IMPACT Annotated Bibliography

This annotated bibliography is designed to facilitate a review of the publications that have resulted from IMPACT, both the randomized trial and subsequent dissemination of the model to other settings and populations. The bibliography is organized into sections, described below, so that you can easily focus on the articles of greatest interest to you. After selecting the bookmark tab to the left, click on the bookmarks to navigate the sections listed below. Or you may click on the links below.

Section Descriptions

IMPACT Trial Results

In one of the largest treatment trials for depression to date, a team of researchers led by Dr. Jürgen Unützer studied the effectiveness of the IMPACT model in 1,801 depressed, older adults from 18 diverse primary care clinics associated with eight health care organizations across the United States. These articles summarize the primary results from the randomized trial.

Other IMPACT Study Findings

These articles include factors influencing depression severity, treatment and effectiveness of IMPACT in various sub-groups of patients as well as patient and physician satisfaction with IMPACT.

Post-Study Implementation

These articles include program evaluations of IMPACT implementations after conclusion of the randomized trial, articles related to the process of implementation, and adaptations of IMPACT for other populations.

The IMPACT Treatment Program

These articles describe the IMPACT program, the roles of various healthcare professionals in IMPACT, and the process of implementing IMPACT in the primary care clinics participating in the randomized trial.

IMPACT Research Methods

These articles focus on research methods used in the IMPACT trial, including screeners and scales used to measure symptoms, the web-based data management system used for patient tracking, and comparing data imputation methods.

Background

These articles report on usual care for late-life depression and the need for programs like IMPACT.

Quick Terms

To assist with the technical language used throughout this document, we have provided a quick glossary of terms for your reference.

IMPACT Trial Results

Unützer J, et al. **Collaborative-care management of late-life depression in the primary care setting: a randomized controlled trial.** *Journal of the American Medical Association.* 2002; 288:2836-2845.

This article explores the primary outcomes from the IMPACT randomized controlled trial. A total of 1801 patients aged 60 years and older from 18 different primary care clinics in 5 states were randomly assigned to the IMPACT program or to usual care. Intervention patients had access for up to 12 months to a depression care manager while other patients received the treatments usually available to them in their primary care clinic, including antidepressant medications. At 12 months, 45% of IMPACT patients had a 50% or greater reduction in symptoms of depression as compared to 19% of patients in the usual care group. Intervention patients also experienced greater rates of depression treatment, more satisfaction with depression care, lower depression severity, less functional impairment and greater quality of life than participants assigned to the usual care group.

Hunkeler EM, et al. **Long term outcomes from the IMPACT randomised trial for depressed elderly patients in primary care.** *British Medical Journal.* 2006; 332(7536): 259-263.

This article describes the long term effectiveness of IMPACT. A total of 1801 adults with depression 60 years and older from 18 different primary care clinics in 5 states were randomly assigned to the IMPACT program with access to a depression care manager for 12 months or usual care for depression. Interviewers blind to treatment condition conducted in-person interviews at baseline and by telephone for follow-up interviews. Six and 12 months after withdrawal of IMPACT intervention resources, those who had access to the IMPACT program did significantly better than patients in the usual care treatment condition in measures of: continuation of antidepressant treatment, depressive symptoms, remission of depression, physical functioning, overall quality of life, satisfaction with care, and self-efficacy. IMPACT collaborative care shows substantial and persistent long-term benefits in treating depression in older adults.

Callahan CM, et al. **Treatment of depression improves physical functioning in older adults.** *Journal of the American Geriatric Society.* 2005; 53(3):367-373.

This article describes the effect of IMPACT care on depressed older adults' physical functioning. In the IMPACT randomized trial 1801 older adults (60 years and older) with depression were assigned to one of two depression treatment conditions: IMPACT collaborative care or care as usual. Patients assigned to usual care had access to all health services available as part of usual care, including medications and psychotherapy if available. Patients assigned to IMPACT care had access to a depression care specialist who coordinated care with their primary care physician over the 12-month intervention. The Physical Component Summary (PCS) and measuring instrumental activities of daily living (IADLs) were used to assess physical functioning in study participants. Both groups showed improved physical functioning with improved depression symptoms and physical functioning was significantly better in patients assigned to IMPACT care than those assigned to usual care. After 12 months of IMPACT depression care, IMPACT patients experienced more improvements in physical functioning than usual care patients. IMPACT patients were also less likely than usual care patients to rate their health as fair or poor.

Lin EHB, et al. **Effect of improving depression care on pain and function among older adults with arthritis.** *Journal of the American Medical Association.* 2003; 290(18):2428-2803.

This article describes IMPACT intervention effects on pain symptoms and functioning in patients with arthritis. In the IMPACT randomized trial 1801 older adults (60 years and older) with depression from 18 different primary care clinics across 5 states were assigned to one of two depression treatment conditions: IMPACT collaborative care or care as usual. Patients treated as usual had access to all health services available as part of usual care, including medications and psychotherapy if available. Patients treated for depression with IMPACT collaborative care had access to a depression care manager who coordinated care with their primary care physician over the 12-month intervention. Of the IMPACT cohort, 1001 patients reported arthritis at baseline. Pain intensity, interference with daily activities, due to arthritis and due to pain, overall health, and quality of life were measured to assess improvement in arthritis pain and physical functioning. In a large and diverse population of older adults with arthritis (mostly osteoarthritis) and comorbid depression, benefits of improved depression care extended beyond reduced depressive symptoms and included decreased pain as well as improved functional status and quality of life.

Williams J Jr., et al. **The effectiveness of depression care management on diabetes-related outcomes in older patients.** *Annals of Internal Medicine.* 2004 Jun 15;140(12):1015-24.

This article explores the outcomes of IMPACT collaborative care on diabetic and depressed older adult patients. A subgroup of 417 patients from the 1801 participants of the randomized controlled trial were assessed for depression, functional impairment, and diabetes self-care behaviors. Patients in the IMPACT collaborative depression care intervention were assigned to a depression care manager that coordinated their depression care with the primary care physician. IMPACT care included education, problem-solving treatment, and/or antidepressant management. No enhancements were made to the diabetes care in the intervention condition. Patients in the control group received treatment as they usually would be treated for depression in their primary care facilities. Older adults with coexisting depression and diabetes who were assigned to IMPACT depression care showed an increase in weekly exercise days, had lower depression severity scores, and greater improvement in overall functioning than those patients in usual care.

Areán PA, et al. **Improving depression care for older, minority patients in primary care: a randomized trial.** *Medical Care.* 2005 Apr; 43(4):381-390.

This article compares depression treatment outcomes in older, minority patients treated with IMPACT collaborative care, patients treated as usual, and nonminority elderly patients with depression. From the cohort of 1801 older adults with depression from the IMPACT randomized trial, 12% were black, 8% were Latino, and 3% were from other minority groups. This study compared the three largest ethnic groups: non-Latino white, black and Latino on depression severity, quality of life, and mental health service use. The IMPACT program resulted in greater improvements of depression, greater rates of depression care (antidepressant medication and psychotherapy), and less health-related functional impairment among older black, Latino, and white older adults than for those treated for depression with care as usual. IMPACT collaborative care is more effective than usual care regardless of ethnicity for depressed older adults.

Steffens D, et al. **Cognitive impairment and depression outcomes in the IMPACT study.** *The American Journal of Geriatric Psychiatry.* 2006 May; 14:401-409.

This article examines the effect of cognitive decline on the efficacy of the IMPACT intervention among the 1,684 older adults with baseline and 24-month follow-up data. Patients were randomly assigned to one year of usual care or collaborative depression care. After that year, all study participants had an additional twelve months of usual care. At 24 months, patients treated with IMPACT collaborative care had better depression outcomes than patients treated with usual care, regardless of baseline cognitive impairment. Depressed older adults with cognitive decline may be at higher risk for poor depression outcomes and may require more careful clinical monitoring and management.

Harpole L, et al**. Improving depression in older adults with comorbid illness.** *General Hospital Psychiatry.* 2005 Jan-Feb; 27(1):4-12.

This article describes depression outcomes in older adults who have comordid medical conditions. In the IMPACT cohort of 1801 depressed older adults 60 years old and older, patients were randomly assigned to IMPACT collaborative depression care or care as usual. Patients treated for depression with IMPACT care had access to a depression care manager for 12 months who provided education, brief psychotherapy (Problem-Solving Treatment in Primary Care), or support of antidepressant medications prescribed by the primary care physician. The IMPACT cohort had an average of 3.8 chronic medical conditions. Depression severity at baseline was greater for older adults with more chronic medical conditions, but when compared to usual care, the number of comorbid medical illnesses did not decrease the effectiveness of the IMPACT intervention. Patients assigned to IMPACT collaborative care were more likely to experience at least a 50% reduction in depressive symptoms, to have improved overall mental health scores, and to report increased quality of life at 3 and 12 months. Compared to usual care, the IMPACT treatment model was equally effective among depressed elderly patients with and without accompanying medical illnesses. Similarly, the presence of multiple comorbid medical illnesses did not affect patient response to IMPACT care.

Unützer J, et al. **Reducing suicidal ideation in depressed older primary care patients.** *Journal of American Geriatrics Society.* 2006 Oct; 54(10):1550-6.

This article examines the effect of the IMPACT intervention on suicide ideation in 1801 depressed older adults from the IMPACT randomized, controlled trial. Patients in the intervention arm were given access to a depression care manager that coordinated medication management with the primary care providers and offered Problem Solving Treatment in Primary Care (PST-PC). Because older adults rarely see mental health specialists, primary care may be the most promising setting for interventions to reduce suicide risk in older adults. In this collaborative care program for late life depression, intervention subjects had significantly lower rates of suicidal ideation than those in usual care at 6 and 12 months and after IMPACT resources were no longer available at 18 and 24 months. This suggests that better treatment of depression in older adult primary care patients may be one of the most promising strategies to reducing risk of suicide late in life.

Katon WJ, et al. **Cost effectiveness and net benefit of enhanced treatment of depression for older adults with diabetes and depression.** *Diabetes Care.* 2006; 29(2):265-270.

This article describes the results of a pre-planned subgroup analysis of the IMPACT trial data, including 418 depressed older adults with pre-existing diabetes drawn from the 1801 patients from the IMPACT cohort that were randomly designed to the IMPACT intervention (*n = 204)* or usual care (*n = 214*). The study sought to determine the incremental cost-effectiveness and net benefit of the IMPACT model compared to usual care for older adults with depression and diabetes. Given the high rate of major depression and medical symptom burden in this population, patients with diabetes and depression have greater medical costs than patients with only diabetes. Depressed older adults with diabetes who were assigned to the IMPACT intervention had lower total health care costs over two years than those assigned to care as usual.

Katon WJ, et al. **Cost-effectiveness of improving primary care treatment of late-life depression.** *Archives of General Psychiatry.* 2005; 62:1313-1320.

This article explores the incremental cost benefits that result from improving primary care treatment of late-life depression with a collaborative care model, like IMPACT care. A total of 1801 depressed patients 60 years and older were randomly assigned to IMPACT collaborative care or usual care for treatment of depression. IMPACT care allowed patient access to a depression care manager who provided education, support of antidepressant medication prescribed by a primary care physician, and problem-solving treatment in primary care (PST-PC), which is a brief psychotherapy. Increased health care costs during the initial year of the IMPACT trial were largely offset by 'savings' in general health care costs during the second year of the study. Over two years, the IMPACT model produced substantial improvements in mental and physical health without significantly increasing total health care costs. Overall, the cost-effectiveness of IMPACT care compares favorably to that of many commonly used medical interventions.

Unützer J, et al. **Long-term cost effects of collaborative care for late-life depression.** *American Journal of Managed Care.* 2008 Feb; 14(2):95-100.

This article describes the effect of IMPACT depression care on total health care costs. Two of the eight health maintenance organizations (HMOs) from the randomized, controlled IMPACT trial had cost data available for the year that patients participated in the IMPACT trial and 3 years after it ended. From these two healthcare organizations, a total of 551 patients were randomly assigned to IMPACT care or care as usual for depression. IMPACT care included patient access to a depression care manager that provided education, antidepressant medication management prescribed by their primary care provider, behavioral activation, and a brief psychotherapy, Problem-Solving Treatment in Primary Care (PST-PC). When healthcare costs were examined over a four-year period, IMPACT patients had lower average costs for all their medical care – about $3,300 less than patients assigned to usual care, even when the cost of IMPACT care is included. This suggests that an initial investment in better depression care not only improves health, it can actually reduce total health care costs over 4 years.

Hegel M, et al. **Impact of comorbid panic and post-traumatic stress disorder on outcomes of collaborative care for late-life depression in primary care.** *The American Journal of Geriatric Psychiatry.* 2005 Jan-Feb; 13(1):48-58.

This article describes the effectiveness of IMPACT collaborative care in treating depression with comorbid panic disorder and comorbid post traumatic stress disorder (PTSD) versus those without comorbid disorders. In a multisite, controlled trial, a total of 1801 depressed adults 60 years and older were randomly assigned to IMPACT intervention or usual care for depression in their primary care clinics. The IMPACT intervention employed depression care managers to offer education, manage antidepressant medication prescribed by the primary care physicians, implement behavioral activation, and provide brief a brief psychotherapy (Problem-solving Therapy in Primary Care or PST-PC). IMPACT collaborative care was more effective than usual care for depressed older patients with comorbid panic disorder and PTSD. Patients with comorbid panic disorder had early, positive, and lasting responses to collaborative care. Patients with depression and comorbid PTSD had a more delayed response that required the full 12 months of treatment to show significant improvement in depression symptoms. Results suggest that collaborative care is more effective than usual care for depressed older adults with or without comorbid panic disorder and PTSD. Slower treatment response suggests patients with PTSD may need more intense and prolonged follow-up than patients with comorbid anxiety or no comorbid disorders.

Other IMPACT Study Findings

Thielke SM, et al**. Pain limits the effectiveness of collaborative care for depression.** *American Journal of Geriatric Psychiatry.* 2007; 15(8):699-707.

This article discusses a secondary analysis of the IMPACT data designed to explore the effects of pain on collaborative care for depression. The IMPACT randomized controlled trial compared collaborative care for depression with usual care for 1,801 depressed older adults with depression in 18 primary care clinics within 8 health care organizations across five states. Patients were randomly assigned to IMPACT collaborative care with a depression care manager providing education, coordinating anti-depressant medication management, implementing behavioral activation, and offering a brief psychotherapy, Problem-solving Treatment in Primary Care (PST-PC). For participants assigned to IMPACT care, greater pain at baseline was associated with worse depression outcomes. The results showed a similar trend for patients with arthritis pain. The results indicate that pain may be an important barrier to improvement of depression and attending to pain might produce better depression care outcomes.

Unützer, J et al. **Pharmacotherapy of pain in depressed older adults.** *Journal of the American Geriatric Society*. 2004;52:1916-22.

This article examines pharmacotherapy for pain in a large sample of depressed older primary care patients. The study used cross-sectional survey data collected during the IMPACT trial, a randomized controlled study of collaborative depression care in eighteen primary care clinics belonging to eight healthcare organizations in five states. The majority of depressed older adults seen in primary care also have a history of chronic pain and functional impairment from pain. Seventy-nine percent of the 1801 IMPACT Trial participants reported a functional impairment from pain the previous month. More than half of the sample reported a diagnosis of or treatment for chronic pain in the previous 3 years. Nearly half of patients experiencing functional impairment from pain do not report using analgesics to treat their pain. Predictors of analgesic use include history of chronic pain or arthritis and the degree of functional impairment from pain in the previous month. Organizations varied substantially in their use of analgesics. There is significant room for improvement in the quality of pain management for depressed older adults.

Thompson A, et al: **One extra month of depression: results of caregiving data from the IMPACT trial.** *International Journal of Geriatric Psychiatry.* 2008 May; 23(5):511-6.

This article examines the results of analyzing data from the IMPACT trial's large cohort of depressed elderly patients to reveal the possibility of self-reported caregiver burden and how that caregiving burden affectsdepression treatment outcomes. From the extensive work addressing the mental and physical difficulties otherwise healthy caregivers may have, it seems possible that a caregiving burden could be a major issue in the mental and physical health of elderly patients suffering from depression. Over 24 months, study participants reporting any caregiving burden had over 30 more days with depression than participants reporting no caregiving burden. Collaborative care did not mitigate the caregiving burden effect on depression outcomes. Caregiving is common in older adults, with 10% of cohabitating elderly depressed patients providing help with basic activities, e.g. dressing, and 20% providing care other care, e.g. taking medication. Future depression interventions should specifically address caregiving activities in treating depression.

Noël PH, et al. **Depression and comorbid illness in elderly primary care patients: impact on multiple domains of health status and well-being.** *Annals of Family Medicine.* 2004 Nov-Dec; 2(6):555-62.

This article examines the relative association of depression severity and chronicity, other comorbid psychiatric conditions, and coexisting medical illnesses with multiple domains of health status among primary care patients with clinical depression. Cross-sectional data collected by a baseline survey as part of the IMPACT clinical trial examining the effectiveness of collaborative care for depression in a total of 1801 patients 60 years or older across 8 health organizations. The baseline survey included sociodemographic characteristics, depression severity and chronicity, neuroticism, and the presence of 11 common chronic medical illnesses, and screening questions for panic disorder and posttraumatic stress disorder. The survey also included measure of 4 general health indicators (physical and mental component scales of the SF-12, Sheehan Disability Index, and global quality of life). After controlling for sociodemographic differences, other psychological dysfunction, and the presence of 11 chronic medical conditions, depression severity was significantly associated with all 4 indicators of general health. Study participants had an average of 3.8 chronic medical illnesses. Depression severity made larger independent contributions to 3 of the 4 general health indicators (mental functional status, disability, and quality of life) than the medical comorbidities.

Hinton L, et al. **Gender disparities in the treatment of late-life depression: qualitative and quantitative findings from the IMPACT trial.** *American Journal of Geriatric Psychiatry.* 2006; 14:10.

This paper examines gender differences in recruitment, depression presentation, and depression treatment history among patients enrolled in the IMPACT trial. IMPACT trial data was quantitatively analyzed in order to reveal gender differences. Data from qualitative interviews with key informants from the IMPACT trial (referring physicians, depression care managers, and study recruiters) was analyzed thematically to develop hypotheses explaining the observed gender differences. Compared with older women, older men were significantly less likely to receive a referral to IMPACT, to endorse core depressive symptoms, and to have received prior depression treatment. The qualitative themes identified as important contributors to gender disparities included: 1) how men experience and express their depression, 2) traditional masculine values, and 3) the stigma of chronic mental illness.

Unützer J, et al. **Depression treatment in a sample of 1,801 depressed older adults in primary care.** *Journal of the American Geriatric Society.* 2003; 51:505-514.

This article describes the results from analyzing cross sectional survey data from IMPACT, a randomized controlled trial, with the objective of examining rates and predictors of lifetime and recent depression treatment in a large sample of older adults. Data was collected from 1801 adults aged 60 and older with major depression or dysthymia being seen in 18 primary care clinics across 8 organizations in 5 states. The majority of subjects were women and white. Twenty-three percent of the sample came from ethnic minority groups, including the largest groups: African American (12%) and Latino (8%). Most patients reported depressive symptoms for 2 or more years, two or more prior depressive episodes, and most reported some lifetime depression treatment. About half of subjects reported depression treatment in the last 3 months, but less than a third of subjects had reported any potentially effective and recent depression treatment. Significant improvements are needed in the care of depressed older adults seen in primary care. Particular care should be taken to improve access to depression care for older men, African-Americans, Latinos, and those patients who prefer treatments other than medication.

Pigeon WR, et al. **Is insomnia a perpetuating factor for late-life depression in the IMPACT cohort?** *SLEEP.* 2008; 31(4):481-488.

This article examines insomnia as a factor influencing the effectiveness of collaborative care for late-life depression in the IMPACT study. Overall, patients with persistent insomnia were 1.8 to 3.5 times more likely to remain depressed, compared with patients with no insomnia. These findings suggest that, in addition to being a risk factor for a depressive episode, persistent insomnia may serve to perpetuate the illness in some elderly patients and especially in those assigned to usual care for depression in primary care settings. Patients with persistent insomnia who were assigned to IMPACT depression care were more likely to respond to depression treatment than their counterparts assigned to usual care, suggesting that IMPACT care may help mitigate the negative effects that persistent insomnia has on response to depression treatment.

Levine S, et al. **Physician satisfaction with a collaborative disease management proxgram for late-life depression in primary care.** *General Hospital Psychiatry.* 2005; 27:383-391.

This article describes 450 primary care providers' satisfaction with depression care and clinical outcomes before and 12 months after implementation of IMPACT collaborative care. As a multisite, randomized controlled trial, IMPACT introduced depression care managers into 18 primary care clinics across 5 states and 8 health care organizations to provide patient education about depression, facilitate antidepressant medication management with the prescribing primary care providers, employ behavioral activation, and offer a brief psychotherapy, Problem-solving Therapy in Primary Care (PST-PC). Before implementing IMPACT, 54% of participating physicians were satisfied with depression care resources. After implementing IMPACT, more than 90% reported the intervention as helpful in treating depression patients, and 82% felt that the intervention improved patients' clinical outcomes. A substantial need for improving depression treatment in primary care was reported. Proactive patient follow-up and education were identified by physicians as the most helpful components of the IMPACT model. Participating physicians were very satisfied with IMPACT care and felt that similar care management models would be helpful in treating other chronic medical illnesses.

Fraser SA, et al. **Low yield of thyroid-stimulating hormone testing in elderly patients with depression.** *General Hospital Psychiatry.* 2004 Jul-Aug; 26(4):302-9.

This article reports the results of a study that examined a subgroup totaling 883 older adults 60 years and older from 18 primary care sites enrolled in the intervention arm of the IMPACT trial. Thyroid-stimulating hormone (TSH) levels were available for 82% of the sample. The majority of participants had mildly elevated TSH levels. Patients with elevated TSH did not differ from those with low TSH levels in the severity or pattern of their depression symptoms. Physicians should exercise caution against accepting borderline TSH results as the primary cause of patient's depressive disorder.

Saur C, et al. **Satisfaction and outcomes of depressed older adults with psychiatric clinical nurse specialists in primary care.** *Journal of the American Psychiatric Nurses Association.* 2007; 13(1):62-70.

This article describes patient perception of and satisfaction with depression care provided by psychiatric clinical nurse specialists (PCNS). A total of 105 adults 60 years of age and older with major depression and/or dysthymia receiving treatment for depression in a primary care setting by a PCNS were surveyed after12-months of depression intervention. A majority of patients preferred the primary care physician's office for mental health care, perceived PCNS care as excellent, were highly satisfied with the relationship with the PCNS, and would seek future treatment with the PCNS. Satisfaction with care was associated with improved symptoms. Patients experienced improved clinical outcomes measured by improved PHQ-9 scores. Clinical improvement was associated with willingness to copay. In conclusion, PCNS services were received well by patients in the primary care setting.

Katon W, et al. **Depressive symptom deterioration in a large primary care-based elderly cohort.** *American Journal of Geriatric Psychiatry.* Mar 2006; 14:246-254.

This article examines the frequency of a return of depression symptoms among patients who have responded to treatment and the factors that may influence a return of symptoms. A subgroup totaling 901 elderly IMPACT trial participants who had improved to the point of no longer meeting criteria for major depression were examined. This subgroup was observed for 12 additional months after the conclusion of the IMPACT trial, a randomized trial that compared collaborative depression care utilizing a depression care manager with care as usual. Study results showed that residual depression symptoms and higher severity of initial depression were associated with increased risk of depression recurrence in the usual care participants but not the intervention participants of the IMPACT trial.

Gum A, et al. **Depression treatment preferences in older primary care patients.** *The Gerontologist.* 2006; 46(1):14-22.

This article describes older patients' preference for counseling as a treatment for depression. Data was analyzed from 1,602 IMPACT trial participants aged 60 years and older who specified a depression treatment preference. The multisite, randomized controlled trial, Project IMPACT, utilized depression care managers in the primary care setting who offered brief psychotherapy, Problem-solving Therapy in Primary Care (PST-PC), and antidepressant medication management. Study results showed that more older adults with depression prefer counseling to medication. Treatment preference was predicted by previous treatment experience, gender, and diagnosis of major depression. Previous experience with a treatment type was the strongest predictor of preference. In addition, men and patients diagnosed with major depressions (vs. dysthymia) were more likely to prefer medication. The IMPACT care model significantly improved access to patients' preferred treatment, particularly counseling. Unavailability of preferred treatment did not predict satisfaction or depression outcomes; these outcomes were most strongly affected by whether participants were treated in the collaborative care or care as usual group.

Areán P, et al. **Service use and outcomes among elderly persons with low incomes being treated for depression.** *Psychiatric Services.* 2007 Aug; 58(8):1057-64.

This article examines the effects of a collaborative, integrated approach to depression treatment on participation and effectiveness among low income older adults. A subgroup of 315 depressed adults 60 years and older from the IMPACT multisite, randomized controlled trial were divided into groups by income level relative to area median income (AMI). A comparison between lower-, middle-, and higher-income patient response to collaborative care versus usual care suggests that lower-income older adults can experience benefits from collaborative management of depression in primary care similar to middle- and higher-income older adults. Results after 12 months showed that, compared to depressed patients receiving care as usual, patients of all income levels receiving collaborative care experienced significantly greater rates of depression care, greater satisfaction, less depression severity, and less health-related functional impairment. Depressed patients with low-income levels can experience similar improvements with collaborative care as adults with higher incomes.

Goldstein, et al. **Hormone therapy does not affect depression severity in older women.** *American Journal of Geriatric Psychiatry.* 2005; 13:17.

This article examines hormone therapy (HT) and depression symptom severity. Baseline data from 1160 women aged 60 years and older from the multisite, randomized controlled IMPACT trial was analyzed. About 45% of the sample was taking HT. Women who were using HT were more likely to be younger, White, married, to have had some college education, to report good or better health, and to have taken antidepressant medications in the previous 3 months. Women with college educations who were taking HT had lower depression scores than women taking HT with less education. Women with college educations not taking HT had higher depression scores than women not taking HT without college educations. In conclusion, after adjusting the analysis, hormone therapy use or non-use was not associated with depression symptom severity.

Areán PA, et al. **Treating depression in older medical patients with psychotherapy.** *Journal of Clinical Geropsychology.* 2001; 7(2):93-104.

Three ongoing research projects, San Francisco General Hospital Depression in Late Life Study, IMPACT, and the NIMH PROSPECT study illustrate the effectiveness of psychotherapy as a depression treatment alternative in the primary care setting. Integration is feasible, and psychotherapy can be an accessible and acceptable treatment for older adults by training staff already found in the primary care clinic, further adapting the interventions for the primary populations served, and offering the treatment in the setting where older adults already seek care.

Areán P, et al. **The effectiveness of problem solving therapy for older primarycare patients with depression: results from the IMPACT project.** *Gerontologist* 2008;48(3):311-23.

This paper compares Problem-Solving Treatment in Primary Care (PST-PC) with community-based psychotherapy in treating late-life major depression and dysthymia in patients who participated in the original IMPACT trial. Older adults who received PST-PC had more depression-free days at both 12 and 24 months than those who received community-based psychotherapy. They also had fewer depressive symptoms and better functioning at 12 months (no difference observed at 24 months) than those who received community-based psychotherapy.

Sha MC, et al. **Physical symptoms as a predictor of health care use and mortality among older adults.** *American Journal of Medicine.* 2005; 118(3): 301-306.

This article describes the patterns of physical symptoms in older adults and examines the validity of symptoms in predicting hospitalization and mortality. Adults aged 60 years and older (N=3498) completed screening for self-reported symptoms at routine primary care visits. Clinical characteristics, hospitalization, and mortality in the year following screening were measured using data taken from a comprehensive electronic medical record. A majority (51%) of respondents characterized their health as fair or poor. The most commonly reported symptoms were musculoskeletal pain (65%), fatigue (55%), back pain (45%), shortness of breath (41%), and difficulty sleeping (38%). A summary score of physical symptoms (range 0-12) was a significant independent predictor of future hospitalization and death even when controlling for clinical characteristics, chronic medical conditions, self-rated health, and affective symptoms. Physical symptoms are highly prevalent in older primary care patients and predict hospitalization and mortality at one year.

Vannoy S, et al. **The relationship between suicide ideation and late-life depression**. *American Journal of Geriatric Psychiatry.* 2007; 15:1024-1033.

This article reports the results of a secondary analysis of the IMPACT data designed to describe the course of suicide ideation (SI) in primary-care based late-life depression treatment, identify predictors of SI, characterize the dynamic relationship between depression and SI, and test the hypothesis that collaborative care decreases the likelihood of reporting SI by decreasing the severity of depressive symptoms. The analysis used data from the 1,801 IMPACT participants; specifically, the Hopkins Symptoms Checklist (HSCL-20) as a measure of depression, and one item from the HSCL-20 as a measure of SI. The analysis found that the prevalence of SI was 14%, and the cumulative incidence of SI over 24 months was 21%. The likelihood that SI emerged after baseline was highly dependent on change in depression. As hypothesized, the effect of collaborative care on SI was mediated by the treatment's effect on depression. In conclusion, SI was not uncommon in depressed older adults being treated in primary care, and the likelihood that depressed older adults reported SI was strongly determined by the course of their depression symptoms.

Voils CI, et al. **Identifying depressed older adults in primary care: a secondary analysis of a multisite randomized controlled trial.** *Primary Care Companion to the Journal of Clinical Psychiatry* 2008;10(1):9-14.

The authors conducted a secondary analysis on data from 898 participants aged 60 years and older with major depressive disorder and/or dysthymic disorder who participated in the IMPACT study, to determine whether a subset of depressive symptoms could be identified to facilitate diagnosis of depression in older adults in primary care. Using linear regression, the authors identified three depression symptoms (psychomotor changes, fatigue, suicidal ideation) that were highly specific for major depressive order in older adults. However, these symptoms proved too insensitive for accurate diagnosis of depression, and the authors recommended use of a full assessment of DSM-IV depression criteria for accurate diagnosis.

Hirsch JK, et al. **Chronic medical problems and distressful thoughts of suicide in primary care patients: mitigating role of happiness.** *International Journal of Geriatric Psychiatry*. 2009;24(7):671-9.

This article discusses a secondary analysis of the IMPACT data designed to test the hypothesis that happiness attenuates the association between number of self-reported chronic diseases and suicidal distress. The 1,801 depressed, primary care patients, 60 years of age or older, participating in the IMPACT trial were assessed for the presence of positive emotion, suicidal distress, and self-reported chronic medical problems. The results showed that chronic medical problems were associated with suicide ideation and, as hypothesized, happiness attenuated the relationship between self-reported diseases and suicidal distress. The presence of positive emotions decreased the risk for distressing thoughts of suicide in the context of medical illness.

Fann JR, et al. **Improving primary care for older adults with cancer and depression.** *Journal of General Internal Medicine.* 2009;24(2):417-24.

The authors evaluated the effectiveness of the IMPACT program for treating depression in the 215 IMPACT study participants who had a cancer diagnosis in the year prior or the year following randomization. The analysis compared changes in depressive symptoms between patients randomized to the IMPACT intervention (N=112) and patients randomized to usual care (N=103). At 6 and 12 months, 55 % and 39% of the intervention patients had a 50% or greater reduction in depressive symptoms from baseline, compared to 34% and 20% of usual care patients. Intervention patients also had greater remission rates, more depression-free days, less functional impairment, and greater quality of life. The authors conclude that the IMPACT program appears to be feasible and effective for depression among older cancer patients in primary care settings.

Katon W, et al. **Major depression: the importance of clinical characteristics and treatment response to prognosis.** *Depression and Anxiety.* 2010; 27(1): 19-26.

This secondary analysis used data from the intervention arm of the IMPACT study to determine whether increasing severity levels of depression at baseline were linked to other factors associated with poor depression outcomes; and whether patients with increasing levels of depressive severity had more intervention visits and treatment trials, but were less likely to reach remission. The analysis showed that patients with higher levels of depression severity received significantly more intervention visits, more months of antidepressant treatment and more antidepressant trials, but had fewer depression-free days during and post-intervention. In addition, these patients were more likely to have other clinical variables previously linked to lack of remission, such as double depression, anxiety, medical comorbidity, high neuroticism levels, and chronic pain.

Van Leeuwen Williams E, et al. **Collaborative depression care for the old-old: findings from the IMPACT trial.** *American Journal of Geriatric Psychiatry.* 2009;17(12):1040-9.

This article is based on the results of a secondary analysis of the baseline and follow-up data for the 906 patients in the intervention arm of the IMPACT study. The analysis compared process of care and clinical outcomes of young-old patients (age 60 to 74; N=606) and old-old patients (age 75+; N=300). The process of care variables (type of treatment and level of care) and clinician outcomes (change in SCL-20 score) at 3-months did not significantly differ between young-old and old-old patients. However, young-old patients were significantly more likely than old-old patients to show response to treatment at 6-, 12-, 18- and 24-month follow-ups.

Vannoy SD, et al. **Advantages of using estimated depression-free days for evaluating treatment efficacy**. *Psychiatric Services*. 2010; 61:160-3.

This study compared traditional measures of treatment used in depression research with the construct of estimated depression-free days (DFDs), using data from the IMPACT study. The Patient Health Questionnaire (PHQ-9) and the Hopkins Symptom Checklist (HSCL-20) were used as outcome measures at four assessment points. Outcomes were computed for relative change, standardized differences, the proportion of improvement in depression, and DFDs. The study concluded that the DFD is a valid measure for estimating treatment outcomes that reflects the course of symptom change over time and should be considered for reporting outcomes in depression research.

Apesoa-Varano EC, et al. **Clinician approaches and strategies for engaging older men in depression care.** *American Journal of Geriatric Psychiatry.* 2010;18:586-95.

This article explores primary care physicians' (PCPs) and depression care managers' (DCMs) approaches to diagnosing and treating depression in older male patients, using qualitative interviews that were part of the IMPACT trial. Nine PCPs and 11 DCMs took part in these interviews. The authors identified three general approaches PCPs and DCMs use to discuss depression with older men (indirect, gradual and direct approaches) and several specific strategies clinicians use for managing depression in older male patients. The most prominent strategy used by clinicians was enlisting family involvement.

Chan D, et al. **Long-term effectiveness of collaborative depression care in older primary care patients with and without PTSD symptoms.** *International Journal of Geriatric Psychiatry.* 2010 Dec 9; Epub ahead of print.

The authors analyzed data from the IMPACT trial to compare outcomes between older depressed patients with and without comorbid post-traumatic stress disorder (PTSD). Patients with PTSD had higher depression severity at baseline than patients without PTSD symptoms. Over 2 years, intervention patients with PTSD symptoms had relatively the same benefits from IMPACT care as patients without PTSD. The authors conclude that collaborative care (compared to usual care) produced similar improvements in depression severity in both patients with and without PTSD symptoms.

Bao Y, et al. **Designing payment for collaborative depression care management in primary care.** *Health Services Research Journal.* In press.

The objective of this article was to design a bundled case rate for Collaborative Care for Depression (CCD) that aligns payment incentives with evidence-based depression care in primary care. The authors conducted an empirical investigation of factors accounting for variation in CCD resource use over time and across patients, using data from the clinical information system used by all IMPACT study care managers. The authors found that CCD resource use varied substantially with patient's time in the program, with monthly resource use declining sharply in the first 6 months regardless of treatment response, then remaining stable after 6 months. These findings point towards episode payment adjusted by number of months patient has received CCD and a monthly payment adjusted by the ordinal month.

Post-Study Implementation

Grypma L, et al. **Taking an evidence-based model of depression care from research to practice: making lemonade out of depression.** *General Hospital Psychiatry.* 2006; 28:101-107.

This article illustrates the results of a study that implemented an adapted version of the IMPACT model in a real world setting at a large HMO. At Kaiser Permanente of Southern California, investigators extended the IMPACT care model to all adult primary care patients with depression and compared results from nearly 300 participants in this program with findings from the usual care and intervention participants in the IMPACT trial. Modifications included an optional group education class about depression, variable duration and frequency of the intervention (according to self-determined patient need) and a medical assistant to help expand the depression care manager's caseload by providing help with tracking patients. Despite about half as many contacts, depressed primary care patients who participated in IMPACT care had similar rates of depression improvement. Patients treated for depression with the IMPACT model also had lower total health care costs than those in usual care.

Bachman J, et al. **Funding mechanisms for depression care management: opportunities and challenges.** *General Hospital Psychiatry.* 2006; 28: 278-288.

This article explores mechanisms to fund collaborative depression care. There is strong evidence that depression care management works well for patients and is a cost effective treatment. However, inconsistent third-party reimbursement for depression care management is a significant economic barrier to utilization and sustainability in primary care settings. The authors discussed barriers to funding with project directors implementing collaborative care and from extensive literature searches. Seven under-utilized and not widely publicized funding mechanisms are described. While substantial obstacles remain in the way of fully implementing these depression care funding mechanisms, several recent policy advancements provide some optimism for the potential adoption of financial mechanisms to support and disseminate these evidence-based practices.

Blasinsky M, et al. **Project IMPACT: A Report on Barriers and Facilitators to Sustainability.** *Administration and Policy in Mental Health and Mental Health Research.* 2006; 33(6):718-729.

The author's used qualitative research methods to determine the barriers and facilitators to sustaining the IMPACT program in a primary care setting, including: 1) review of grant proposals, 2) site visits to each study site post-study completion, and 3) telephone interviews with key informants. The authors found strong evidence in support of the program's sustainability, but great variation across sites in terms of strategies and for continuation and operationalization. The success of the IMPACT intervention (both in terms of outcome data and "real world" experience of treating patients) was the most important factor in sustaining the IMPACT program after completion of the study.

Gilmer, TP, et al**. Improving treatment of depression among Latinos with diabetes using Project Dulce and IMPACT.** *Diabetes Care.* 2008 Jul; 31(7):1324-6.

This article discusses the feasibility and cost of integrating IMPACT depression care management with Project Dulce diabetes care management in primary care settings that treat predominantly low-income, Latino patients. Thirty-three percent of diabetic patients in a low-income, predominantly Spanish speaking Latino community clinic population had symptoms of major depression. When IMPACT was combined with diabetes care management for these patients. Depression symptoms were significantly reduced (an average of 7.5 points on the PHQ-9). The pilot intervention was successful in reducing depressive symptoms at a reasonable cost in 3 primarily low-income Latino clinics suggesting that integrative care models, such as the IMPACT-Project Dulce model explored here, can be effective with diverse patient populations.

Dwight-Johnson M, et al. **Can collaborative care address the needs of low-income Latinas with comorbid depression and cancer? Results from a randomized pilot study.** *Psychosomatics.* 2005; 46:224-232.

In this pilot study, 55 low-income, female, Latina patients from public sector oncology clinics, with breast or cervical cancer and comorbid depression were recruited into the Multifaceted Oncology Depression Program. Patients were randomly assigned to receive either collaborative care or usual care. Patients in the collaborative care study arm were more likely to show ≥ 50% improvement in depressive symptoms and improvement in emotional well-being.

Ell K, et al. **Randomized controlled trial of collaborative care management of depression among low-income patients with cancer.** *Journal of Clinical Oncology* 2008;26(27):4488-4496.

This article describes outcomes of a study that adapted IMPACT for use in public sector oncology clinics. The study included 472 low-income, predominantly female, Hispanic patients with cancer age 18 and over with major depression, dysthymia or both. Patients were randomly assigned to receive the intervention program for up to 12 months or enhanced usual care. At 12 months, patients assigned to the intervention had greater reductions in depressive symptoms, greater rates of depression treatment and significantly better quality-of-life, including social/family, emotional, functional and physical well-being.

Katon WJ, et al. **The Pathways Study: A randomized trial of collaborative care in patients with diabetes and depression.** *Archives of General Psychiatry.* 2004; 61:1042-1049.

Depression has been shown to be associated with poor self-management (adherence to diet, exercise, checking blood glucose levels) and high hemoglobin A_{1c} (HbA_{1c}) levels in patients with diabetes. This study randomized 329 patients with diabetes mellitus and comorbid major depression and/or dysthymia. Patients were randomly assigned to the Pathways case management intervention or usual care. The intervention provided enhanced education and support of antidepressant medication treatment prescribed by the primary care physician or problem solving therapy delivered in primary care. When compared with usual care patients, intervention patients showed greater improvement in adequacy of dosage of antidepressant medication treatment in the first 6-month period. The Pathways collaborative care model improved depression care and outcomes in patients with comorbid major depression and/or dysthymia and diabetes mellitus, but improved depression care alone did not result in improved glycemic control.

Unützer J, et al. **Care management for depression and osteoarthritis pain in older primary care patients: a pilot study.** *International Journal of Geriatric Psychiatry*.2008; 23:1166-71.

This article describes a pilot program to evaluate the efficacy of a care management program to address both the physical and emotional pain associated with late-life depression and osteoarthritis. Participants were patients 60 years or older with depression and osteoarthritis pain. The intervention entailed a nurse administered care management program supporting depression and arthritis treatment by primary care physicians. Depression, pain severity and functional impairment from pain were assessed at baseline and 6 months. Between baseline and 6 months, depression scores, pain intensity scores, and pain interference scores all dropped. Patients experienced improvements in self-efficacy, in satisfaction with depression care, and in timed walk and transfer tests. The combined intervention was feasible and well received by patients. Preliminary outcomes are promising and comparisons to an earlier trial of care management for depression alone suggest that the combined program may be equally effective for depression but more effective for pain.

Unützer J, et al. **From establishing an evidenced-based practice to implementation in real-world settings: IMPACT as a case study.** *Psychiatric Clinics of North America.* 2005; 28: 1079-1092.

This article presents the IMPACT model as a case study in moving from the development of an evidence-based model of care for late-life depression to the implementation of the model in diverse health care settings. Four steps in this implementation process are discussed: 1) research regarding the clinical epidemiology of late-life depression, 2) the development of a feasible, evidence-based intervention strategy, 3) the evaluation of the effectiveness and cost-effectiveness of the intervention in diverse settings, and 4) moving from research to practice.

Richardson L, et al. **Collaborative care for adolescent depression: a pilot study.** *General Hospital Psychiatry*. 2009; 3: 36-45.

This article describes the outcomes of a pilot study to assess the feasibility and acceptability of an adapted version of the IMPACT model for treating adolescent depression. Of the 40 youth enrolled, 87% completed the intervention. At the 6-month follow-up, 74% had a 50% or more reduction in depressive symptoms as measured by the PHQ-9. The study assessed satisfaction with care through a Likert-scale questionnaire, an open-ended question about study experiences, and qualitative exit interviews. Both parents and youth expressed a high degree of satisfaction with the intervention.

Korsen N, et al. **Translating evidence to practice: two stories from the field.** *Journal of Clinical Psychology in Medical Settings.* 2009; 16:47–57

This case study describes two programs focused on improving care for adults with depression. One of the programs described is the Institute for Clinical Systems Improvement (ICSI) DIAMOND project, which is based on the IMPACT model. The article includes discussion of the DIAMOND program and lessons about translating evidence to practice that may be helpful to other organizations.

Ell K, et al. **Collaborative care management of major depression among low-income, predominantly Hispanics with diabetes: a randomized controlled trial.** *Diabetes Care*. 2010; 4: 706.

This article presents a study that randomized 387 diabetes patients (96.5% of which were Hispanic) with clinically significant depression and followed them over 18 months. The intervention included Problem-Solving Therapy and/or antidepressant medication based on a stepped care algorithm; first-line treatment choice, telephone treatment response / adherence / and relapse prevention follow-up over 12 months; plus systems navigation assistance. Enhanced usual care (EUC) included standard clinic care plus patient receipt of depression educational pamphlets and community resource list. Intervention patients had significantly greater depression improvement compared to EUC patients. Socioculturally adapted collaborative depression care improved depression, functional outcomes and receipt of depression treatment in predominantly Hispanic patients in safety net clinics.

Davidson KW, et al. **Enhanced depression care for acute coronary syndrome patients with persistent depressive symptoms. Coronary Psychosocial Evaluation Studies (COPES) Randomized Controlled Trial.** *Archives of Internal Medicine*. 2010 Apr; 170(7): 600-8.

Depressive symptoms are a predictor of mortality and major adverse cardiac events (MACE) in patients with acute coronary syndrome (ACS). The Coronary Psychosocial Evaluation Studies (COPES) was conducted to determine the acceptability and efficacy of enhanced depression care for patients with ACS. The researchers enrolled 237 ACS patients with persistent depression from five hospitals. Patients were randomized to receive either an adaptation of the IMPACT model for ACS patients or usual care. Outcome measures included patient satisfaction with depression care, changes in depressive symptoms on the Beck Depression Inventory, and MACE or death. Patients receiving the adapted IMPACT model had greater satisfaction, greater reduction in depressive symptoms, and were less likely to suffer a major adverse cardiac event.

Ell K, et al. **Collaborative depression treatment in older and younger adults with physical illness: pooled comparative analysis of three randomized clinical trials.** *American Journal of Geriatric Psychiatry*. 2010 Jun; 18(6):520-30.

This study conducted intent-to-treat analyses on pooled data from three randomized controlled trials that tested collaborative care (N=1,081participants). Patients had major depressive symptoms and cancer, diabetes, or other comorbid illnesses. The three trials had similar intervention protocols, which were delivered in oncology, primary care safety net clinics, and diverse home healthcare programs. The meta-analysis looked at the following measures at baseline, 6 and 12 months: PHQ-9, Short-Form Health Survey-12/20 quality of life, self-reported hospitalization, ER and intensive care unit utilization, and antidepressant, psychotherapy treatment receipt. The analysis found no significant differences in depression and quality of life for physical function outcomes between older (≥ 60) and younger (18-59) patients. The study concluded that collaborative depression care for individuals with comorbid illness is equally effective in reducing depression in older and younger patients, including among low-income, minority patients.

Solberg LI, et al. **Partnership research: a practical trial design for evaluation of a natural experiment to improve depression care**. *Medical Care*. 2010 Jul; 48(7).

The objective of this article is to describe an implementation study of The Depression Improvement Across Minnesota: Offering a New Direction (DIAMOND) program. The article gives a detailed description of the DIAMOND project and the study design for the evaluation, and reports on participant recruitment. The paper also discusses how the study was developed in an ongoing partnership with the initiative leaders from 7 health plans, 85 clinics, and a regional quality improvement collaborative, with the goal of evaluating the implementation and its impacts on patients and other stakeholders. The authors conclude with a list of factors contributing to the success of the study and a list of challenges they encountered thus far.

Smith M, et al. **Depression training for nurses: evaluation of an innovative program.** *Research in Gerontological Nursing.* 2010; 3(3):162-75.

This article discusses the results of an evaluation of a CD-based depression training program for nurses. The training uses principles of IMPACT collaborative care, and includes workplace exercise and case-based learning to change daily care practices. The relevance and application of depression assessment, treatment, care planning, communication, and referral methods were addressed using a mixed-methods evaluation that accompanied the dissemination of 513 training packets statewide. Evaluations were returned by 250 participants. Results indicate the training program may positively influence nursing practice and collaboration with interdisciplinary providers.

Katon W, et al. **Collaborative care for patients with depression and chronic illnesses**. *New England Journal of Medicine.* 2010 Dec; 363:2611-2620.

Researchers conducted a single-blind, randomized, controlled trial in 14 primary care clinics, involving 214 patients. Enrolled patients had poorly controlled diabetes, coronary heart disease, or both, and coexisting depression. Patients assigned to the intervention group received guideline-based, collaborative care management from a supervised nurse, working with the patient's primary care provider, with the goal of controlling risk factors associating with multiple diseases. The primary outcome was based on simultaneous modeling of glycated hemoglobin, LDL cholesterol, and systolic blood-pressure levels and SCL-20 depression outcomes at 12 months. As compared with patients in the usual care group, patients in the intervention group had greater overall 12-month improvement across outcome variables, and had a better quality of life and satisfaction with care.

The IMPACT Treatment Program

The clinical components of the IMPACT program are summarized in two treatment manuals, an educational brochure for patients and significant others, and an educational videotape that are available from the IMPACT Implementation Center:

- Unützer J, et al. Project IMPACT Intervention Manual: Improving care for depression in late life. UCLA NPI Center for Health Services Research. 1999.
- Oishi S, et al. Making an IMPACT on Late Life Depression: Working with your Health Care Team. UCLA NPI Center for Health Services Research. 1999.
- Harpole L, et al. Making an IMPACT: Improving care for late life depression. (video) Duke University Media Group, Durham, NC. 1999.
- Hegel M, et al. Problem-Solving Treatment for Primary Care: A Treatment Manual for Project IMPACT. Dartmouth University. 2003.

Oishi SM, et al. **IMPACTing late life depression: integrating a depression intervention into primary care.** *Psychiatric Quarterly.* 2003; 74:75-89.

This article reviews the themes resulting from two focus groups and interviews with Depression Clinical Specialists (DCSs) from the IMPACT trial regarding their experiences integrating collaborative depression care into the primary care setting. Focus groups and semi-structured interviews conducted with the DCSs conveyed that the basic components of Project IMPACT supported integration into primary care clinics. Key treatment model components described by the DCSs as supporting successful patient care included psychiatrist supervision, team meetings, computerized patient tracking, and outcomes assessment tools.

Hegel M, et al. **Role of allied behavioral health professionals in a collaborative stepped care treatment model for depression in primary care: Project IMPACT.** *Families, Systems, & Health.* 2002; 20:265-277.

This article describes specifically the role of the behavioral health professional (e.g. psychologist or psychiatric nurse) as a Depression Clinical Specialist (DCS) in the IMPACT collaborative care treatment model for depression. The behavioral health professional training program is described, and two case studies are presented to illustrate the IMPACT intervention in practice. The article reviews issues in implementing the model, including reimbursement challenges.

Harpole L, et al. **Implementing a disease management system for depression in primary care: a random work sampling study.** *General Hospital Psychiatry.* 2003; 25:238-245.

This article describes the details of the daily work activities of Depression Clinical Specialists (DCSs) at seven national sites of the IMPACT clinical trial as recorded by the DCSs when they were cued to record their activities by random-reminder beepers. A total of 4030 work activities over 147 consecutive workdays were recorded by the 13 DCSs. Nearly half of the DCSs' workdays (49.4%) were spent directly engaged in patient care activity. DCSs spent almost half of their days alone (48.7%) and spent very little time with research-related staff or other health care providers in the clinics. The second greatest portions of their workdays, nearly 38%, were spent with patients. DCSs oftentimes administered patient care over the telephone (19.2% of direct patient care was by telephone).

Saur CD, et al. **Treating depression in primary care: an innovative role for mental health nurses**. *Journal of the American Psychiatric Nurses Association.* 2002; 8:159-167.

This article conveys that registered nurses trained as depression clinical specialists (also known as care managers) are ideally suited to provide depression treatment in a collaborative-care model in primary care settings, such as IMPACT. As is illustrated by three case studies, the IMPACT model can be tailored to the specific treatment needs of individuals.

Haverkamp R, et al. **Problem-solving Treatment for Complicated depression in late life: a case study in primary care.** *Perspectives in Psychiatric Care.* 2004; 40(2):45-52.

This case study details the use of Problem-Solving Treatment for Primary Care (PST-PC) in conjunction with antidepressant medication to treat a complicated course of depression in a 60-year old woman.

Vannoy S, et al. **Making an IMPACT on late-life depression.** *Current Psychiatry*. 2006; 5(9): 85-92.

This article summarizes the IMPACT treatment program and post-study implementation.

IMPACT Research Methods

Unützer J, et al. **Improving primary care for depression in late life: the design of a multi-center randomized trial.** *Medical Care.* 2001; 39:785-799.

This article describes the design methods of the multi-center randomized IMPACT trial. The IMPACT clinical trial involved 1,801 older adults with major depression and/or dysthymia who were recruited from 18 participating primary care clinics affiliated with 7 health care organizations in 5 states to participate in this study of depression treatment in primary care. Subjects were randomly assigned either to a collaborative-care program for late-life depression (IMPACT) or to usual care for 12 months. All participants were monitored by independent assessments over a 24-month period.

Callahan CM, et al. **Six-item screener to identify cognitive impairment among potential subjects for clinical research.** *Medical Care.* 2002; 40(9):771-781.

This article describes the brief (6-item) screening measure used by the IMPACT trial to identify subjects with cognitive impairment. The 6-item screening measure was derived from the Mini Mental State Examination (MMSE). The study described in this article tested the 6-item screener in two cohorts of black older adults. The first cohort of 344 participants was drawn from a random sample of community-dwelling older adults in Indianapolis. From Indiana Alzheimer Disease Center subject referrals, 651 black older adults participated. The mean age of the sample was 74 years and consisted of nearly 60% women with a mean of 10 years of education. In the sample, the prevalence of dementia was 4.3%, and the prevalence of cognitive impairment was 24.6%. This screener was found to be comparable to the mini-mental state examination, reliable, easy to score, and can be administered either in person or by telephone.

Löwe B, et al. **Monitoring depression treatment outcomes with the Patient Health Questionnare-9.** *Medical Care.* 2004 Dec; 42(12):1194-1201.

This article describes a study that evaluated change of PHQ-9 scores in comparison with SCL-20 scores and independent structured diagnostic interviews for depression during a 6-month period within a large subgroup of 434 participants of the IMPACT cohort. The change scores of both the PHQ-9 and SCL-20 accurately identified patients with persistent major depression, partial remission, and full remission. In conclusion, the PHQ-9 is a valid and reliable measure of depression treatment outcomes in depressed older adults.

Perkins AJ, et al. **Common comorbidity scales were similar in their ability to predict health care costs and mortality.** *Journal of Clinical Epidemiology.* 2004; 57:1040-8.

This article compares the ability of commonly used measures of medical comorbidity to predict mortality and health care costs over one year. These common measures included ambulatory care groups [ACGs], Charlson comorbidity index, chronic disease score, number of prescribed medications, and number of chronic diseases. In an outpatient setting, a basic count of medications may be the most efficient measure of medical comorbidity for predicting utilization and costs of health care over the ensuing year. Diagnostic measures have been shown to have greater predictive validity for 1-year mortality. Current comorbidity measures showed poor to moderate predictive validity for health-care costs or patient mortality over one year.

Unützer J, et al. **A web-based data management system to improve care for depression in a multi-center clinical trial.** *Psychiatric Services.* 2002; 53:671-678.

This article describes the web-based clinical information system developed for the IMPACT trial that effectively supported the implementation of the IMPACT collaborative care program across diverse study sites and health care organizations. The IMPACT clinical information system successfully supported study-related tasks, as it provides real-time monitoring of activities entered into the system, such as recruitment activities. On-site data entry prevents duplicate entries. Immediate availability of data to the coordinating center allows for immediate backup or analysis of the data. The secure web-based system allows enrollment totals, contact info, and assessments to be available to researchers/providers regardless of geographic locations. These capabilities are beneficial both in the clinical and research settings. An additional clinical application of the system is its capability for recording patient treatment plans.

Tang L, et al. **A comparison of imputation methods in a longitudinal randomized clinical trial.** *Statistics in Medicine.* 2005; 35:13-24.

This article describes two alternative methods of handling multivariate incomplete data for the multi-site IMPACT trial. In longitudinal clinical trials, such as IMPACT, item non-response, unit non-response and drop-out are common problems. A hot-deck multiple imputation strategy was superior to alternate methods of handling missing data in the IMPACT trial, a longitudinal randomized control trial. The first approach is a combination of hot-deck multiple imputation using a predictive mean matching method for item non-response and the approximate Bayesian bootstrap for unit non-response. The second method compared in this study was based on a multivariate normal (MVN) model using PROC MI in SAS software V8.2. The hot-deck multiple imputation strategy was superior to alternate methods of handling missing data in a simulation of the IMPACT trial data.

Background

Callahan CM. **Quality improvement research on late life depression in primary care.** *Medical Care.* 2001; 39(8):772-84.

This article describes a qualitative literature review of health services research on quality improvement for late life depression in primary care. Thirty years of outcomes research in health services suggests several important points. Usual care of major depression in the primary care setting typically results in poor outcomes, particularly for older adults. Improvement of depression outcomes for older adults necessitates adequate informational support for primary care physicians. Nearly one-third of older patients may fail to respond even to excellent guideline-level therapy in the primary care setting. To achieve guideline-level therapy the patient must be informed and participatory and working in with health care team and system designed to care for chronic conditions. Although many older adult patients do not seek or fail to receive treatment for depression, they are likely to be seen in primary care for treatment of other medical conditions. Efforts that focus on improvement of care systems and facilitate active patient participation in treatment offer the best opportunities to improve outcomes for depressed older adults.

Unützer J, et al**. Transforming mental health care at the interface with general medicine: report for the President's New Freedom Commission for Mental Health.** *Psychiatric Services*. 2006; 57(1): 37-47.

This article is based on a report commissioned by the Subcommittee on Mental Health Interface With General Medicine of the President's New Freedom Commission of Mental Health, which recommends integrated, collaborative models of care such as IMPACT to help bridge gaps in care at the interface of mental health care and general medicine. Collaboration between mental health care and general medicine is needed to improve health care. Many barriers exist impeding this collaboration. Effective care is inhibited by the separation of medical and mental health systems. Illnesses often go undetected or improperly diagnosed. Recommendations to improve care based on the IMPACT model of depression care are: 1) Educating providers and consumers, 2) improving detection, diagnosis, and monitoring of mental illness, 3) valid performance criteria for care, 4) care management protocols to match treatment intensity to clinical outcomes, 5) depression care specialists in the primary care setting that provide mental health support to the general medical provider, and 6) funding mechanisms for evidence-based models of care.

Katon WJ, et al. **Increased medical costs of a population-based sample of depressed elderly patients.** *Archives of General Psychiatry.* 2003 Sep; 60(9):897-903.

This article explores increases in medical costs associated with depression. A total of 11679 patients from two clinics of a large health maintenance organization in Seattle, Washington received the PRIME-MD 2-item depression screen by mail. The number of successfully enrolled participants reached 8894 patients in addition to 107 patients referred to the study by their primary care physicians. Patients with positive findings on the depression screener or who were referred by their physician were offered a Structured Clinic Interview for the DSM-IV. Total cost of medical services 6 months prior to the study were obtained from the health maintenance organization. After adjusting for chronic medical illness, total ambulatory costs were 43% to 52% higher or $763 to $979 more in depressed patients than nondepressed elderly patients. Total ambulatory and inpatient costs were 47% to 51% higher or $1045 to $1700 more in depressed elderly patients when compared with nondepressed patients. Depression is associated with significant increases in health care costs in older primary care patients, even when figures are adjusted for chronic medical illness.

Unützer, J. **Late-Life Depression.** *New England Journal of Medicine.* 2007; 357:2269-76.

A case vignette highlighting late-life depression, its diagnosis and treatment in a widowed 71-year-old man with suicidal thoughts. Late-life depression that is untreated can last for years and is associated with a poor quality of life, difficulty with social and physical functioning, poor adherence to treatment, worsening of chronic medical problems and increased morbidity and mortality from suicide and other causes. Older men have the highest rates of completed suicide (with the use of firearms in most cases). Recognizing and treating depression (with antidepressant medication and/or psychotherapy), and reducing access to firearms may be the most important things primary care providers can do to reduce the risk of suicide.

Unützer J, et al. **Health care costs associated with depression in medically ill fee-for-service Medicare participants.** *Journal of the American Geriatrics Society.* 2009; 57:506-510.

This article examines the association between depression and healthcare costs in medically ill fee-for-service (FFS) Medicare recipients, using observational analysis of Medicare claims data on 14,902 participants with diabetes mellitus, congestive heart failure (CHF) or both. The study compared healthcare costs (based on Medicare claims) over the 12-month period prior to MHS enrollment between participants with: 1. Claims diagnosis of depression *(n = 2,108);* 2. Possible depression based on two-item PHQ or self reported anti-depressant use *(n = 1,081);* 3. No depression (*n = 11,*713). Gamma regression models were used to adjust for demographic and clinical differences and nonnormal distribution of cost data. Participants with depression had significantly higher total healthcare costs that those without. Even after adjusting for demographic and other clinical differences, significantly higher costs were observed in participants with depression in every cost category except specialty mental health care, which accounted for less than 1% of total healthcare costs, and participants with depression had higher costs in each quartile of increasing medical severity.

Quick Terms*

Association/associated: A measure of whether and how closely certain values (numbers, amounts) in a research study go up or down at the same time. An association does not indicate that one value *causes* the other to go up or down at the same time.

Cohort: A group of people who are followed over time.

Comorbid: Having more than one illness at the same time; for example, the same person might have both depression and diabetes.

Correlation: A measure ranging from 0.00 to 1.00 that shows how well two or more things change together. Both things may get higher at the same time, or lower at the same time, or one may get higher while the other gets lower. For example, saving money and spending money are correlated (inversely), because the more money you save, the less you spend.

Cost-effectiveness: A measure of the relationship between program costs and effectiveness of the program in achieving the desired outcome, e.g. reduction in symptoms of depression.

Cross-sectional: A study that measures subjects at only one point in time, creating a "snapshot" of that particular time point.

Dysthymia: A chronic form of depression characterized by moods that are consistently low but not as extreme as in other types of depression, like Major Depression. The main symptom of dysthymia is low, dark, or sad mood nearly every day for at least 2 years. Other symptoms can include: poor appetite or overeating, insomnia or sleeping too much, low energy, low self-esteem, poor concentration and/or feelings of hopelessness.

Functional impairment: Reduced ability to perform routine activities that are part of daily life.

Ideation: Thoughts or ideas

Intervention: In a research study like IMPACT the intervention is the new program being tested.

Longitudinal: A research study design that follows the same group of people over time to show how time affects the thing being studied.

PST: Problem-Solving Treatment (see below)

PST-PC: Problem-Solving Treatment in Primary Care, which is a brief (6-8 session), evidence-based counseling intervention designed for use in primary care settings by healthcare providers with little or no prior mental health training that has been adapted for use in a wide variety of settings, including specialty mental health.

Qualitative: Research using what people say or write in words, rather than numbers or numbered answers.

Quantitative: Studies of information that people give in numbers or in a way that can be numbered.

Randomized controlled trial: A study design that entails randomly assigning research participants to receive one or more interventions or to serve as a comparison group.

Secondary analysis: Refers to data that was collected for another study. For original study it is primary data and primary analysis of that date.

Usual care: The care that is normally available in a primary care clinic, including referral to specialty mental health care of utilization of co-located mental health professionals.

*** Some definitions adapted from: *Dressed-Down Research Terms: A Glossary for Non-Researchers* written and published by the Program in Consumer Studies and Training at the Missouri Institute of Mental Health in St. Louis, Missouri, http://www.cstprogram.org/PCS&T/Research%20Glossary/Dressed_Down_Glossary.pdf.**