Collaborative transdisciplinary team approach for dementia care

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Practice points

- Nearly 6 million Americans live with Alzheimer's disease and related disorders, many with co-morbid medical conditions and depression that would best benefit from transdisciplinary approaches to care that maximize the unique skills and talents of providers.
- Collaborative care models are team-based, multicomponent interventions to enact system-level medical care delivery, with the goal of improving patient-centered care and providing a pragmatic strategy to deliver integrated health and medical care to patients and families.
- Trained transdisciplinary care teams deliver care to patients and caregivers and interface with primary care providers, use comprehensive assessment tools to measure and monitor patient and caregiver biopsychosocial needs, and response to interventions.
- Essential to the foundation for a successful collaborative care model is: open communication between team members; teamwork; trust and respect for each team member's expertise; collegiality and understanding the scope of practice.
- Care protocols should be patient- and family-centered, individualized and incorporate input from patient and caregiver in a shared decision making process.
- Measurable outcomes and quality indicators need to be incorporated to demonstrate impact, economy, efficiency and effectiveness.

SUMMARY Alzheimer's disease (AD) has high economic impact and places significant burden on patients, caregivers, providers and healthcare delivery systems, fostering the need for an evaluation of alternative approaches to healthcare delivery for dementia. Collaborative care models are team-based, multicomponent interventions that provide a pragmatic strategy to deliver integrated healthcare to patients and families across a wide range of populations and clinical settings. Healthcare reform and national plans for AD goals to integrate quality care, health promotion and preventive services, and reduce the impact of disease on patients and families reinforcing the need for a system-level evaluation of how to best meet the needs of patients and families. We review collaborative care models for AD and offer evidence for improved patient- and family-centered outcomes, quality indicators of care and potential cost savings.

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Nearly six million Americans live with Alzheimer's disease (AD) and related disorders, many with co-morbid medical conditions and depression [1–3]. Between the years 2000 and 2010, the mortality rate for persons with AD increased by 68% [1]. Over the next 20 years, the number of people over 65 and 85 years is expected to grow by 62 and 84%, respectively [4,5]. The incidence, morbidity and mortality rates for dementia will thus increase dramatically. With increased longevity and the aging of the population, the societal financial impact of illness and dependency will expand exponentially. AD affects not only patients but also families. Each AD patient is estimated to have 2.9 informal (mostly family) caregivers who are estimated to provide 17.5 billion hours of care annually valued at US\$216 billion [1]. The replacement costs and lost wages for unpaid caregivers for individuals with AD was \$374 billion in 2010 and are expected to increase 79% by 2050 [1]. There is a concomitant increase in the unpaid caregivers own healthcare cost of \$9.1 billion in 2012 [1]. Thus an accountable way to improve dementia care and patient- and family-centered outcomes is greatly needed.

The Institute of Medicine recommends inter-professional teams to address patients' complex needs [6]. Team care should be structured in a way that maximizes the skills and abilities of every team member and include clear goals with measurable outcomes. Collaborative care models provide a pragmatic strategy to deliver integrated health and medical care to patients and families [7,8]. Collaborative care models are team-based, multicomponent interventions to improve patient-centered care through a system-level medical care delivery. This includes organizational leadership support, using evidence-based approaches to medical decision-making, capitalizing on emerging clinical information systems and engaging patients and their family caregivers to improve their care through self-management support and linkages to community resources [9]. Based on the Wagner's Chronic Care Model [10], collaborative care models focus on the need for long-term, systematic approaches to properly manage chronic conditions, rather than prioritizing treatment of acute symptoms. The collaborative care model may also provide a cost-efficient strategy to improve health outcomes for patients and family caregivers across a wide range of populations and clinical settings [10]. Collaborative care models also focus on shared

decision making – engaged discussion between clinicians and patients (and family caregivers) to best tailor health promotion and treatment guidelines to individuals' preferences and social norms to reach agreement about a health decision involving multiple medically appropriate treatment options [11]. Shared decision making provides a framework for clinicians to present and discuss treatment options, their associated risks and benefits, alternatives to traditional therapeutics, communicate the evidence base for these options and assess understanding of the options in both the patient and family caregiver [12–14].

Healthcare reform and national plans for AD goals to integrate quality care, health promotion and preventive services, and reduce the burden of disease on patients and families reinforce the need for a rethinking of how best to deliver needed services and care for older adults with AD and their families. Over the past 3 years, we implemented a collaborative care model to improve access to care, provide timely diagnosis, treatment, interventions, care coordination and community referrals, reduce adverse outcomes and increase quality of life for older adults with dementia and their family caregivers. Additionally, we can reduce healthcare costs by providing patients and caregivers with support and knowledge and decreasing inappropriate use of medical services. Using the principles of shared decision making [12–14], our collaborative care model emphasizes evidence-based medicine, patient- and family-centered care, and open lines of communication to establish diagnosis and treatment plans, clarify patient and family values and preferences and develop an agreed upon follow-up plan to evaluate decisions. In this article, we review the evidence-based collaborative care models for AD and offer evidence that implementation of this model of care can lead to improved patient- and family-centered outcomes, quality indicators of care and potential cost savings to Medicare and Medicaid by providing comprehensive, collaborative memory care to older adults from diverse backgrounds with cognitive impairment and their caregivers.

What is collaborative care?

Over the past 20 years, there has been increasing use of collaborative care approaches utilizing the framework of the Chronic Care Model to develop new models of care for older adults leading to improved quality, efficiency and outcomes

of care [15–21]. However, these models have not been widely adopted outside of primary care because they require an extensive redesign of the specialty practice environment including the inclusion and training of a workforce from different disciplines, partnerships with the healthcare delivery systems and ‘buy-in’ from third-party payers to recognize the cost savings to support these changes in specialty practice [16].

The collaborative approach to providing memory care is less a defined structure than a model of care that utilizes an interprofessional, transdisciplinary team to allow for the most comprehensive means of providing care to patients and their caregivers. Collaborative is defined differently among disciplines and the model of care, be it physician led or otherwise, can be malleable depending on the care team. Most of the available evidence evaluating collaborative care approaches involves either a physician (MD) or nurse practitioner (NP) collaboration with the NP serving in a care coordination role [17,22], social worker case management [23] and/or occupational therapy [24]. Models have been described in which a collaborative memory care clinic has been set up within a primary care practice [18,25] or as a stand-alone clinic [26]. In clinical practice, the collaborative approach can include a MD, NP or physician assistant, registered nurse and/or medical assistant with utilization of other outpatient specialists including social workers (SW), psychologists, physical and occupational therapists and/or pharmacists.

The collaborative approach in memory disorders is valuable because the nature of the diagnostic process is time and labor intensive and not reimbursed as well as other medical specialties. Evaluation, diagnosis and treatment of memory disorders take significant clinician time and ongoing follow-up. Use of other team members can offset physician time and facilitate meeting the patient and caregiver needs are more effectively addressed in a timely fashion. Primary care providers may not always be confident in diagnosing dementia and managing dementia related symptoms [20,27] and specialty memory centers may not be available in rural or underserved areas. While early recognition of cognitive impairment improves outcomes, the lack of provider confidence and proximity to specialists makes the goals of early diagnosis more challenging. In a collaborative care model, each member of the care team provides their

own clinical, management and/or administrative strengths which allow the patient and caregiver to receive comprehensive care outside of the simply medical domain. A transdisciplinary approach ensures that patients and families receive appropriate services and referrals with each team member using their strengths and expertise to maximize patient- and family-centered outcomes.

Empirical evidence supporting effectiveness of collaborative care approaches

Ganz *et al.* conducted a quality improvement project to compare primary care geriatricians with and without an NP for comanagement of older adults with a variety of geriatric syndromes including dementia, depression, falls, heart failure and urinary incontinence [22]. NP participation in care coordination improves quality of care for dementia, falls and incontinence and increased adherence to recommended care by 20% [22,28]. Vickrey *et al.* conducted a randomized trial of usual care versus coordinated care that included a social worker who completed a comprehensive home assessment, provided recommendations to the physicians and follow-up [23]. The intervention also included physician education seminar on relevant care issues in dementia. The intervention increased adherence to dementia guidelines and provided a benefit in patient health-related quality of life [23]. Lee *et al.* established a memory care clinic within a primary care practice in Canada including a ‘family health’ team composed of the physician, registered nurses, a social worker and pharmacist with a geriatrician available for consultation [25]. They reported successful capacity building to addressing the rising number of patients with AD, a high level of satisfaction with care by patients and families and nearly all patients were treated with appropriate antidementia medications [25].

Callahan *et al.* conducted a randomized trial of collaborative care management compared with usual care. The cornerstone of this study was the use of an interprofessional team lead by an advanced practice nurse. Patients in the collaborative care arm had fewer behavioral problems (assessed with the Neuropsychiatric Inventory) and fewer depression symptoms (measured with the Cornell Scale for Depression in Dementia) [17]. This same group is conducting a follow-up RCT to include home-based occupational

therapy intervention with the goal of delaying functional decline [24].

Differences between multidisciplinary & transdisciplinary care

While sometimes used interchangeably, multidisciplinary and transdisciplinary care differs widely in approach. Multidisciplinary care refers to the delivery of parallel services without direct interaction between providers. Transdisciplinary care involves the use of a team approach consisting of many different types of providers who collaborate to identify and meet patient and family needs. An interprofessional, transdisciplinary team has more fluid boundaries based on clinician expertise to address a multitude of symptoms, problems and needs. This interprofessional team can be composed of physicians, nurses, physician assistants, social workers, psychologists, therapists, health educators, other allied health professionals and support staff. A successful transdisciplinary approach is characterized by a shared commitment to quality care, strong communication skills between team members and an appreciation of and value placed on the contributions of each member toward the shared goal of improvement of patient- and family-centered outcomes.

Responsibilities of different team members in a collaborative care approach to dementia care

The centerpiece of a successful collaborative care model is the initial evaluation providing expert clinical evaluation and diagnosis of the patient, assessment of caregiver and patient needs, provision of supportive counseling, referrals for community resources and development of care plan with short-term, intermediate and long-term goals. These components are completed by different team members, who bring unique expertise and perspective to be integrated in the collaborative care model.

• Role of the physician

- Diagnosis of memory disorder and initiation of care plan;
- Review of brain imaging and laboratory tests, if indicated;
- Evaluation of patients with unexpected change in condition, atypical or unusual presentations;

- Available for patient emergencies;
- Referral to Medicare Part A services (home care, hospice) depending on state regulations.
- **Role of the nurse practitioner or physician assistant**
- Re-evaluate plan of care and provide ongoing assessment of cognition and associated symptoms;
- Coordination of care with other disciplines and medical providers [29,30];
- In some collaborative models, the NP may be the clinician making the initial diagnosis, completing the initial assessment and identifying a plan of care;
- Referral for outpatient services (i.e., physical therapy/occupational therapy);
- Follow-up of all imaging and testing results;
- Patient and family education on pharmacologic and nonpharmacologic interventions.

• MD-NP collaboration

Medicare defines nurse practitioner collaboration as ‘a process whereby an NP works with a physician to deliver healthcare services within the scope of the NP’s professional expertise with medical direction and appropriate supervision as provided for in jointly developed guidelines or other mechanisms as defined by Federal regulation and the law of the state in which services are performed’ [31]. Nurse practitioner oversight varies by state. In states that require collaborative agreements, such as New York State, nurse practitioners are able to collaborate with one or more physician(s) to provide medical care. Nurse practitioners see patients independently of the physician and make their own decisions about prescribing and clinical management, but work in collaboration with physician(s) again depending on state regulations.

The MD-NP collaborative relationship in memory care specifically can be individualized depending on the practice and billing structure. The MD or NP can make the initial cognitive diagnosis and follow patients over time. The MD, whether primary care provider or specialist in neurology or geriatric psychiatry, has the additional training and expertise to guide the NP in complex or uncommon diagnoses, review of imaging and management when the clinical course is complicated or not progressing in an

expected fashion. In a primary care practice, the MD may also help to determine when a specialist referral is needed. The MD may also be needed for referrals to Medicare Part A services such as hospice or home care, depending on state regulations.

In our collaborative model, the MD leads the initial evaluation, makes the diagnosis and initiates the medical work-up, and the NP focuses on evaluating the patient and caregiver in follow-up for medication and symptom management, and reassessment of behavior, mood and function [28]. With the NP able to see follow-up patients, the physician is free to see more new patients, increasing clinic capacity and shortening wait times for new patient appointments. Other models can also be employed again depending on the practice with the end goal of utilizing each provider's strengths and skill set. The NP can serve as the bridge to outpatient and community referrals by melding the medical and nursing models of care.

• Billing

- NPs may bill independently, if certain criteria are met;
- NPs who bill independently are paid at 85% of the Medicare Physician Fee Schedule;
- Time based billing may be appropriate when more than 50% of face to face time is spent with coordination of care or counseling;
- 'Incident to' billing is defined by Medicare as 'the services furnished as an integral, although incidental, part of the physician's personal professional services in the course of diagnosis or treatment of an injury or illness';
- NPs may bill at the full medicare rate if duties are performed under the direct supervision of the physician;
- Physician must perform initial assessment and devise care plan;
- Need evidence from physician of active participation in patient care;
- Physician must provide direct supervision – same office suite and immediately available.

• Role of the registered nurse

- In some collaborative models, the RN may serve as the care coordinator and manager

[29,30], particularly if there is not an NP or physician assistant as part of the team. Generally an RN serving this role will have at least a bachelor-level degree;

- Performs routine vital signs on patients in the office;
- Perform memory and functional screening or monitoring tools that allow for objective re-evaluation of change in performance and/or function over time;
- Patient and caregiver phone follow-up, clear up confusion about instructions and follow-ups and prevent or correct any medication errors;
- Assists with outpatient referrals to disease specific organizations, MedicAlert+ SafeReturn and similar useful patient and caregiver resources.

• Role of the social worker

- Varies by state – generally two professional licenses:
- Licensed Master Social Worker (LMSW): requires MSW and national licensing exam;
- Licensed Clinical Social Worker (LCSW): all social work services including psychotherapy.
- Educates about memory loss and caregiver issues;
- Offers referral for concrete services (transportation services, assistance in the home, meal delivery and adult day programs);
- Provides assistance with transition to alternate care settings;
- Provide psychotherapy and counseling services (billable service);
- Refer to or lead support programs for patients and/or caregivers;
- Collaborates with local agencies and organizations;
- Provides educational resources and materials.

• Role of the medical assistant

- Coordinate paperwork for office visits to complete in the waiting area;
- Assist with completion of documentation (long-term care insurance, adult day program paperwork, referrals);

- Coordination with collateral source – caregiver, family and friend;
- Provide feedback on patient's ability to manage appointments and compliance;
- May complete simple screenings (cognition, fall risk assessment).

• Role of a neuropsychologist

- Trained to perform and interpret neuropsychological testing;
- May play key role in diagnosis and monitoring of patients;
- In role of a psychologist, may provide counseling and therapeutic services;
- May lead cognitive remediation or retraining programs.

• Role of a health educator

- Generally at least a bachelor-level, more commonly master – prepared individual with training in psychology, social work, sociology, medicine, public health or neuroscience;
- Trained to perform neuropsychological testing, however interpretation of tests is performed by MD or psychologist;
- Complete surveys with patient and families;
- Maintains print and electronic library of resources and health information;
- Coordinate distribution of health information materials consistent with MD, NP and recommendations.

• Role of occupational and physical therapists

- Home safety assessment;
- Cognitive skills training;
- Fall prevention and balance training;
- Activities of daily living (ADL) evaluation;
- Caregiver education;
- Driving evaluation.

Specific design of a collaborative care model for dementia care

We created a collaborative team approach to deliver high quality and cost-effective care, establishing evidence-based approaches to

evaluate and care for the older adult with AD and their family caregivers from diverse backgrounds [32,33]. There is high public health significance to instituting delivery of health-promotion and disease-management programs when patients are capable of benefiting from them most, in other words, increasing 'active life expectancy' and decreasing 'disabled life expectancy' [34–37]. Essential to the foundation for a successful collaborative care model is: open communication between team members; teamwork; trust and respect for each team member's expertise; collegiality and understanding the scope of practice. All team members should share the tasks of referral to concrete services (transportation services, home, meal delivery and adult day programs), taking advantage of particular 'niche' knowledge based on specialty. The components of our model include:

- Trained transdisciplinary care team (neurologist, nurse practitioner, social worker and health educator) to deliver care to patients and caregivers and interface with primary care providers;
- Comprehensive assessment tools to measure and monitor patient and caregiver biopsychosocial needs and response to interventions;
- Patient-centered, individualized care protocols that incorporate input from patient and caregiver;
- Family-focused protocols to improve family care needs, provide enhanced social support with ready availability of phone or in-person consultation with NP or SW and limit inappropriate use of acute medical services (emergency department, hospitalizations);
- Care consultation models [38] that incorporate patient and caregiver needs to improve knowledge, care confidence, mastery and coping skills; reducing caregiver burden, patient and caregiver depression and prepare transitions in care plans.

Our clinical model uses a transdisciplinary approach incorporating a neurologist, adult and geriatric nurse practitioner, social worker and health educator to provide diagnosis, treatment, nonpharmacologic interventions [39–41], care consultation, community resources and education to meet the needs of patients with AD and their family caregivers. In the past 3 years, our care team has provided diagnostic

evaluations to 579 new patients including individualized treatment plans and family conferences and 867 sessions of psychosocial services and counseling. Patients had the following characteristics: mean age of 78.0 ± 8.0 years (range: 50–92); 50.4% female; mean education of 15.9 ± 3.6 years (range: 4–24); Mean Mini Mental State Exam score 22.4 ± 6.0 (range: 1–30); mean Clinical Dementia Rating 0.86 ± 0.63 (range: 0–3) and mean CDR-Sum Boxes 4.9 ± 4.2 (range: 0–18). The racial and ethnicity distribution of the patients was 89% Caucasian, 6% African American, 3% Hispanic and 2% Asian American. Diagnostic categories are as follows: 2% subjective memory impairment; 31% MCI; 38% AD (with and without co-morbid vascular disease); 19% Lewy body dementia; 2% vascular dementia; 4% frontotemporal degeneration and 4% other dementias. Caregivers were 58% spouses/partners, 29% children, 4% other relatives and 9% close friend. At time of first evaluation, caregivers exhibited mild to moderate caregiver burden with mean Zarit Burden Inventory [42] scores of 17.9 ± 10.1 (range: 0–42) and mild caregiver depression with mean PHQ-4 [43] scores of 2.2 ± 2.6 (range: 0–10). All patients are treated with stage-appropriate antidementia medications (acetylcholinesterase inhibitors and/or

memantine) and 60% of patients are treated with antidepressants. Nonpharmacological approaches [39–41] to behavior are emphasized with less than 20% of patients being treated with antipsychotic medications; continued need, efficacy and adverse events are closely monitored. This approach with 24-h coverage has decreased inappropriate use of emergency department visits and hospital admissions, promoted appropriate use of long-term hospice for end-of-life care and provided caregivers with support mechanisms to reduce transitions in care. **Box 1** highlights notable quality improvements in dementia care delivery and outcomes using our collaborative care model [44,45].

Example of workflow of our collaborative care model for Alzheimer's disease

Figure 1 outlines the workflow through our collaborative care model for dementia services. Upon calling the office for an appointment, the patient and caregiver are sent a welcome letter that describes our team approach and provides education about role of NP and SW in collaborative care. This packet also contains questionnaires and surveys for demographics, symptoms, everyday functioning, medications and co-morbid medical conditions. Completing this information prior to the office visit not

Box 1. Quality improvements in dementia care in our collaborative care model.

- Determination of presence and severity of differential diagnosis of the specific type of dementia
- Evaluation for reversible causes of dementia
- Appropriate use of medical tests and evaluations
- Active case finding and treatment for excess disability due to co-morbid medical conditions and assessment of impact of co-morbid diseases on cognitive status
- Active case finding and treatment for patient depression, psychoses, behavioral disturbances, sleep disorders and hazardous activities (e.g., driving, alcohol and substance abuse)
- Active case finding for caregiver burden and depression and ascertainment of family dynamics
- Needs assessment of patient–caregiver dyad
- Pharmacotherapy of dementia syndrome with stage-appropriate medications
- Referral for physical, occupational, speech and language and cognitive therapies
- Nonpharmacological therapies for psychological and behavioral disturbances
- Consideration and close monitoring of pharmacotherapy for behavioral disturbances
- Referral to patient and caregiver educational programs and/or community support agencies
- Counseling and care coordination services
- Facilitated communication between all clinicians involved in patient care
- Active surveillance and tracking of patient- and caregiver-centered outcomes
- Active monitoring and support of the caregiver's emotional and physical health.
- Development of transition-in-care plans and appropriate referrals for palliative and hospice services.
- These quality improvement measures enacted in our collaborative care model are based on best evidence from the literature, specifically Callahan *et al.* [17], Lawson *et al.* [40] American Academy of Neurology [41]

Figure 1. Example of a workflow in a collaborative care dementia practice. An example of patient and caregiver flow through our transdisciplinary collaborative care model for dementia is provided. Prior to the office visit, patient and caregiver complete questionnaires and surveys for demographics, symptoms, everyday functioning, medications and co-morbid medical conditions. Following clinic registration, the patient completes a neuropsychological evaluation with the HE (30 min). During this same time period, the caregiver meets with the physician, NP and SW to collect history regarding the onset and progression of cognitive, motor, mood, behavior and functional symptoms and impact of symptoms on patient and caregiver quality of life. In the next stage, the physician and NP collect history from the patient and conduct a general physical examination, frailty and falls risk evaluation, neurologic examination and mental status evaluation. During this same time, the SW conducts a psychosocial interview and needs assessment with the caregiver. This stage takes approximately 20 min. After all components of the assessment are completed, the patient, caregiver and collaborative team meet for a comprehensive care conference where results are reviewed; a diagnosis is delivered and a tailored, individualized care plan is developed with input from all team members, the patient and caregiver; questions are answered; resources, referrals and health information is provided and follow-up visits with individual team members are scheduled. The care conference takes 20–30 min. For complete details see text.
HE: Health educator; MD: Physician; NP: Nurse practitioner; SW: Social worker.

only saves time but also highlights important topics that will need to be addressed during the visit. Following registration, the patient moves with the health educator to complete neuropsychological testing including tests of semantic,

working and episodic memory, psychomotor processing, executive function, construction and mood – this takes approximately 30 min. While the patient is being tested, the caregiver is interviewed by the rest of the care team to

collect history regarding the onset and progression of cognitive, motor, mood, behavior and functional symptoms and impact of symptoms on patient and caregiver quality of life.

After completion of the history, the physician and NP evaluate the patient while the SW conducts a psychosocial interview and needs assessment with the caregiver. The psychosocial interview includes assessment of behavior, sleep, caregiver burden and depression using standardized scales and a needs assessment to rate dynamics, strengths and weaknesses regarding patient care. The caregiver is given the opportunity to report on the experience of providing direct care or supervising the care of their loved one. Simultaneously, the patient is evaluated by the NP who completes the vital signs (including assessment of orthostatic hypotension), general physical examination and a standardized evaluation of grip strength, frailty and falls risk. If neuroimaging was performed prior to the visit, the physician reviews the films. The physician then conducts an interview with the patient to collect history from the patient's perspective, assess their insight, perform a mental status evaluation focusing on language, praxis, abstract thinking and thought processes, and complete a comprehensive neurological evaluation. This stage takes approximately 20 min.

After all components of the assessment are completed, the patient, caregiver and collaborative team meet for a comprehensive care conference [38] where results are reviewed, a diagnosis is delivered and a tailored, individualized care plan is developed with input from all team members, the patient and caregiver, and questions are answered. This care conference includes ordering of additional labs and imaging (if not already completed), health promotion activities (nutrition, sleep, exercise and cognitive activities), nonpharmacologic approaches to behavior, referrals to community resources, counseling and a schedule for follow-up. Written feedback of diagnosis, test results, treatment plan, referral and resources is provided to the patient and caregiver, and a detailed report is sent to the patient's primary care providers either via electronic medical records or postal service. On average, the care conference takes 20 min, thus in 60–75 min comprehensive dementia care services can be delivered that are tailored to the patient's and family's individual needs.

Specific examples of patient and family-centered outcomes and potential long-term benefits

An important component when establishing new clinical services is to conduct an evaluation of the services provided; identify associated effects, benefits and limitations and assess patient and caregiver satisfaction with services delivery. The results of these evaluations can serve three purposes: early identification of problems with service delivery; development of marketing tools to advertise the collaborative practice and objective measures of success and efficacy can be used to gain institutional support for continuation, expansion and dissemination of the collaborative care model. To do this, we conducted pre- and postvisit evaluations of patient- and family-centered outcome measures (Table 1) to evaluate effectiveness of collaborative care and satisfaction with the service delivery of collaborative care compared with other memory care providers (Table 2).

Patient and caregiver outcome measures were collected for all patients ($n = 135$) evaluated by our collaborative care model between September 2013 and June 2014. Using a 5-point Likert scale (strongly disagree to strongly agree) caregivers and patients independently rated their perceptions of the impact of the patients memory disorder on their life (stress, strain, frustration, caregiving burden, mood, ability to perform activities of daily living, knowledge and confidence). Evaluations are given prior to the initial visit (baseline) and then following each return visit (follow-up). Because not all dyads have completed a pre- and postevaluation, we compared group mean responses on baseline and follow-up visits using the Wilcoxon-Mann-Whitney test. We *a priori* selected p -values < 0.1 to represent clinically meaningful trends and p -values < 0.05 to represent significant differences. For patient-centered outcomes (Table 1), three domains were impacted by delivery of our collaborative care approach. Patients were less stressed about their memory problems ($p = 0.06$); more confident in their knowledge about AD and related disorders ($p = 0.04$) and reported less depressive symptoms ($p = 0.09$). Other responses were generally moving in a positive direction but did not reach our prespecified levels. For caregiver-centered outcomes (Table 1), five domains were improved by our collaborative care approach. Caregivers were less frustrated when dealing with the patient ($p = 0.06$);

reported less uncertainty about what to do with patient ($p < 0.001$); less concerned that they were not doing enough for the patient ($p = 0.06$); reported a better sense of control ($p = 0.04$) and were more confident about finding sources of support ($p = 0.08$). Other responses were generally moving in a positive direction but did not reach our prespecified level.

Another approach to demonstrate satisfaction with our collaborative care model was to use a common survey between three practices at our memory center comparing two memory care providers (a neurologist and a psychiatrist) who use the traditional single physician approach with our interprofessional collaborative model. At the end of the visit, the patient and caregiver jointly completed a survey using a 5-point Likert scale (Excellent, Very good, Good, Fair, Poor) to rate a number of aspects of the clinic experience (e.g., timeliness, quality of explanations, communications skills of clinicians, inclusion of patient in decision making, willingness to return for follow-up and willingness to recommend the clinic to others). This survey was administered to all patients ($n = 260$) evaluated at our center between August 2011 and June 2012. We used Chi-square statistics to compare the percentage

of respondents that reported ‘Excellent’ for each question by provider type (Collaborative Care, Psychiatry or Neurology) and used a z-test to compare proportions between three providers using the collaborative model as a the referent group. These ratings (Table 2) suggest that although overall quality of medical care was similar, there were clear differences with how patient and family concerns were addressed and their overall experience, particularly for time availability for follow-up, answering questions and shared decision making with strong preferences for collaborative care approaches.

Challenges in establishing a collaborative dementia care model

The evidence-base is growing for the effectiveness of collaborative care models across a variety of clinical settings but actual dissemination of these models into routine care faces a number of challenges. As ongoing clinical trials of collaborative care models are completed, implementation and dissemination will be facilitated by changes in healthcare policy and national legislation. The Affordable Care Act [46] places emphasis on preventive services, cognitive screening and quality measures for clinical care

Table 1. Patient- and caregiver-centered outcomes following delivery of collaborative care.			
	Baseline (mean ± SD)	Follow-up (mean ± SD)	Difference (p-value)
<i>Patient outcomes (n = 135)</i>			
Stressed because of memory	2.9 ± 1.3	2.7 ± 1.2	0.06
Social relations impacted	2.1 ± 1.1	1.9 ± 1.0	0.11
Worried about ADLs	2.4 ± 1.2	2.2 ± 1.0	0.37
Comfortable discussing memory problems	3.5 ± 1.1	3.4 ± 1.0	0.77
Confident in knowledge	3.2 ± 1.1	3.5 ± 1.0	0.04
Depressed mood	2.3 ± 1.3	1.9 ± 1.1	0.09
Lost control of life	2.1 ± 1.2	2.0 ± 1.1	0.89
Confident about finding sources of support	3.9 ± 1.1	3.9 ± 1.0	0.49
<i>Caregiver outcomes (n = 135)</i>			
Not enough time for self	2.7 ± 1.3	2.8 ± 1.3	0.38
Frustrated around patient	3.0 ± 1.3	2.7 ± 1.1	0.06
Strained around patient	2.8 ± 1.3	2.6 ± 1.2	0.32
Own health suffered	2.3 ± 1.3	2.2 ± 1.2	0.72
Uncertain about what to do with patient	3.1 ± 1.3	2.3 ± 1.1	<0.001
Could do more for patient	2.9 ± 1.1	2.7 ± 1.3	0.06
Worried about patient’s ability to manage ADLs	3.5 ± 1.3	3.2 ± 1.2	0.15
Depressed mood	2.4 ± 1.3	2.2 ± 1.1	0.28
Lost control over the situation	2.3 ± 1.1	2.0 ± 0.9	0.04
Confident about finding sources of support	3.4 ± 1.2	3.7 ± 1.0	0.08
Pre- and post-test surveys are scored on 5-point Likert scale (Strongly disagree, Disagree, Not sure, Agree, Strongly agree) with lower scores representing better outcomes. Group mean responses on baseline and follow-up visits are compared using the Wilcoxon-Mann-Whitney test. Significant trends ($p < 0.1$) are in bold.			
ADL: Activities of daily living.			

Table 2. Satisfaction ratings comparing collaborative care team approaches with single physician models.

	Collaborative model n = 112	Single MD (psychiatry) model n = 29	Single MD (neurology) model n = 119	p-value
Overall quality of care	81.3	65.5	64.7 [†]	0.014
Time availability	65.2	41.4 [†]	45.4 [†]	0.004
Personal manner	81.3	62.1 [†]	58.0 [†]	0.001
Caring and respect for patient	87.5	58.6 [†]	70.6 [†]	0.001
Communicate with patient/family	85.7	62.1 [†]	71.4 [†]	0.006
Provide explanation about diagnosis and management	85.7	58.6 [†]	68.1 [†]	0.001
Include patient in decision making	69.6	37.9 [†]	62.2	0.007
Address concerns and questions	75.0	51.7 [†]	61.3 [†]	0.02
Overall experience	76.8	51.7 [†]	54.6 [†]	0.001
Definitely return to clinic	89.3	72.4 [†]	84.9	0.07
Definitely recommend clinic	83.9	58.6 [†]	81.5	0.009

[†]Proportions differ significantly from collaborative model at the 0.05 level.

Survey questions scored on 5-point Likert scale (Excellent, Very good, Good, Fair, Poor). Analyses compare 'Excellent' ratings across three models of care using Chi-square statistics. Significant values are in bold.

MD: Physician.

while the National Alzheimer Project Act [47] places emphasis on advancing national goals to raise awareness of AD, better understand the impact of AD on patients, families, providers and health delivery systems, increase research participation in older adults and translate this acquired knowledge into public health practice in the context of an increasingly diverse older adult population. Collaborative care models for dementia are ideal to meet these challenges as team-based, multicomponent approaches are well-equipped to improving patient-centered and family-centered care. Delivery of such care however is associated with significant start-up costs for hiring and training new staff, interfacing with electronic medical records and finding creative funding sources to provide services that are currently not covered under Medicare (e.g., social services). Creation of a collaborative care model may also encounter initial resistance from patients and caregivers not familiar with team-based approaches for dementia care, and from providers who are more familiar with a physician-centered workflow that make varied use of ancillary staff [8]. We utilized constructs from Wagner's Chronic Care Model [10] in establishing the structure of our collaborative care model and provided the evidence base for maintaining and supporting its continual growth (Figure 2). The six components include organizational support, care coordination to deliver a collaborative care model, shared decision making, decision support mechanisms, self- and family-management support mechanisms and support

from information and electronic medical record systems [9]. Implementation of these components by a well-trained collaborative care team empowers providers and family caregivers, supports evidence-based shared decision making, tailors health promotion and treatment guidelines to patient preferences and provides improved access to quality care. Use of such a schematic allows for recognition of challenges and potential barriers and plans to overcome barriers when creating a collaborative practice for dementia care.

At the onset, organizational support is critical – to be success it is important to identify a 'champion' in the health system leadership to provide the initial start-up funds to hire and train collaborative team members and cover deficits until adequate patient flow is established. An early important lesson involved understanding reimbursement rates from Medicare and third party payers; particularly differences in payments between physician and NP provided services. We worked with our billing office to ensure correct usage of time-based codes and documentation of care and counseling to maximize reimbursement and meet requirements for Medicare meaningful use. In the initial phase of implementation, there was initial resistance to not seeing the physician at each office visit; this required us to revise our welcome packet several times to clarify collaborative care. As word-of-mouth spread, the volume of self-referrals increased with both patients and families intentionally seeking out the enhanced services of an NP and SW. A challenge may exist in integrating

collaborative care into electronic medical records where multiple provider types are engaging the patient and family simultaneously during the visit. Another lesson learned in initiating our collaborative model was engagement of grateful patients, philanthropy and local and state departments of health to provide financial support of nonincome generating staff (e.g., health educators, unit secretaries) and piloting novel programs. In the past year, we have leveraged these additional funds to pilot a falls prevention intervention, peer-led support groups and bilingual educational programs in the community. It is also important to note that not all programs will be successful. For example, despite several attempts we were unable to launch a telemedicine component.

Conclusion

AD and related disorders have a high global economic impact and place significant burden on patients, caregivers, providers and health-care-delivery systems. With increased longevity and the aging of the population, the societal financial burden of AD and care dependency will increase exponentially, thus a redesign of healthcare delivery for dementia care is needed. Collaborative care models provide a pragmatic strategy to deliver integrated health and medical care to patients and families. Collaborative care models are team-based, multicomponent interventions to improve patient- and family-centered care through a system-level redesign of healthcare delivery capitalizing on the expertise of a transdisciplinary care team. The collaborative care model may also provide a cost-efficient strategy to improve health outcomes for patients and family caregivers across a wide range of populations and clinical settings. Healthcare reform and national plans for AD goals to integrate quality care, health promotion and preventive services, and reduce the burden of disease on patients and families, reinforce the need for a rethinking of the way older adults with dementia are diagnosed and treated. We described herein our collaborative care model to offer evidence that this model of care can lead to improved patient- and family-centered outcomes, quality indicators of care, and potential cost-savings.

Future perspective

Collaborative care models utilizing a transdisciplinary cadre of clinicians maximizing the unique skills and abilities of every team

member provide a pragmatic strategy to deliver integrated health and medical care to patients and families [6–9]. Key to these efforts is the need to take into account patient and family needs, social norms and preferences for care in shared decision making [11–14], a concept all the more important because of the progressive nature of dementing illnesses. Our collaborative care approach has improved patient- and family-centered outcomes, satisfaction with care and met prespecified quality indicators by incorporating clinicians with different but complementary competencies into the health-care model [30]. This approach is also consistent with healthcare reform [46] and NAPA [47] goals to integrate quality care, health promotion and preventive services, and mitigating the emotional and psychological effects of disease on patients and families. There remain significant challenges to broad implementation of collaborative care models including significant start-up costs, workforce training, reimbursement from third-party payers and reluctance on the part of some physicians to delegate clinical care to nonphysician providers. Current demonstration projects [21,24] and peer-reviewed manuscripts of successful implementation will overcome some of these challenges. Further effort is needed to work with stakeholders and third-party payers to develop bundled payment arrangements and reimbursement for case management services to include clear goals with measurable outcomes that demonstrate quality improvement and cost savings. The knowledge gained from broad implementation and dissemination of collaborative care models for dementia care, management and coordination will ensure the sustainability of these approaches.

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Figure 2. Components of collaborative care model for Alzheimer's disease. Based on Wagner's Chronic Care Model [10] and models of shared decision making, this figure describes the key components of our collaborative care practice for Alzheimer's disease. Bullet points highlight the challenges and potential barriers for creating and sustaining a successful interprofessional collaborative care approach for dementia care. Implementation of these components by a well-trained collaborative care team empowers providers and family caregivers; supports evidence-based shared decision making between patients, caregivers and physicians; tailors health promotion and treatment guidelines to patient preferences and provides improved access to quality care.

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