

# Does Sharing Care Across the Primary–Specialty Interface Improve Outcomes in Chronic Disease? A Systematic Review

Susan M. Smith, MD; Shane Allwright, PhD; and Tom O’Dowd, MD

Shared care has been defined as the joint participation of primary and specialty care practitioners in “the planned delivery of care for patients with a chronic condition, informed by an enhanced information exchange, over and above routine discharge and referral notices.”<sup>1</sup> It has been promoted for the management of many chronic conditions,<sup>1</sup> with the assumption that it will deliver better care than either primary or specialty care alone. At times, there also has been an assumption that shared care will allow more efficient use of limited specialist resources. Shared care, also referred to as integrated care, frequently includes an interface worker, prespecified clinical protocols, referral guidelines, continuing education of participating clinicians, specifically designed information exchange systems, and ongoing audit and evaluation of services delivered. Theoretically, shared care presents an opportunity to provide patients with the benefits of specialist intervention combined with continuity of care and management of comorbidity from generalists who are responsible for all aspects of the patient’s healthcare beyond the specified chronic disease. Starfield described a “strong imperative” for a shared model of relationship between primary care and specialty care physicians in the management of common chronic conditions.<sup>2</sup> However, little is known about the nature of the primary care–specialty care interface,<sup>2</sup> and there is a need to identify evidence that will guide healthcare planning and provide a framework for improved chronic disease management.

We carried out a systematic review to determine the effectiveness of shared care interventions for the management of chronic disease across the primary–specialty care interface.

## METHODS

The protocol was peer-reviewed and published in the Cochrane library.<sup>3</sup> Eligible studies included randomized controlled trials (RCTs), controlled clinical trials, controlled before-and-after studies, and interrupted time-series analyses.

Participants were people or populations who had a specified chronic disease and who had been enrolled in a defined shared care service provided by primary and specialty care practitioners.

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**Objective:** To determine the effectiveness of shared care interventions designed to improve the management of chronic disease across the primary–specialty care interface.

**Study Design and Methods:** Systematic review using the Cochrane Collaboration method.

**Results:** Twenty studies were identified, 19 of which were randomized controlled trials. The majority of studies examined complex interventions and were of short duration. Results were mixed, with no consistent improvements in physical or mental health outcomes, psychosocial outcomes, hospital admissions, default or participation rates, recording of risk factors, and satisfaction with treatment. However, there were improvements in prescribing in the studies that considered this outcome. The methodologic quality of studies varied, with only a minority of studies of high-quality design. Cost data were limited and difficult to interpret across studies.

**Conclusions:** At present, there is insufficient evidence to support the introduction of shared care services into clinical practice. However, methodologic shortcomings, particularly inadequate length of follow-up, may account for this lack of evidence. Further research is needed to test models of collaboration across the primary–specialty care divide both in terms of effectiveness and sustainability over longer periods of time.

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**For author information and disclosures, see end of text.**

Primary care was defined as “integrated, easy to access, health-care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained and continuous relationship with patients, and practicing in the context of family and community.”<sup>4</sup> Specialty care was defined as care delivered in hospital settings such as outpatient clinics and emergency departments or in community settings where care was delivered based on a certain physiologic system or clinical condition, or based principally on the age of patients.

Shared care interventions were defined as any type of structured system that involved continuing collaborative clinical care between primary and specialty care practitioners in the management of patients with chronic diseases. These interventions were classified as “simple” if they used a single intervention and “multifaceted” if they incorporated more than 1 feature. We excluded interventions with no specified chronic disease management component (eg, interventions to improve care of elderly patients based solely on age).

Outcomes included any objective measure of physical and mental health, well-being and functional impairment, hospital admissions, medication prescribing and adherence, treatment satisfaction, service utilization, risk factor recording, provider behavior, and measures of efficiency and cost. Attitude and knowledge outcomes were excluded.

### Search Strategy

The search strategy was based on the Cochrane Effective Practice and Organisation of Care Group (EPOC) search strategy ([www.epoc.cochrane.org](http://www.epoc.cochrane.org)) and used a combination of methodologic and subject terms relating to shared care, chronic disease, primary care, structured care, secondary care, and collaboration, combined with the methodology terms. The [Appendix](#) (available at [www.ajmc.com](http://www.ajmc.com)) provides full search details. There were no language or age restrictions.

The titles and/or abstracts of potentially relevant studies were screened. Full-text copies of articles identified as potentially relevant were retrieved and independently assessed for inclusion. Disagreements about eligibility were resolved by consensus between reviewers. If necessary, authors were contacted to clarify the nature of the intervention.

### Data Extraction and Analysis

Two reviewers undertook data extraction independently using a modified version of the EPOC data collection checklist. The quality of all included studies was assessed by 2 independent reviewers using standard EPOC quality criteria ([www.epoc.cochrane.org](http://www.epoc.cochrane.org)).

Primary analyses were based on the principal outcome measure as defined by the study authors. We carried out meta-analysis where we considered it to be appropriate in relation to study characteristics and available data.

## RESULTS

The search strategy identified 4968 titles/abstracts, of which 20 met the inclusion criteria for the review ([Figure 1](#)).<sup>5-24</sup> The broad search strategy resulted in a majority of the studies being ineligible based on objectives, study design, or content. Where there was a possibility that the study might be eligible ( $n = 80$ ), 2 reviewers independently checked the full paper to determine eligibility and the authors were approached if clarification was needed (we e-mailed 7 authors, and 6 replied with further details of their intervention).

Although the search strategy was designed to identify a range of study types, 19 of the 20 included studies were RCTs, and 1 was a controlled before-and-after study.<sup>21</sup> The studies varied from 3 months to 2 years in duration, with the majority lasting 1 year. They included nearly 9000 participants with 8 groups of chronic conditions—including depression (6 studies); diabetes mellitus (4 studies); asthma/chronic obstructive pulmonary disease (COPD) (2 studies); chronic mental illness (2 studies); congestive cardiac failure; hypertension; cancer; and opiate misuse—as well as a group of patients with a variety of chronic conditions requiring long-term oral anticoagulation therapy (1 study each). The studies were carried out in a variety of healthcare settings in the United Kingdom, the United States, Australia, New Zealand, Denmark, Ireland, and Sweden. The intervention descriptions and the outcomes studies are presented in the [Table](#).

The intervention groups generally were compared with a group of control patients receiving “usual care.” This usual care was provided in primary care settings,<sup>10,13,14,18,19,22-24</sup> specialty care settings,<sup>5,9,11,16</sup> and mixed or unspecified settings.<sup>6-8,12,15,17,20</sup>

### Shared Care Interventions

All but 1 study<sup>20</sup> examined complex interventions involving combinations of prior agreement to care roles within each sector, clinical and referral guidelines, defined patient reviews in each sector, education and training for patients and professionals (principally for primary care professionals and workers at the primary–specialty care interface), and synchronized patient records and recall systems. The shared care interventions were driven by the specialist sector in 9 of the included studies.<sup>6-8,10-12,15,16,20</sup> These studies had relatively limited analysis of activity in primary care. The remaining 11 studies

involved a clearer collaboration between both sectors, with more complete analysis of activity in both sectors.<sup>5,9,13,14,17-19,21-24</sup> Six of the studies had a clearly identified professional (usually a nurse specialist) outside of the study team whose role included the coordination of shared care.<sup>6,11,13,17-19</sup> Other studies reported that the service was coordinated by members of the specialist team or study team.<sup>7,8,10,12,14,15,22,23</sup> Three studies reported shared care interventions that were largely computer based.<sup>5,9,16</sup>

**Methodological Quality of Included Studies**

Of the 19 RCTs, only 3 met all the quality criteria.<sup>8,10,17</sup> Six more studies met all quality criteria except protection against contamination, as they failed to take account of possible cluster effects.<sup>12-14,18,19,23</sup> The method of randomization was unclear in 2 studies, with the Diabetes Integrated Care Evaluation (DICE) study describing a pragmatic randomization approach<sup>5</sup> and the Llewellyn-Jones et al study using a controversial sequential randomization with baseline data collection not done concurrently.<sup>15</sup> Only 4 studies included data on follow-up of providers.<sup>6,7,16,22</sup> In 2 of the studies, primary care providers were unaware that they were participating in an intervention study.<sup>11,15</sup>

Nine of the included RCTs had a cluster design.<sup>5-8,10,16-19,22</sup> Only 3 of those studies clearly incorporated clustering effects in both their power calculation and analysis.<sup>8,17,22</sup> An additional 2 studies had explicitly incorporated clustering in their analysis but not in their power calculations.<sup>18,20</sup> The 1 controlled before-and-after study included in the review met EPOC quality criteria, although failed to account for a potential clustering effect at the general practice level and only reported preliminary data on process outcomes.<sup>21</sup>

**Physical Health Outcomes**

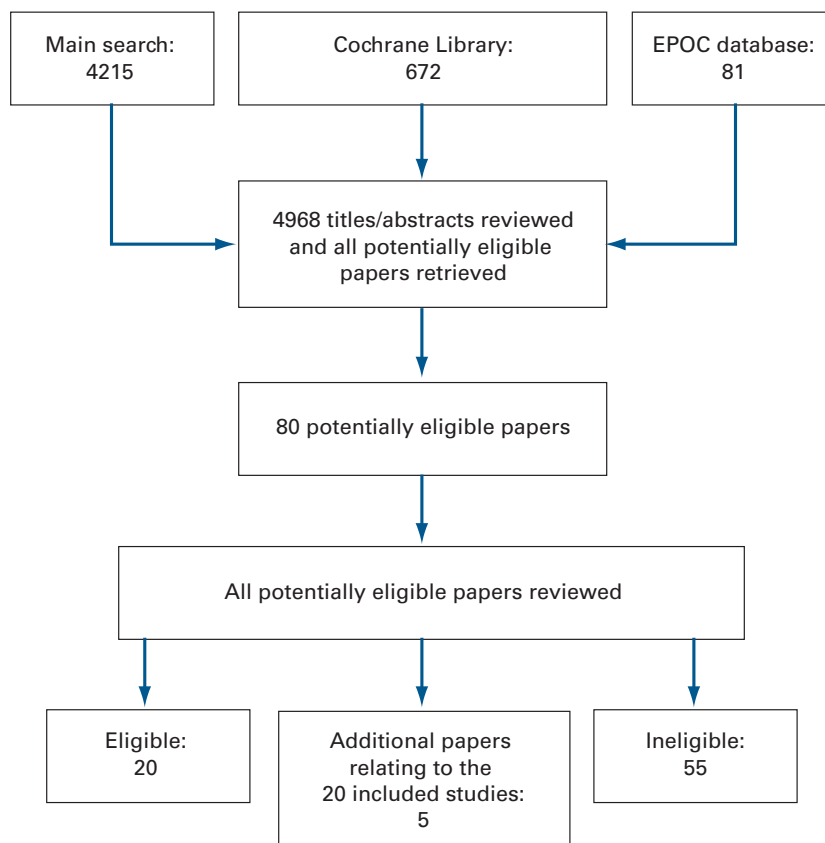
Seven studies (all RCTs) presented data comparing physical outcomes of the intervention group with those of the control group at study completion.<sup>3,5,9,11,16,17,24</sup> These studies included patients with diabetes, hypertension, asthma, and

COPD. Shared care was not associated with any statistically significant benefits in physical health outcomes, except in 1 study that found a significant improvement in 1 of the physical health measures (forced expiratory volume in 1 second) in patients with moderate to severe COPD.<sup>24</sup>

**Mental Health Outcomes**

Eight studies presented data on mental health outcomes. Six of these studies examined shared care for various forms of depression.<sup>13-15,18,19,23</sup> Results were mixed, although the majority found improvements in the proportions who recovered or maintained remission from depression. However, meta-analysis of the proportions recovered from depression revealed no significant benefit for shared care (Figure 2). Results also were mixed in the 6 studies examining changes in mean depression scores, with 3 of the 6 studies indicating significant benefit for shared care. Meta-analysis of mean depression scores was not possible because of missing data. Two studies that targeted chronic mental illness found no significant benefit for shared care.<sup>20,22</sup>

■ **Figure 1.** Flow Chart of Search Process and Results



EPOC indicates Cochrane Effective Practice and Organisation of Care Group.

■ REVIEW ARTICLE ■

■ **Table.** Characteristics of Included Studies

Study (Country)	Participants	Intervention	Outcomes
Byng et al 2004 <sup>22</sup> (UK)	335 patients with long-term mental illness	Mental Health Link intervention comprising assessment of local need; development of shared care agreement and referral protocols; shared care toolkit (database, register, recall system, and audit system); aligned caseload link worker with multidisciplinary clinical review meetings	Patient satisfaction and perception of unmet need; general and mental health status  Process of care  GP satisfaction and attitude  Direct costs to healthcare system
Dey et al 2002 <sup>6</sup> (UK)	167 opiate misusers	Liaison worker  Primary care training  Primary care-based reviews	Participation in shared care (defined by number and nature of visits to CDT, communication between sectors, care plans, division of responsibilities, and written evidence of a shared care agreement)
Diabetes Integrated Care Evaluation Team 1994 <sup>5</sup> (UK)	274 patients with diabetes	Primary care guidelines and structured reviews  Computerized recall system and synchronized records  Annual specialist review	Health outcomes: metabolic control (A1C, BP, BMI, creatinine); Diabetes Knowledge scores; beliefs about control of diabetes; Diabetes Clinic Satisfaction scores; disruption of normal activities  Process: numbers of consultations and admissions; frequency of metabolic monitoring  Direct costs to patients and health-care system
Donohue et al 2000 <sup>7</sup> (UK)	1939 patients with diabetes	Primary care-based annual foot review  Regular practice visits by specialist foot care team  Clinical and referral guidelines  Education for patients and professionals	Patients' attitudes to foot care and their knowledge of foot care  Professionals' knowledge of foot care problems  Appropriateness of referral to specialist foot clinic and community chiropodist (judged by independent academic chiropodist)  Direct costs of the intervention
Doughty et al 2002 <sup>8</sup> (NZ)	197 patients with heart failure	Structured alternating clinical reviews in each sector  GP education  Patient education from study nurse	Health outcomes: time to first event (combined death or hospital readmission); Minnesota Living with Heart Failure scores  All-cause readmissions; heart failure readmissions; all-cause bed days  Process: prescribing of medication (ACE inhibitors)

(Continued)

## Effect of Sharing Care on Outcomes

■ **Table.** Characteristics of Included Studies (*Continued*)

Study (Country)	Participants	Intervention	Outcomes
Drummond et al 1994 <sup>9</sup> (UK)	712 patients with asthma	Primary care guidelines and structured reviews  Computerized recall system and synchronized records  Annual specialist review	Health outcomes: sleep disturbance; restrictions of normal activities; psychological aspects such as perceived control and anxiety component of HAD scale; satisfaction with care  Peak flow rates and FEV <sub>1</sub> rates  Process: use of inhaled bronchodilators, inhaled steroids, and oral steroids; GP visits for asthma; hospital admissions for asthma  Direct costs to healthcare service and patients
Holm et al 2002 <sup>10</sup> (Denmark)	343 patients on long-term OAT for chronic disease	GP education  GP routine monitoring of OAT  Telephone hotline for GPs  Annual evaluation of all patients with feedback to GPs	Health outcomes: median time spent within therapeutic interval of INR (optimal OAT control)  Major and minor hemorrhage; recurrent thrombosis; deaths
Hoskins et al 1999 <sup>11</sup> (Australia)	206 patients with diabetes	Liaison nurse coordinating care, including GP reminders  Primary care structured reviews  Annual specialist review	Health outcomes: metabolic control (A1C, BP, weight)  Process: attendance rates; data collection rates  Relative direct costs
Johansson et al 2001 <sup>12</sup> (Sweden)	416 patients with cancer	Intensified primary care management  Extended information routine between sectors  Home care nurse education	Health outcomes: weight loss and HAD scores  Process: utilization of specialist care within 3 months (number of admissions, days of hospitalization, and number of outpatient visits)
Katon et al 1999 <sup>14</sup> (USA)	229 patients with persistent depression	Joint treatment by specialist and PCP  Specialist monitoring of medication adherence with prompts to primary care if necessary  Patient education	Health outcomes: SCL-20 depression scores and proportion "recovered"; treatment satisfaction; medication adherence; Sheehan Disability score; social functioning and role limitation components of SF-36 score  Process: PCP visits; psychiatrist visits (intervention group only), proportion seen by nonstudy mental health professional  Costs: incremental cost-effectiveness of the intervention per additional depression-free day

*(Continued)*

■ REVIEW ARTICLE ■

■ **Table.** Characteristics of Included Studies (*Continued*)

Study (Country)	Participants	Intervention	Outcomes
Katon et al 2001 <sup>13</sup> (USA)	386 patients recovered from recurrent major depression, or dysthymia relapse prevention	Depression nurse specialists formally liaising with PCPs  Patient education and personalized relapse prevention plans  Telephone monitoring  Medication adherence monitoring plus alerts to primary care if necessary	Health outcomes: SCL-20 depression score; odds of a major episode of depression during follow-up  Process: follow-up rates; antidepressant medication refills and adequacy of antidepressant dosage  Costs: incremental cost-effectiveness analysis
Katon et al 2004 <sup>23</sup> (USA)	329 patients with diabetes and comorbid major depression and/or dysthymia	Individualized stepped care treatment provided by depression nurse specialist and PCP  <i>Step 1:</i> antidepressant medication or problem-solving treatment (12 weeks)  <i>Step 2:</i> if depression persisted, switch treatment or refer to psychiatrist  <i>Step 3:</i> referral to specialty mental health system	Health outcomes: SCL-90 depression score; Patient Global Impression score; satisfaction with treatment; A1C  Process: adherence and adequate dosage of antidepressant medication; number of specialty visits
Llewellyn-Jones et al 1999 <sup>15</sup> (Australia)	220 patients with depression in residential home	GP and career education focusing on improved detection  Psychosocial support and activity programs  Depression care with monthly multidisciplinary liaison meetings	Health outcomes: Geriatric Depression scale; movement within groups to being "less depressed"  Process: mean daily dose of antidepressant; number of depressogenic drugs
McGhee et al 1994 <sup>16</sup> (UK)	554 patients with hypertension ("well controlled")	Clinical care protocols in each sector  Computer-generated annual reports and feedback to GPs  Laboratory screening for abnormal results sent to specialist  Patient-held summary card	Acceptability to patients and GPs (only recorded in shared care group)  BP control  Process: proportion of patients with complete review in second year; drop-out rates  Costs: cost per complete review in year 2 to patients and health service
Rea et al 2004 <sup>24</sup>	135 patients with moderate to severe COPD	Initial assessment by specialist physician and nurse, then GP and practice nurse in chronic disease management program with patient-specific action plans and education, annual influenza vaccination, and pulmonary rehabilitation program; 1 home visit from the nurse specialist and further contact triggered by admission	Health outcomes: hospital admissions (days per patient per year)  Smoking; attendance at pulmonary rehabilitation; physical functioning (spirometry and shuttle walk test); SF-36 score and Chronic Respiratory Questionnaire score  Process: COPD medications prescribed in primary care

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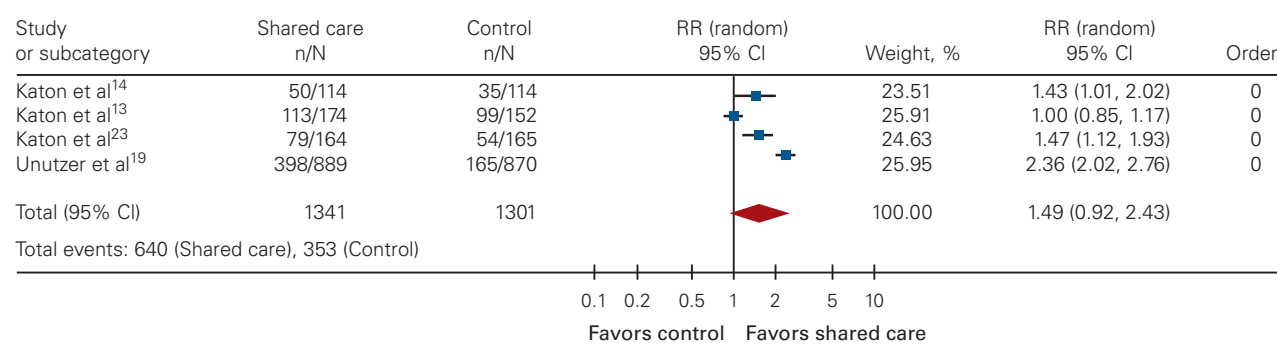
## Effect of Sharing Care on Outcomes

■ **Table.** Characteristics of Included Studies (*Continued*)

Study (Country)	Participants	Intervention	Outcomes
Smith et al 2004 <sup>17</sup> (Ireland)	183 patients with diabetes	Liaison nurse specialist  Agreed-on protocols and referral criteria  Three monthly GP reviews and annual specialist review  GP and practice nurse education  Structured record card transferred between sectors	Health outcomes: A1C; BP; cholesterol; BMI; Diabetes Well-Being scores; Diabetes Clinic Satisfaction scores; smoking status  Information exchange between sectors (shared care group only); default from care (patient report)  Process: measures of diabetes care delivery, including recording of risk factors and number of specialist and GP visits  Costs: direct costs
Swindle et al 2003 <sup>18</sup> (USA)	268 patients with depression (screen detected)	Clinical nurse specialist liaising with PCP and creating individual treatment plans, specialist support  Education for PCPs  Administrative support for appointment reminders	Health outcomes: Beck Depression Inventory score; satisfaction with treatment  Process: recording of diagnosis of depression; change in antidepressant medication; referral to mental health specialists  Health service utilization (including all clinic visits, pharmacy visits, and laboratory tests)  Costs: total direct healthcare costs
Unutzer et al 2002 <sup>19</sup> (USA)	1801 patients with depression ("late life," screen detected)	Patient education  Clinical nurse specialist liaising with PCP and creating individual treatment plans, specialist support  Weekly meetings of all	Health outcomes: SCL-20 depression score; proportion with major depression and proportion with remission of depressive symptoms in relation to baseline scores; Quality of Life scores; satisfaction with antidepressant care; functional impairment  Process: antidepressant use, intervention implementation  Costs: direct mean healthcare costs of the intervention
Warner et al 2000 <sup>20</sup> (UK)	90 patients with long-term mental illness	Shared care record card (patient held)	Health outcomes: BASIS-32; Brief Psychiatric Rating Scale; Client Satisfaction Questionnaire  Process: hospital admissions; OPD attendances; default rates
Wood and Anderson 1995, <sup>21*</sup> (New Zealand)	118 patients with chronic mental illness	Multidisciplinary case management team attached to each general practice  Key workers for individual patients  Monthly meetings for all	Process: comparison of inpatient admission days and time to first readmission 2 years before and 2 years after case management

\*All studies were randomized controlled trials except that of Wood and Anderson, which was a controlled before-and-after trial. GP indicates general practitioner; CDT, Community Drug Team; A1C, glycosylated hemoglobin; BP, blood pressure; BMI, body mass index; ACE, angiotensin-converting enzyme; HAD, Hospital Anxiety and Depression; FEV<sub>1</sub>, forced expiratory volume in 1 second; OAT, oral anticoagulation therapy; INR, international normalized ratio; PCP, primary care physician; SCL-20, Symptom Checklist-20 items; SF-36; Short Form 36; SCL-90, Symptom Checklist-90 items; COPD, chronic obstructive pulmonary disease; BASIS-32, The Behaviour and Symptoms Identification Scale; OPD, outpatient department.

■ **Figure 2. Mental Health Outcomes: Recovery From Depression\***



\*Test for heterogeneity: chi-square = 64.24, *df* = 3 (*P* < .00001), *I*<sup>2</sup> statistic = 95.3%. Test for overall effect: *z* = 1.61 (*P* = .11). RR indicates relative risk; CI, confidence interval.

### Psychosocial Outcomes

Of 5 studies that reported measures relating to quality of life and well-being,<sup>5,8,17,19,22</sup> 3 reported significant benefit for shared care. Four studies presented measures relating to functional impairment and disability, and 2 found a significant benefit for shared care in relation to functional impairment.<sup>9,14,19,24</sup> Byng et al also reported psychosocial measures analyzing the patients' perceptions of met and unmet need, but found no significant difference between the groups for these measures.<sup>22</sup>

### Hospital Admissions

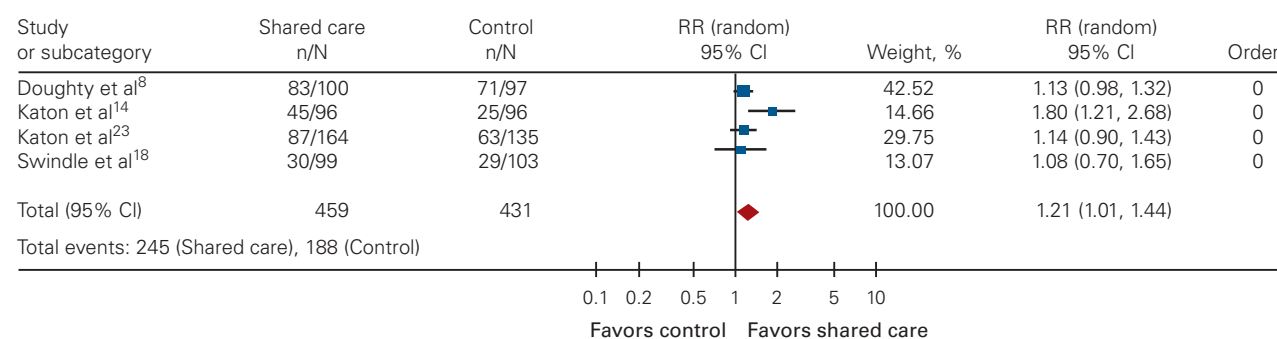
Seven studies examined the effect of shared care on hospital admissions, 6 RCTs<sup>5,8,9,12,20,24</sup> and 1 controlled before-and-after study.<sup>21</sup> They found mixed results consistent with shared care being associated with a reduction in hospital admissions in older patients and in those with higher levels of baseline morbidity. Reporting on the controlled before-and-after trial,

Wood and Anderson found a significant reduction in the proportion of intervention-group patients with chronic mental illness who were readmitted in the 2 years after the introduction of shared care and a significantly lower median number of inpatient days.<sup>21</sup>

### Medication Prescribing and Adherence

Eight studies reported outcomes relating to appropriate prescribing. Five of these studies looked at proportions of patients receiving appropriate medication or appropriate doses of medication for their condition and reported mixed results.<sup>8,10,14,18,23</sup> Meta-analysis was carried out for the 4 studies with available data and indicated benefit for shared care (Figure 3). Holm et al reported a statistically significant benefit for patients on oral anticoagulation therapy who received shared care; these patients spent a higher percentage of time within the therapeutic interval for the international normalized ratio, a measure of anticoagulation control.<sup>10</sup> Five studies

■ **Figure 3. Process Outcomes: Appropriate Medication\***



\*Test for heterogeneity: chi-square = 5.13, *df* = 3 (*P* < .16), *I*<sup>2</sup> statistic = 41.5%. Test for overall effect: *z* = 2.10 (*P* = .04). RR indicates relative risk; CI, confidence interval.

## Effect of Sharing Care on Outcomes

considered various measures of medication adherence and use.<sup>13,14,17,19,23</sup> Meta-analysis of these studies indicated benefit for shared care (Figure 4).

### Additional Outcomes

Six studies reported measures relating to participation in or defaulting from services,<sup>5,6,11,16,17,20</sup> and 4 of these indicated significantly improved participation rates for patients receiving shared care. Other outcomes relating to treatment satisfaction, service utilization, recording of risk factors, and provider outcomes were mixed and difficult to interpret. Studies used different measures of patient satisfaction (proportion satisfied vs treatment satisfaction scores) that were difficult to compare, and even within categories, results were mixed. For example, patients in the shared care group in the DICE study were recruited from the specialist sector; as a result of being randomized to receive shared care, they had less contact with their specialists, which they were unhappy about.<sup>5</sup> In the other studies with patient satisfaction as an outcome, satisfaction was increased in patients participating in shared care. Data relating to service utilization were difficult to interpret, as it was sometimes unclear what would constitute an improvement. In some cases, provider visits were expected to change in different directions depending on whether the aim was to reduce the number of healthcare contacts within either sector in an effort to shift care between sectors, or whether the intervention was intended to reduce overall contact by using planned disease-related visits more effectively.

### Costs

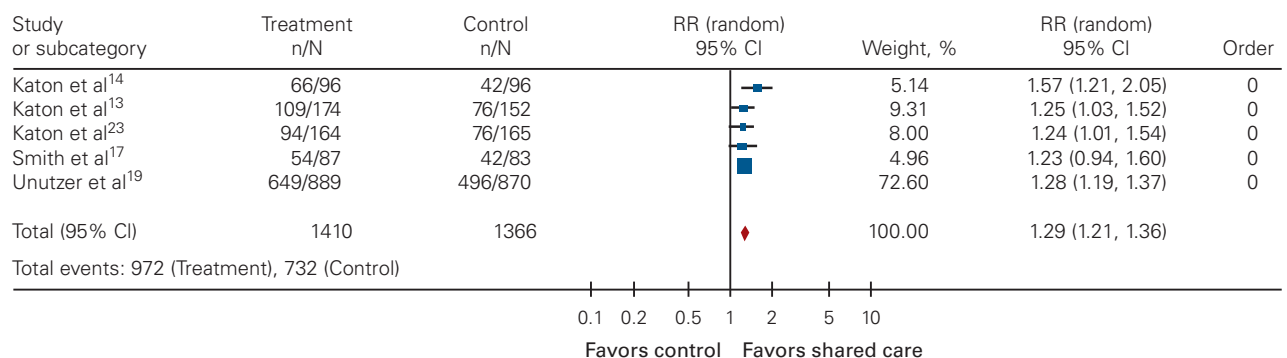
Eleven studies reported cost data, although only 3 of these reported economic analyses linking costs to outcomes.<sup>13,14,19</sup> Results were mixed, and comparison between studies was dif-

ficult as costs were reported in different currencies at different time points, with the majority not stating the year of pricing. There also was a variation in costs allocated to each sector depending on how health systems are organized in each country.

## DISCUSSION

This review identified 20 studies examining shared care across the primary–specialty care interface in chronic disease management. The majority examined complex, multifaceted interventions for a variety of common chronic diseases, with diabetes and depression predominating. Shared care was primarily introduced to improve patient care through a variety of mechanisms. Hoskins et al state that a purpose of their intervention (a shared care service for diabetes) was to relieve pressure on specialist services and contain costs.<sup>11</sup> However, it is possible that increasing activity in primary care will create further demands for specialist services; as quality of care improves, more cases and complications might be picked up. Only 3 studies were largely computer supported, which is surprising given the investment in and development of information technology in healthcare systems in industrialized countries. Only 1 study involved a parallel qualitative exploration of patients’ experience of the introduction of the new service.<sup>25</sup> In general, there was minimal consideration of provider outcomes or satisfaction with services and very limited consumer involvement in designing or introducing shared care services. Further limitations of the review relate to the specific definition of shared care that was adopted, which focused on collaboration between primary and specialty care physicians. Collaborative care involving other disciplines was excluded, but may represent an alternate and

■ **Figure 4. Process Outcomes: Medication Use\***



\*Test for heterogeneity: chi-square = 2.51, *df* = 4 (*P* < .64), *I*<sup>2</sup> statistic = 0%. Test for overall effect: *z* = 8.24 (*P* = .00001). RR indicates relative risk; CI, confidence interval.

### Take-away Points

- Clinicians and planners may presume that shared or integrated care will improve outcomes for chronic disease; however, further research is needed to test models of collaboration.
- This review found insufficient evidence to support the introduction of shared care services into clinical practice.
- As the majority of the 20 reviewed studies were of suboptimal quality and none lasted longer than 2 years, questions remain regarding the effectiveness of interventions to improve care across the primary–specialty care divide.

potentially more effective way to improve outcomes for chronic disease.

### Effectiveness of Shared Care

This review indicates that consistent evidence for the effectiveness of shared care is lacking for the majority of outcomes studied. A few studies suggested that shared care may be more effective in certain patient groups, such as those with depression and other serious chronic mental health illness, those with high levels of morbidity at baseline such as the elderly, and those with moderate to severe congestive cardiac failure or COPD. However, these results were not consistent across all studies. The clearest evidence of benefit was for improved prescribing. Greater activity in relation to medication prescribing should have an important effect on outcomes in most chronic diseases. However, improvements in prescribing may take some time to improve physical health outcomes; and given the relatively short study durations, this potential effect of shared care was not detected.

Shared care had mixed effects on patient satisfaction with treatment, which may reflect the fact that the measurement of quality of health services is complex and should not be approached primarily through the “reductionist filter of user satisfaction.”<sup>26</sup> The qualitative evaluation by Smith et al indicated that patients value shared care, identifying it particularly with the liaison nurse and practice nurses rather than the doctors involved.<sup>25</sup>

We were unable to identify a simple reason for the mixed results between studies, although we considered the effect of computerized support and the effect of a specified liaison worker at the primary–specialty care interface. The interventions we examined were complex, and it often was difficult to determine the exact contribution of each component and the “active ingredient” within the range of interventions comprising the full shared care service.<sup>27</sup> In the 6 studies that did consider the complex nature of their interventions, 3 stated that they were unable to define which of the elements of the intervention were effective.<sup>10,14,15</sup> Swindle et al considered the fact that the clinical nurse specialists seemed to have undertreated

individuals with depression, and further exploration revealed that nurse specialists did not agree with many of the depression diagnoses that patients had received, based on a depression screening questionnaire on recruitment into the study.<sup>18</sup>

Fundamentally, shared care should involve a genuine collaboration between primary and specialty care. It was usually difficult to determine whether this collaboration had happened in the research environment and to know how much collaboration occurred in clinical practice. Byng et al thought that the earlier detection of relapse rates in patients with chronic mental illness in the shared care group could be attributed to improvements in collaboration between primary and specialty care, but they did not attempt to measure whether this collaboration had occurred.<sup>22</sup> Smith et al considered that their diabetes shared care intervention may have lacked effectiveness because of lack of access to a community dietician or funding for protected time for general practitioners.<sup>17</sup>

One could argue that if shared care is not clearly effective in research settings, it is unlikely to work in everyday clinical practice. On the other hand, the majority of included studies involved interventions that were supported by research budgets. These interventions might have been more effective had they been better resourced. Many clinicians and health planners intuitively believe that shared care should improve outcomes. That may partly explain the relatively small number of included studies, as shared care services often are introduced in service delivery contexts without being piloted or subjected to the rigors of research evaluation.

### Future Research

Several methodologic issues were identified relating to study design and quality, including clustering effects and identification and recruitment of patients with chronic diseases. There was minimal description of the care provided in control groups, which is particularly important given the variations in care delivery in different healthcare systems.

Shared care has been compared with either ongoing routine specialist care or ongoing structured or unstructured primary care, suggesting considerable clinical heterogeneity between studies. There needs to be a consideration of whether a successful intervention is one that is equivalent to current service delivery or one that improves on it at an acceptable cost. That will require more sophisticated economic analyses, because adoption of shared care has potentially major implications for resource allocation. Only 1 of the included studies incorporated a parallel qualitative analysis.<sup>25</sup> Future random-

ized trials also should incorporate qualitative evaluations and a consideration of treatment fidelity for interventions involving behavior change in patients or practitioners.<sup>28</sup> These evaluations have the benefit of providing a deeper understanding of the views and beliefs of participating patients and providers, and also can be used to provide an in-depth description of the actual care being delivered both in the control group and in relation to adherence to protocols in the intervention group. Qualitative evaluations are one component of process evaluations of RCTs, which along with consideration of treatment fidelity, add to an understanding of what actually happened as the intervention was tested in a clinical setting. That is particularly important for trials with negative results, but also enables replication of successful interventions in other settings. One also could argue that it would be appropriate to broaden the concept of shared care to incorporate interventions delivered by healthcare professionals other than general practitioners and specialist physicians. However, this approach would add to the heterogeneity of included studies, and broadening a systematic review in this way should be approached with caution.

None of the included studies lasted longer than 2 years, and only 1 follow-up study has been reported to date. Lack of evidence of effectiveness of shared care may be due in part to inadequate length of follow-up. Future studies need to be longer in duration to deal with this issue and also to evaluate the longer term sustainability of interventions. Such studies will need to consider issues such as drifting away from protocols and to devise strategies for longer term follow-up of participating patients and longer term evaluations of services. The increasing awareness of the importance of preventing medical errors needs to be designed into future shared care studies. In addition, researchers designing future collaborative-type interventions will need to recognize that the majority of participating patients are likely to have multiple morbidities and that a focus on single diseases may be inappropriate in clinical practice.<sup>29,30</sup> Future research may be best directed at assessing shared care for those with more serious conditions or combinations of conditions, and considering service issues such as time and resources spent by clinicians in managing patients in both sectors.

## CONCLUSIONS

This review does not provide evidence to support the introduction of shared care for the management of patients with chronic diseases. However, as the majority of studies were of suboptimal quality and none lasted longer than 2 years, questions remain regarding the effectiveness of inter-

ventions to improve care across the primary–specialty care divide. The review suggests that shared care may have the potential to provide longer term benefits through improved prescribing. We conclude that shared care should not be developed or introduced into mainstream clinical practice until there is evidence to support its cost-effectiveness. Future research should be directed at exploring other models of collaboration across the primary care–specialty care divide in an effort to improve outcomes for patients with chronic disease.

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This article is a version of a Cochrane review, which is available in The Cochrane Library. Cochrane systematic reviews are regularly updated to include new research, and in response to feedback from readers. If you wish to comment on this or other Cochrane reviews, please send comments to the Cochrane Effective Practice and Organisation of Care Group ([www.epoc.cochrane.org](http://www.epoc.cochrane.org)).

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**Author Affiliations:** Department of Public Health and Primary Care, Trinity College, Dublin, Ireland.

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**Address correspondence to:** Susan M. Smith, MD, Senior Lecturer in Primary Care, Department of Public Health and Primary Care, Trinity College Centre for Health Sciences, AMNCH, Tallaght, Dublin 24, Ireland. E-mail: [susmith@tcd.ie](mailto:susmith@tcd.ie).

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