehensive framework to modify the primary care delivery systems in accordance with the local resources and demands and emphasize the importance of collaboration and coordination of care across different health care providers, family, and community organizations and agencies (Boustani, Schubert, & Sennour, 2007). Thus, a current and future challenge to the PCPs will be how to integrate these models within the existing constraints of primary care settings. As Boustani and colleagues (Boustani, Schubert, & Sennour, 2007) pointed out, improving the care for these vulnerable patients in the United States demands supporting the primary care system with various resources including screening and diagnostic processes, dementia care managers, and coordination with interdisciplinary teams. It remains to be seen how best to sustain these experimental models of primary care enhancement to help people with dementia once research and demonstration funding ends and how to adapt these models in office-based primary care settings in the community (Fortinsky, 2008). Moreover, this study suggests that taking the pulse of PCPs from a population perspective can lend insights into the perceived or actual organizational linkages between PCPs and home and community-based service providers for older adults with dementia and their families in large geographic areas.

Several study limitations are notable. Study results are based on PCP self-reports, and no efforts were made to validate results with behavioral data. The pooled response rate of 39%, assuming that nonrespondents included an equal number of ineligible PCPs as found among respondents, was modest and could have yielded biased results. However, the large sample size and the statewide representativeness of the sampling frames increase the likelihood that results carry a reasonable degree of external validity. Connecticut and Maine surveys were conducted more than one year apart, so changes in availability of services and medications may have affected the comparisons. Race and ethnicity of PCPs was not ascertained in the study questionnaire; therefore, we cannot report results related to the potential influence of this PCP characteristic on dementia care variables. Questionnaire length constraints prevented us from examining additional aspects of information technology among sample PCPs, including whether they used information technology more generally in their office-based practices and whether they faced technological barriers that diminished their capacity to provide optimal dementia care. Finally, we did not ask about self-perceived expertise in providing dementia care, nor about attitudes toward older patients more generally. These are all important avenues for further research.

Despite these important study limitations, this study adds to the existing body of evidence regarding PCPs’ dementia care practices in several ways. First, this work is the only known inquiry on this topic based on well-defined samples of statewide licensed PCP populations. Second, based on statewide samples, this is the first known study to directly compare PCPs across states to document geographic variations in dementia care practices. Third, this is the first known study to document medication prescribing practices for diagnosed dementia in PCP settings at a population level of inquiry. Fourth, this is the first known study to determine PCP interests in using computer software to assist in dementia diagnosis and management. Last, by comparing results in these samples with published findings from a decade ago using nearly identical questionnaire items, this is the first known study to provide evidence on trends over time in community support service linkage among PCPs for their patients with dementia.

In conclusion, study results provide recent evidence to help improve our understanding of dementia care practices in the primary care setting in Connecticut and Maine, with insights and implications for primary care elsewhere in the United States. These results are timely given the recent recommendations to improve dementia care released by the Alzheimer’s Study Group (2009); recommendations include developing and implementing quality-of-care indicators as well as more coordinated systems of care at the community level. Implications of study results for practice and policy lie in the continued need to develop and consider how best to finance health and social care services to enhance and complement the capacity of busy office-based PCPs to steer patients and families toward further assistance as they live with the daily challenges of dementia.

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