

Time Allocation and Caseload Capacity in Telephone Depression Care Management

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Objective: To document time allocated to care management activities and care manager workload capacity using data collected for studies of telephone care management of depression.

Study Design: Cross-sectional, descriptive analysis of depression care manager (DCM) activities and workload in 2 collaborative depression care interventions (1 implementation study and 1 effectiveness study) at Department of Veterans Affairs primary care facilities.

Methods: Each intervention tracked specific care management activities for 4 weeks, recording the number of events for each activity type and length of time for each activity. Patient workload data were obtained from the patient tracking systems for the 2 projects. We calculated the average time for each activity type, the average total time required to complete an initial assessment call and follow-up call, and the maximum patient panel for both projects.

Results: The total time per successful initial assessment was 75 to 95 minutes, and the total time per successful follow-up call was 51 to 60 minutes, with more time spent on ancillary activities (precall preparation, postcall documentation, and provider communication) than on direct patient contact. A significant amount of time was spent in unsuccessful call attempts, requiring 9 to 11 minutes for each attempt. The maximum panel size per care manager per quarter was in the range of 143 to 165 patients.

Conclusions: The study found similar DCM time allocations and panel sizes across 2 studies and 3 regions with full-time DCMs. Reductions in DCM time spent on ancillary activities may be achievable through improved informatics and other support for panel management.

(*Am J Manag Care.* 2007;13:652-660)

For author information and disclosures, see end of text.

Collaborative care is a population-based approach to treating depression in which multidisciplinary care teams assist primary care providers (PCPs) in delivering evidence-based treatment. The collaborative depression care model, based on a chronic illness care management model, includes patient-, provider-, and system-level components.^{1,2} A recent review of collaborative-care trials demonstrated this approach to be successful in improving both the process and outcomes of depression care.³

Using care management to systematically monitor adherence to treatment and follow-up care is a key element in collaborative care.⁴ Inclusion of systematic follow-up is an important predictor of positive clinical outcomes for depression.⁵ The care manager provides structured assessment and monitoring, education, and self-management support in partnership with the depression care team. The care manager role is based on the “clinical case manager” envisioned by Kanter⁶ more than the typical coordination and service support role of a case manager.

Among collaborative-care models, several types of medical professionals (nurses,^{7,8} psychologists,⁹ social workers,¹⁰ pharmacists^{11,12}) or non-medical professionals with healthcare experience¹³ have taken the role of care manager. Care management is conducted through on-site visits,⁹ telephone calls,¹⁴⁻¹⁶ or a combination of both.^{17,18} Care management by telephone, a less expensive approach than in-person patient visits, can significantly improve treatment of depression in primary care settings.^{14,19,20}

Information about the resources required for telephone care management is important for administrators and policymakers planning to implement collaborative-care models. However, no research has prospectively documented the time allocated to care management activities or estimated the workload capacity of depression care managers (DCMs). Based on data collected for 2 studies of telephone care management of depression, we describe the time care managers devote to specific clinic activities and provide estimates of care manager workload in terms of maximum patient panel sizes. The 2 programs were implemented in multiple primary care clinics in the Department of Veterans Affairs (VA) healthcare system. By documenting care management activities and resource needs, we hope to provide managers and decision makers

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within and outside the VA with concrete information for planning collaborative-care interventions to improve depression treatment.

METHODS

Study Design

This study is a cross-sectional, descriptive analysis of DCM activities and workload in 2 collaborative depression care interventions implemented in different VA primary care facilities. The Translating Best Practices for Depression into Evidence-based Solutions (TIDES) project was an implementation study conducted in 7 outpatient clinics in rural areas or small cities with on-site mental health staff in 3 VA regional healthcare networks, with 1 nurse DCM in each network. The TIDES clinics had 4600 to 14 000 primary care patients per year and 4 to 10 primary care clinicians. The Telemedicine Enhanced Antidepressant Management (TEAM) study was an effectiveness study conducted in 3 small community-based outpatient clinics without on-site psychiatrists in 1 regional healthcare network with 1 nurse DCM. The TEAM clinics had from 2900 to 4800 primary care patients per year and 5 to 10 primary care clinicians.

Both TIDES and TEAM DCMs were primary care registered nurses. Although the implementation plan for both projects did not require DCMs to have mental health experience, 2 of 3 TIDES DCMs (one with a master's degree and one with a bachelor's degree) and the TEAM DCM (who had a master's degree) were senior nurses with considerable experience in mental health. The third TIDES DCM, who had a 2-year associate's degree, had no experience in mental health and, in addition to psychiatric supervision, was mentored by the 2 other TIDES DCMs. The TIDES DCMs received an initial 2-day training session in depression care management and TIDES protocols before accepting patients. The TIDES DCMs also participated in weekly conference calls for support, problem solving, and care management education. The training for the TEAM DCM included directed readings and role playing over a 3-month period before patient enrollment. Both TIDES and TEAM DCMs worked full-time on the projects and were not involved in other clinical duties or research projects.

Table 1 presents characteristics of the TIDES and TEAMS interventions.

Translating Best Practices for Depression into Evidence-based Solutions

TIDES implemented a model of collaborative care based in primary care with mental health collaboration. The imple-

mentation strategy was the evidence-based quality improvement process, a structured implementation model that begins with establishing a work agreement between researchers as facilitators and regional and local administrators with organizational and fiscal decision-making authority. Implementation structure, templates, and protocols for the collaborative-care model are locally developed based on organizational priorities and resources, with guidance from the research/facilitation team. The implementation includes continuing education for PCPs and mental health specialists; information technology staff are involved, and to the extent practical, the electronic medical record is optimized for collaborative care.

In the TIDES depression care management model, PCPs referred patients with depressive symptoms to the DCM for assessment and follow-up care. DCMs followed a locally designed protocol for initial assessment of depression symptoms using a modified version of the 9-item Patient Health Questionnaire (PHQ-9) approved by Kroenke et al.²¹ The modified version of PHQ-9 asked the second question (which referred to "feeling down, depressed or hopeless") first. Also, the modified version used a "2 pass" method, first asking about the presence of each symptom and then asking about the frequency of endorsed symptoms. Follow-up scores on the PHQ-9 were used to track patient progress over time. Patient treatment preferences were respected, with some patients receiving antidepressant medications, some on a "watch & wait" status, and some referred for psychotherapy. Patients were followed for 6 months by the DCM with at least 4 calls scheduled at 1-2 weeks, 4-6 weeks, 8-12 weeks, and 24 weeks. Frequency of calls was tailored to patient progress. During each call, the DCM asked for the best way to reach a patient, including cell phone number, but did not schedule the next call routinely. Patients who were referred to mental health were monitored for compliance in keeping their mental health appointments and had the PHQ-9 repeated at 6 months by the DCM.

DCMs tracked patients' response to medications; provided follow-up care primarily in the form of social support and education about symptoms, therapy, recovery strategies, and specific strategies in self-management (eg, goal setting, formulating questions to ask PCPs, accessing information and resources for depression treatment); and addressed problems and barriers that arose. However, the DCMs did not provide psychotherapy. Centrally located (at the regional level) DCMs contacted patients by telephone, which was preferred by many patients and also allowed the DCMs to work with patients in remote settings. Formative evaluation showed that TIDES was a successful model of stepped care in which,

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■ **Table 1.** Comparison of Depression Telephone Care Management Models

Model Component	TIDES	TEAM
Program structure		
Design	Implementation study of regionalized collaborative care program	Effectiveness study of telemedicine-based collaborative care intervention
Organization	Seven primary care clinics with on-site psychiatrists in 3 regions; 3 DCMs	Three primary care clinics without on-site psychiatrists in 1 region; 1 DCM
Care manager discipline	Registered nurses	Registered nurse
Care manager interaction	Exclusively by phone	Exclusively by phone
Intervention duration	6 mo	12 mo
Patient enrollment	PCPs or clinic nurse referrals	Two-stage screening using standardized instruments (PHQ-2–PHQ-9)
Follow-up call frequency	Follow-ups at 1-2 wk, 4-6 wk, 8-12 wk, and 24 wk based on treatment and outcomes	Follow-ups every 2 wk during acute phase; every 4 wk during continuation
DCM supervision	Telephone consult with psychiatrist or mental health clinical nurse specialist as requested by DCM	Weekly in-person consult with psychiatrist
Other providers in intervention team	PCPs, supervising psychiatrist	PCPs, telepsychiatrists and supervising psychiatrist, clinical pharmacist
Call content (initial and follow-up)		
Symptom assessment	Modified instrument (PHQ-9)	Standardized instrument (PHQ-9)
Comorbidity assessment	Assessment of psychiatric comorbidity in structured interview	None
Side effects assessment	Semiscrpted protocol	Scripted protocol
Suicide assessment	Semistructured interview; structured, site-approved protocols for response to patients at risk	Standardized suicide risk assessment instrument and protocol; study psychiatrist contacted patients at risk by telephone
Barrier assessment and resolution	Unscripted protocol	Standardized assessment instrument and scripted protocol
Patient education	Semiscrpted protocol; set of materials mailed to patient by DCM as needed	Scripted protocol
Documentation		
Feedback to physicians	Progress notes in electronic patient record; PCP cosignature requested only if action required	Progress notes in electronic patient record; PCP cosignature requested only if action required
Informatics	Templates in electronic patient record; paper patient registry using tracking cards for assessment and follow-up; moving to electronic entry	Stand-alone electronic patient registry with scheduling and tracking capability; standardized assessment instruments and scripts

TIDES indicates Translating Best Practices for Depression into Evidence-based Solutions; TEAM, Telemedicine Enhanced Antidepressant Management; DCM, depression care manager; PCP, primary care provider; PHQ-2, 2-item Patient Health Questionnaire; PHQ-9, 9-item Patient Health Questionnaire.

among patients referred to DCMs, 82% were treated for depression in primary care, 74% stayed on medication, and 90% of primary care patients and 50% of mental health patients had clinically significant reduction in depressive symptomatology (PHQ-9 scores <10) at 6 months.²²⁻²⁴

Telemedicine Enhanced Antidepressant Management

The purpose of the TEAM effectiveness study was to adapt the collaborative-care model for small primary care clinics without on-site psychiatrists, using telemedicine technologies without altering the nature/content of the collaborative-care

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model itself.¹⁹ Telemedicine (eg, telephone, interactive video, electronic medical records, Internet) facilitated communication between a centrally located depression care team and PCPs practicing in geographically diverse clinic locations. The TEAM intervention used a stepped-care intervention, beginning with a standard level of care for all patients and increasing treatment intensity for patients failing to respond to lower levels of care. Patients and providers chose either watchful waiting or treatment with an antidepressant medication, although providers were encouraged via the positive depression screen in the electronic medical record to initiate guideline-concordant antidepressant treatment. Each additional level of stepped care involved a greater number of intervention personnel with increasing mental health expertise. Patients received the intervention for a 12-month acute-treatment phase or until a 6-month continuation phase was complete (without a relapse), whichever came first. Intervention participants included (1) PCPs located at community-based outpatient clinics; (2) consult telepsychiatrists located at parent VA medical centers; (3) an off-site DCM; (4) an off-site clinical pharmacist (with a PharmD degree); and (5) an off-site supervising psychiatrist. The supervising psychiatrist provided clinical supervision to the DCM and clinical pharmacist via weekly face-to-face meetings.

The DCM contacted patients by telephone to conduct patient education, activation and barrier assessment/resolution activities, and the symptom- and medication-monitoring components of the intervention, but the DCM did not provide psychotherapy. Encounters were scripted and used standardized instruments. During the initial encounter, patients were (1) given the PHQ-9 symptom-monitoring questionnaire without modifications; (2) educated and activated using a semistructured script⁷; and (3) assessed for treatment barriers using semistructured follow-up scripts for endorsed barriers.⁷ Symptom and medication monitoring were conducted every 2 weeks during the acute-treatment phase and every 4 weeks during watchful waiting or the continuation treatment phase. In a 6-month period, a nonresponsive patient (ie, one remaining in the acute phase of treatment) received 12 calls, whereas a responsive patient (ie, one transitioning from the acute phase to the continuation phase of treatment) received 8 calls. As in the TIDES approach, the DCM asked for the best way to reach the patient during a call, but did schedule the next call routinely. Monitoring followed a structured script¹⁴ to assess response, current medication use, and severity of antidepressant side effects. With nonadherent patients or those experiencing severe side effects, the DCM used a semistructured script¹⁴ to address common problems. The DCM provided all feedback to the PCP using progress

notes in the electronic medical record. Compared with patients receiving usual care, the TEAM intervention patients had twice the odds being adherent to medication, responding to treatment (measured as a 50% reduction in scores on the 20-item Hopkins Symptom Checklist [SCL-20]), and achieving remission (SCL-20 score < 0.5). Intervention patients also had significantly higher health-related quality of life and satisfaction.¹⁹

Data Collection Methods

Each intervention tracked specific care management activities for 4 weeks. DCM activities for the TIDES project were recorded for 1 week each month from November 2003 to February 2004, when the TIDES program was fully implemented in all 7 clinics and actively enrolling patients. For the TEAM project, data were collected during 4 consecutive weeks from July 2004 to August 2004, near the end of the enrollment period and primarily during patient follow-up. TIDES and TEAM DCMs used a structured spreadsheet to record time spent on implementation activities. The structured spreadsheet was designed with the input from DCMs, and a 1-week pilot test was conducted with DCMs. The DCMs recorded the number of events for each type of activity and length of time for each activity during the recording period. The data were used to estimate the average time for each intervention activity. The TIDES DCMs used the spreadsheet to record the number of unsuccessful and successful call attempts. The TEAM DCM used a computerized system to record call attempts. Call attempt data were used to estimate the number of unsuccessful call attempts per successful call.

DCM activities for both programs were grouped into 6 categories: precall preparation, unsuccessful call attempts, completed assessment calls, completed follow-up calls, postcall documentation of assessment or follow-up calls, and communications among providers. Precall preparation for both initial assessments and follow-up calls included patient tracking and review of clinical notes. Provider communication included communications with PCPs, mental health providers, DCM supervisors and other DCMs, and liaison with VA and community resources. Total time for successful calls included precall preparation for every call attempt, all unsuccessful calls, the completed call, documentation, and communication.

Patient workload data were obtained from the patient tracking systems for the 2 projects. The tracking systems contain dates of patient contact with DCMs, including date of enrollment, date of initial assessment, dates of follow-up, date of completion, and disposition status (eg, refusal, death, unable to reach, completion). Counts of numbers of patients

■ **Table 2.** Depression Care Manager (DCM) Activities

Activity	Mean (SD)*	
	TIDES [†]	TEAM [‡]
Initial assessment		
Unsuccessful call attempts		
Precall preparation	8 (3.5)	6 (1.0)
Unsuccessful call	3 (0.8)	3 (0.7)
Average total time per unsuccessful call	11 (5.0)	9 (1.0)
No. of unsuccessful calls per patient	1.1 (1.7)	3.2 (3.8)
Completed assessment calls		
Precall preparation	8 (3.5)	6 (1.0)
Completed call	33 (17.0)	33 (15.9)
Postcall documentation	17 (19.8) [§]	24 (8.5)
Communication with providers	5 (3.1)	3 (1.8)
Average total time per successful call	63 (35.0)	66 (10.3)
Total time per completed call	75 (38.5)	95 (13.4)
Initial assessment calls completed	89.3%	96.6%
Follow-up		
Unsuccessful call attempts		
Precall preparation	7 (5.0)	6 (0.5)
Unsuccessful call	3 (0.8)	3 (0.7)
Total time per unsuccessful call	10 (3.9)	9 (0.5)
No. of unsuccessful calls per follow-up	1.2 (0.2)	2.2 (1.6)
Completed follow-up calls		
Precall preparation	7 (5.0)	6 (0.5)
Completed call	17 (5.1)	17 (6.9)
Postcall documentation	10 (23.6) [§]	14 (8.3)
Communication with providers	5 (3.1)	3 (1.8)
Total time per successful call	39 (28.3)	40 (15.7)
Total time per completed call	51 (31.0)	60 (16.8)
<p>*Values are minutes except where indicated. [†]DCM workload was recorded on paper (structured spreadsheet). [‡]DCM workload was reported on electronic work log. [§]The large variation is due to 1 outlier from a DCM. Includes precall preparation for every call attempt, all unsuccessful calls, the completed call, postcall documentation, and provider communication. TIDES, Translating Best Practices for Depression into Evidence-based Solutions; TEAM, Telemedicine Enhanced Antidepressant Management.</p>		

who were newly enrolled, continued from the previous quarter, completed the program, or were lost to follow-up through inability or refusal to continue were recorded each quarter during the implementation period for the 2 projects. The patient panel (workload) for the each quarter was calculated as the sum of the number of continuing patients from the pre-

vious quarter plus new patients, minus the number of patients who completed the program or were lost to follow-up during the previous quarter. Maximum panel size was estimated as the largest number of active patients per DCM in the TIDES and TEAM patient registries.

Data Analysis

Analyses were descriptive. We calculated the average time for each DCM activity, the average total time required to complete an initial assessment call, the average total time required to complete a follow-up call, and the maximum patient panel for both TEAM and TIDES projects.

RESULTS

Table 2 reports average times spent by DCMs in the TIDES and TEAM projects on precall preparation, call attempts, completed calls to patients, documentation, and communication with providers. Average total time for initial assessment and patient education was 75 and 95 minutes for TIDES and TEAM, respectively. In both programs, DCMs averaged more time (42 and 62 minutes, respectively) on ancillary activities (precall preparation, postcall documentation, and provider communication) than on direct patient contact (33 minutes). The large variation in post-call documentation of completed initial assessment and follow-up calls in TIDES was due to an outlier from 1 DCM. Increased time spent on ancillary activities by the TEAM DCM reflects almost 3 times as many unsuccessful calls for each successful initial assessment (3.2 vs 1.1 attempts for TIDES), and more time on postcall documentation (24 vs 17 minutes).

Average total time for successful follow-up calls was 51 and 60 minutes for TIDES and TEAM, respectively, including 36 and 42 minutes for ancillary activities. Again, total time for the TEAM DCM reflects significantly more unsuccessful call attempts than in the TIDES program (2.2 vs 1.2). Average time for documentation was slightly more (14 vs 10 minutes), and average time for precall preparation and provider contacts was slightly less (9 vs 12 minutes) for TEAM compared with TIDES.

Table 3 and **Table 4** provide data on panel sizes for the TIDES and TEAM DCMs. The TIDES program increased

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■ **Table 3.** Patient Panel by Quarter in TIDES

Quarter	No. of Clinics	No. of DCMs	No. of Patients Completed in Previous Quarter	No. of Patients Lost in Previous Quarter*	No. of Referred Patients in Current Quarter	Size of Patient Panel in Current Quarter [†]
2002						
Q3	2	2	0	0	12	12
Q4	3	2	0	1	20	31
2003						
Q1	5	2	0	2	35	64
Q2	7	3	4	7	167	220
Q3	7	3	23	23	115	289
Q4	7	3	19	47	237	460
2004						
Q1 [‡]	7	3	45	56	136	495
Q2 [§]	6	3	90	42	122	485
Q3	5	3	160	49	102	378

*Patients who refused to be in the program, were already managed by mental health clinics, could not be contacted, died, or were unable to complete the program because of health problems in the previous quarter.
[†]Patients actively managed by DCMs in the current quarter (the number in the previous quarter plus new referrals, minus patients lost or completed).
[‡]One site discontinued patient referrals in March 2004.
[§]One site discontinued patient referrals in May 2004.
^{||}TIDES interventions continued after this quarter. These patients continued to be followed up.
TIDES indicates Translating Best Practices for Depression into Evidence-based Solutions; DCM, depression care manager.

patient load gradually, reaching the maximum number of patients in the 7th quarter when 3 DCMs managed 495 patients (ie, 165 patients per DCM). TEAM reached the maximum number of patients more quickly, with a maximum patient load of 143 in the 4th quarter of the program.

DISCUSSION

This study documented time allocated to patient care activities and panel sizes of DCMs from 2 studies of telephone care management of depression. The average total time per successful initial assessment was 75 to 95 minutes, and the average total time per successful follow-up call was 51 to 60 minutes. The average time for direct patient contact (completed patient call) was the same from both studies: 33 minutes for an assessment call and 17 minutes for a follow-up call. In the TEAM stepped-care protocol, the pharmacist called 41.8% of the patients to provide medication management for those failing the first antidepressant trial. This planned call from the pharmacist probably reduced the amount of time the DCM needed to spend with the patient after identifying the failed antidepressant trial, but DCMs continued to follow these patients as prescribed in the stepped-care model.

Although telepsychiatry referrals were common in the TEAM study, telepsychiatry consultations were not. Thus, consultations did not impact DCM workload.

The results show that DCMs spent more time on ancillary activities (precall preparation, postcall documentation, and provider communication) than on direct patient contact, especially for retrieving (precall preparation) and documenting (postcall documentation) patient information. One possible reason is that panel management tools are not yet integrated into many electronic health records, including VA electronic medical records (Veterans Health Information Systems and Technology Architecture and computerized patient record system [CPRS]). These 2 studies therefore used project-specific panel management systems. The TIDES project used the paper patient registry with tracking cards for assessment and follow-up; DCMs then transferred the notes to the electronic medical records for the standard reports. The TEAM project used a stand-alone electronic patient registry with scheduling and tracking capability, standardized assessment instruments, and scripts. The TEAM management system guided the DCM through a structured and self-documenting encounter. The management system automatically generated a clinical note that was copied to the CPRS.

■ **Table 4.** Patient Panel by Quarter in TEAM

Quarter	No. of Clinics	No. of DCMs	No. of Patients Completed in Previous Quarter	No. of Patients Lost in Previous Quarter*	No. of Referred Patients in Current Quarter	Size of Patient Panel in Current Quarter [†]
2003						
Q3	3	1	0	0	44	44
Q4	3	1	0	0	63	107
2004						
Q1	3	1	0	2	33	138
Q2	3	1	3	7	15	143
Q3	3	1	18	5	12	132
Q4	3	1	43	0	10	99
2005						
Q1	3	1	39	1	0	59
Q2	3	1	29	2	0	28
Q3	3	1	13	0	0	15
Q4	3	1	5	0	0	10
2006						
Q1	3	1	10	0	0	0

*Patients who refused to be in the program, were already managed by mental health clinics, could not be contacted, died, or were unable to complete the program because of health problems in the previous quarter.
[†]Patients actively managed by DCMs in the current quarter (the number in the previous quarter plus new referrals, minus patients lost or completed).
 TEAM indicates Telemedicine Enhanced Antidepressant Management; DCM, depression care manager.

Reductions in DCM time spent on ancillary activities may be achievable through improved informatics support for panel management and/or scheduling future DCM calls with patients. In subsequent studies, TIDES investigators developed improved care management informatics tools using functionality available in the VA electronic medical record. TIDES and TEAM investigators also developed Web-based applications to support panel management and structured assessment of depression processes and outcomes.²⁵⁻²⁸ Further evaluation will be needed to assess the time reduction in ancillary activities.

This study shows that a significant amount of DCM time was spent in unsuccessful call attempts, requiring 9 to 11 minutes of DCM time for each attempt. Compared with TIDES, TEAM had a higher number of unsuccessful call attempts (3.2 calls vs 1.1 calls per initial assessment), which resulted in a higher total time per initial assessment call for TEAM. The difference in unsuccessful call attempts between the 2 programs was due to the nature and design of the programs. Because TIDES was an implementation study, the maximum number of call attempts was set at 5. However, TEAM was an effectiveness study, and the DCM tried to reach all patients to

maximize patient enrollment, achieving 97% initial assessment call completion compared with 89% for TIDES.

The TEAM panel size gradually decreased as patient recruitment ended and patients completed the program according to the study design. By the end of the data collection period, TIDES patient recruitment was decreasing and panel sizes also were declining. The decline for TIDES may reflect the fact that 2 sites discontinued the TIDES quality improvement activities during the study period, one in March 2004 and the other in May 2004.

The maximum panel size per DCM per quarter was 165 patients for TIDES and 143 patients for TEAM. At these panel sizes, DCMs in both programs felt that they were managing the maximum number of patients and that increasing panel sizes further would not be feasible. Note that the monthly panel size could be substantially greater than one third of the quarterly panel size. Because of the length of the care management protocol (6 months for TIDES and 12 months for TEAM), a significant proportion of patients continue under the DCM's care from one month to the next. This study was unable to reconstruct monthly patient panels because the DCM patient workload data were reported on a

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quarterly basis. Only 1 other study described panel size in depression care management; the Improving Mood—Promoting Access to Collaborative Treatment for Late Life Depression (IMPACT) study had an average panel size of 67 patients per month.²⁹ Further, very little research has estimated patient panel sizes for care management involving other chronic diseases. A study on self-management education for patients with chronic obstructive pulmonary disease estimated a possible workload of 50 to 70 patients per year for a case manager.³⁰

Coordination among disease care managers is important for patients with multiple chronic conditions. Interactions with other disease care managers were rare in TIDES and TEAM, mainly because there were few other disease care managers at the time of both studies. For TIDES, the DCMs screened for comorbid conditions that might affect depression treatment. On those rare occasions when another care manager was involved in patient care, the TIDES DCMs asked the care manager to document coordination by cosigning electronic progress notes. For TEAM, the DCM did not screen for comorbid conditions, and there were no other disease care managers in TEAM clinics during the study period.

This study has several limitations. First, we relied on DCM reporting of activities and time spent for each activity. To avoid potential bias, we obtained input from DCMs in designing the data collection process and conducted pilot data collection to practice recording work activities. Second, the data collection period for estimating times for DCM activities was only 4 weeks. However, the data collection time periods for both projects occurred when all DCMs would have had stable panel sizes and been very experienced with the care management activities. Data collected at this point were most likely to represent a steady-state situation and provided the best estimates of times for care management activities. Third, this study did not account for nonpatient care time, such as research support (TEAM) or administrative support (TIDES). For example, TIDES DCM presented in provider education sessions and produced TIDES quarterly reports to market the TIDES quality improvement program. In TEAM, the DCM was required to complete research activities such as human subjects protection training and research compliance audits. Panel size estimates may be higher if research or administrative support activities are reduced. On the other hand, panel size estimates will decrease as a function of increasing nondirect patient-related administrative work requirements. Fourth, we did not assess the effect of patient characteristics or comorbid conditions on DCM con-

Take-away Points

Telephone care management is shown to significantly improve depression treatment outcomes in primary care, but there is little information on resources required for telephone care management of depression. This paper documents that:

- Two telephone care management projects had similar care manager time allocations and panel sizes.
- The total time per successful initial assessment was 75 to 95 minutes, and the total time per successful follow-up call was 51 to 60 minutes, with more time on ancillary activities (precall preparation, postcall documentation, and provider communication) than on direct patient contact.
- The maximum panel size per care manager per quarter was 143 to 165 patients.

tact time, because we were unable to link the aggregate DCM surveys and workload data with patient-level data. Anecdotes from DCMs indicate that older, nonadherent, nonresponsive, and suicidal patients required more DCM time. Finally, the study results may be generalizable to large managed care organizations or integrated healthcare systems with electronic medical records. However, VA patients are generally older, have more comorbid conditions, and are more difficult to manage than general populations. Therefore, the DCM time estimates may represent upper-bound estimates.

In summary, this study described DCM time allocations for care management activities and the maximum patient panel sizes from 2 depression collaborative-care projects using telephone care management. The study found similar DCM time allocations and panel sizes across 2 studies and 3 regions with full-time DCMs, suggesting that the results we found are valid under current VA conditions. Reductions in DCM time spent on ancillary activities, however, may be achievable through improved informatics and other support for panel management. Clinical managers and policymakers can use these results to estimate DCM staffing requirements and appropriate panel sizes for collaborative care for depression in similar telephone care management programs. Researchers can use these methods and results to estimate the cost associated with DCM interventions.

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Funding Sources: This research was supported by the Department of Veterans Affairs, Veterans Health Administration, HSR&D service grants MNT-02-209, IIR 00-078-3, and MNT-01-027.

The views expressed herein are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs or other affiliated institutions.

Author Disclosures: The authors (C-FL, JF, SV, KV, WNR, BR, MG-M, JP, LVR, EC) report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (C-FL, JF, SV, WNR, LVR, EC); acquisition of data (C-FL, JF, SV, KV, WNR, BR, MG-M, LVR); analysis and interpretation of data (C-FL, JF, SV, JP, LVR, EC); drafting of the manuscript (C-FL, JF, JP); critical revision of the manuscript for important intellectual content (C-FL, JF, SV, KV, BR, MG-M, JP, LVR, EC); statistical analysis (C-FL); provision of study materials or patients (KV, BR, MG-M, LVR, EC); obtaining funding (C-FL, JP, LVR, EC); administrative, technical, or logistic support (C-FL, WNR, EC); supervision (C-FL).

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