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model of chronic illness care

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model of chronic illness care

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Abstract (word count 175)

SA HealthPlus, one of nine national Australian coordinated care trials, aimed to inform policy to address the emerging crisis in chronic illness care. The trial tested the hypothesis that coordinated care would improve health outcomes within the costs of usual care. SA HealthPlus used geographic and randomised designs in eight projects in four sub-trials. A generic model of coordinated care was applied to 3115 intervention patients and compared to usual care in 1488 controls. Innovative aspects of the trial were the role of service coordinators and the behavioural and care planning approach used to place the patient at the centre of their care. Results showed improvements in self-assessed health status (SF-36) in six of eight projects and that patients with a history of prior hospitalisation in the year immediately preceding the trial were the most likely to yield cost savings. A mid trial review found that health benefits from coordinated care were more dependent on patient self-management than illness severity, a factor which subsequently led to the development of the Flinders self-management model in Australia.

Key words: chronic disease, coordinated care, care plan, self-management, health outcomes

Introduction

In Australia, coordination of care for patients with multiple service needs is vulnerable to mixed funding sources and lack of integration of systems of care. Both Commonwealth and State or Territory Governments fund public health services: the Commonwealth Government administers the taxpayer-funded Medicare program to provide universal access to public health services by funding General Practitioners (GPs) and specialists on a fee-for-service basis, whereas public hospitals are funded by State Governments. A mixture of State and Commonwealth programs fund community care, including allied health services. Individuals can purchase private health insurance which provides private hospital care and a range of ancillary services (physiotherapy, psychology, podiatry etc).

In 1997, Australian Governments began trials of coordinated care to develop and test models of service delivery for chronic conditions (Commonwealth Department of Human Services and Health, 1995). The impetus for reform has included escalating health care costs driven by an ageing population and advances in technology, a shift in emphasis of health care delivery from the tertiary to the primary care sector (World Health Organisation, 2002) and demands by consumers for more patient-centred care.

The national primary hypothesis that trials were asked to test within a two-year time frame was:

That coordination of care of people with multiple service needs, where care is accessed through individual care plans and funds pooled from existing Commonwealth, State and joint programs will result in improved individual client health and well being within existing resources. The principal intent of the trials was to ‘develop and test different service delivery and funding arrangements, and to determine the extent to which the coordinated care model contributes to:

- improved client outcomes
- better delivery of services which are individually and collectively more responsive to clients’ assessed needs

- more efficient ways of funding and delivering services.’ (Commonwealth Department of Human Services and Health, 1995).

This paper describes SA HealthPlus, which comprised eight projects within four regional sub-trials across South Australia and was the largest of nine national coordinated care trials. Previous publications have provided a brief summary of the outcomes of trial (Battersby, 2005), and trial elements (Hurley et al., 2000; Harvey, 2001; Heard et al., 2002; Smith et al., 2002). The aim of this paper is to highlight the innovative aspects of the generic (not disease specific) model of care including the case management role, strengths and weaknesses of the model, implementation issues, and policy implications.

Aim of the SA HealthPlus trial

SA HealthPlus provided the opportunity to create and test the impact of a fundamental shift in the way health services are delivered from a funding based model to an outcomes based model. The funding based model is characterised by fee for service which provides incentives for throughput and reactive care rather than proactive care for chronic conditions, and by a system which is provider focused, fragmented, and where secondary and tertiary services are disease orientated. In an outcomes based model, the pool of funds provided by both State and Commonwealth governments for all aspects of care for a defined group of patients is used to achieve population health outcomes. The funding for a range of primary and acute care services is pooled to provide patient-centred, planned, evidence based coordinated care to achieve individual and population targets.

An outcomes based system requires an information system to facilitate a continuous learning approach for both managers and clinicians. The major challenge for SA HealthPlus was to create and implement an outcomes based system within a two-year time frame, in order to realise sufficient savings to cover the costs of coordinating care, provide the necessary preventive services, and fund the required systems changes as well as educate clinicians and administrators to adopt and use such an approach for the care of patients. Almost none of the six elements of the chronic care model (Wagner et al., 2001) were in place at beginning of the trial.

In effect, two concurrent research trials were conducted, the first directed at the individual level to improve health outcomes, and the second at the systems level in order to effect organisational change (Harvey, 2001). The trial was intended to provide new service delivery and funding systems for the South Australian population with chronic illness (Blight, 1995). The sub-trials had broad geographical and clinical attributes. Three sub-trials were conducted in Southern, Central and Western metropolitan areas of Adelaide, the capital of South Australia, and one in the rural Eyre Peninsula region. The four sub-trials contained eight projects: Southern [Somatisation, aged care, chronic obstructive pulmonary disease (COPD)], Central [cardiac], Western: [type II diabetes, COPD] and Eyre: [chronic and complex, and type II diabetes].

The coordinated care intervention

The trial addressed the hypothesis in two parts i.e. whether improved patient outcomes could be achieved and whether this could be done within existing resources. The model of care aimed to reduce the complications of illness by prospective, preventative care planning and to reduce or delay disability and handicap by assisting patients to achieve their goals. These two elements were designed to lead to 'improved health and well being'. Achieving this within existing resources depended on preventing unplanned hospital admissions, and using the funds saved to pay for coordination and preventive services.

The SA HealthPlus model addressed different coordination issues in separate but linked sets of strategies. Strategies to bring all of the medical costs for a group of patients under one fund and re-allocating them (funds pooling) addressed under-supply of necessary primary services and acute demand on tertiary services. Strategies around the structured care plan addressed reactive crisis care for chronic illness and the lack of communication between providers. Strategies relating to patient-centred care addressed the previous provider focus and fragmentation of services.

1. Funds pooling

Funds were contributed to the funds pool by public hospitals (inpatient services), the Medical Benefits Schedule (MBS; doctor visits, investigations and procedures),

Pharmaceutical Benefits Schedule (PBS; subsidized approved medications), Department of Veterans Affairs, and regional domiciliary services (home care for older people provided by community nurses and allied health organisations).

2. The care plan

The care plan was designed to be a global summary of the patient's planned care over twelve-months, a motivational tool, a measure of outcomes over time, and a communication tool. It provided a record of demographic details, including details about the patient's partner or community care giver, health service providers, diagnoses, investigation results, medications, services planned and services received. To break down barriers to coordination, all providers needed to use a common care plan, which contained a twelve-month overview of the planned care, including patient-defined problems and goals. The care plan complemented the detailed management plan of each provider. The process of creating the care plan was designed to engage the patient in their own care and begin the process of behavioural change to improve self-management of their chronic condition.

2.1 Care Planning: Patient defined Problems and Goals (P&G)

Use of the patient's perception of their main life problem signified a fundamental shift in individual health management from a disease focus to a patient and problem focus. The Problems and Goals (P&G) approach was based on a semi-structured interview developed in the mental health field (Marks et al., 1977; Marks, 1986; Richards and McDonald, 1990; Fox and Conroy, 2000), based on motivation and behavioural change being enhanced by defining the patient's (life) problem first, then their goals, rather than the more commonly used provider-generated list of goals. The patient's perception of the impact of their chronic condition(s) was at the forefront of care planning (Battersby et al., 2001). Problem severity and goal achievement were rated on a 0-8 scale (0 = severe problem, 8 = no progress towards the goal) by both patient and health care provider, so that care planning could be patient-centred, holistic, outcomes-based and motivational (Battersby, Ask et al., 2001). The P&G assessment was completed as part of the initial assessment after enrollment of patients in the intervention group, as the first step in assisting the patient towards improved

self-management. The GP and other health workers could use the patient's goals to encourage adherence to medical management.

2.2 Care planning: Evidence based guidelines

Clinical guidelines for each project were developed by multidisciplinary groups, which defined a set of criteria and associated preventative services for each of three levels of severity for the relevant disease or condition. The groups agreed on the minimum frequency of these services over a twelve-month period. The focus was on prevention of medical complications and hospital admissions.

Hospital admissions, which were potentially preventable, were identified from hospital discharge data, resulting in a list of preventable Diagnostic Related Groups (DRGs) for each principal disease. To satisfy the financial component of the hypothesis, each project was set a target of reducing preventable admissions by 50% compared to the control group. In this way, the two components of the primary hypothesis were brought together i.e., a mechanism was created to achieve improved outcomes within existing resources, if hospital savings could be used to buy more effective coordination and preventive primary care services. Together with the GP's medical assessment and the previous twelve months service history, the patient's P&G statement contributed to the development of a structured twelve-month care plan by GPs, service coordinators (see below) and patients. GPs were paid a fee to develop each care plan as well as an annual fee to oversee their patients' care and were supported by service coordinators who were employed in all trial sites. SA HealthPlus staff monitored patient outcomes in terms of service use, P&G (0-8) ratings, and health status measures throughout the trial, and provided this information to each patient's GP. This process supported the commitment to continuous improvement that was a cornerstone of the SA HealthPlus strategy.

3. Coordination and the continuous learning framework

The roles of service coordinator (SG), GP and project leader were clearly defined. At the inception of the trial very few nurses or allied health professionals worked in Australian general practice where the GPs provided all patient services. GPs referred patients to other

providers in an inconsistent and uncoordinated way. The SC conducted the enrollment, administered trial questionnaires, conducted the P&G assessment and prepared a draft care plan based on the care plan generator and current or planned services provided by other health professionals involved in the patient's treatment. The care plan generator provided a guide on the minimum recommended services for the main condition over a twelve- month period. The SC arranged an appointment for the patient with the GP who conducted a medical assessment. Based on this and his/her knowledge of the patient, and the patient's P &G statements, the GP and patient agreed on the services in addition to those recommended by the care plan generator, to be added to the care plan over the following 12 months. Both GP and patient signed the care plan and a copy was made for the patient, the service coordinator, other providers and the original retained by the GP.

The SC assisted the patient to arrange access to and coordinate the community and patient education services. Over the following months, the SC, through a combination of face to face and telephone contacts, worked with the patient to achieve their goal and self-management of their chronic conditions. The SC did not provide disease specific education. This was part of the planned services on the care plan. The SC provided a minimum 3 monthly verbal or written report on the patient's progress to the GP and had contact with the patient on average, monthly during the trial. Patients received a review of all aspects of the care plan by the SC and GP at 12 months and a new care plan was prepared for the following 12 months.

The GP oversaw the creation, implementation and monitoring of the care plan and provided both prospective and as-needed medical management. Project leaders, mostly specialists, supported GPs and service coordinators by reviewing care plans and conducting case conferences with complex cases. A model of continuous learning was provided by the project leaders' committee which oversaw an annual review of the care plan guidelines using information provided by project aggregated data and case conferences (Frith et al., 2001). An electronic care plan which included individual patient service data was piloted with GPs and specialists towards the end of the trial (Warren et al., 2001).

4. Training and supervision

The Coordinated Care Training Unit (CCTU) was established with mental health nurses who had strong backgrounds in behavioural psychotherapy. Service coordinators, who were mainly registered nurses, but also included allied health professionals such as physiotherapists and social workers, initially received two days of training in the trial methodology, care planning and the P&G approach, followed by a competency assessment and accreditation that was reviewed annually. The CCTU supported service coordinators through individual and group supervision.

Evaluation methods

The trial evaluation was conducted by an independent Local Evaluation Team (LET) in accordance with the national evaluation framework (Commonwealth of Australia, 2001). As well as addressing the primary outcome measures of health status and resource use, the evaluation acknowledged that the trial involved changes in relationships, responsibilities, planning and financing for many people and organisations. The evaluation combined extensive quantitative analysis with qualitative approaches including interviews and focus groups with patients, service coordinators and GPs, document analysis and case studies.

Trial design

Participating patients meeting the admission criteria were allocated randomly to intervention or control groups (in the ratio of 2:1) after enrollment in the Southern and Central sub-trials. It was not possible to blind GPs and service coordinators to patient allocation, as the interventions of care planning and care coordination, which they provided, were available only to intervention patients. Some GPs were responsible for the care of control group patients as well as those in the intervention group. Geographically isolated control groups were recruited in the northern metropolitan area for the Western sub-trial, and in the rural Yorke Peninsula for the similarly situated rural Eyre Peninsula sub-trial. Service use was tracked for all enrolled patients, who were also asked to complete two survey instruments (see below).

Eligibility

Eligibility criteria were defined by each project group within the broad framework of chronic and complex medical conditions requiring high service demand. For most projects, criteria included all of; a hospital admission in the twelve months prior to enrollment, frequent use of GP (>8 visits per year) and greater than four emergency or 'outpatient' (ambulatory) hospital visits. As recruitment progressed the criterion of requiring prior hospitalisation was relaxed to achieve recruitment targets and to accommodate some GPs who believed that their complex patients without prior hospitalisation would benefit from the intervention. Patients were excluded if they were medically or mentally impaired so as not to be able to give informed consent, complete survey forms or carry out trial related activities.

The recruitment process took place between August and December 1997. Patients from GP lists were recruited by letter and phone contact. The SC visited the patient at home to enrol and randomise the patient, and conduct the P&G assessment on patients in the intervention group.

Sample size

Cost modelling from historical data of representative samples matching the eligibility criteria for each project prior to recruitment indicated that preventable admissions accounted for 36% of the cost of all hospital admissions. SA HealthPlus aimed to reduce preventable admissions by 50% with a resultant reduction in overall admissions of 18%. EPI Info 6 Statcalc (Centers for Disease Control and Prevention, 1997) was used to determine sample size, based on the expected admission rate in the control group during the trial. For example, using a ratio of intervention to control of 2:1 (95% confidence limit, 80% power) and a 90% admission rate in the controls, the intervention sample size required to detect a 15% reduction in intervention admissions was 207. If the admission rate in the controls was 60% the intervention sample size required to detect a 15% reduction in admissions was 751.

Outcomemeasures

Health and wellbeing

Two instruments were administered to intervention and control group patients in all sub-trials (mainly by mail) at enrollment, at twelve months, and at the end of the trial, a period 19-27 months after enrollment.

Self assessed health status (the SF-36) (Ware and Sherbourne, 1992) was used as a generic measure of self reported health and well being and had been validated in an Australian population (McCallum, 1995; Sanson-Fisher and Perkins, 1998). The Work and Social Adjustment Scale (WSAS) (Marks, 1985; Mundt et al., 2002) was used as a measure of disability and handicap for all intervention and control groups. The scale asks the client's perception of the impact of their main problem on five areas of daily life; work; home management; social leisure; private leisure; and family and relationships. Each area is measured on a 0-8 scale. While quick and easy to use and sensitive to change over time, it had not been validated in a chronically medically ill population.

Other specific measures not reported here were used for intervention and control group patients in four projects. The P&G assessment, an essential component of the intervention and therefore used only with intervention patients, was also a key measure of patient and service coordinator perception of goal achievement over time.

Service use

Enrolled patients consented to tracking of their service use for the two years prior to enrollment, and for the duration of the trial. Service use data were available (in the absence of unique patient identifiers) for the major areas of service use: medical visits/services, medications, hospital admissions (public and private), metropolitan domiciliary services (allied health daily living support home care) and metropolitan home nursing care. Non-inpatient hospital data (e.g., outpatient, allied health, accident and emergency) was largely unavailable due to multiple incompatible information systems, complicated by the large number of hospitals involved. Data on private allied health and community services were not available.

Results

Recruitment

In 1997 and 1998 trial staff recruited 4603 patients and 295 GPs in the four regional sub-trials (Table 1). Between 1 and 90 patients per GP were recruited. The analysis presented here is based on the regional sub-trials as GPs and service coordinators provided the intervention to more than one project in the region. The Central [intervention/control (I/C) 271/138] and Southern [(I/C) 887/427] sub-trials were randomised by patient and Eyre [(I/C) 1353/513] and Western sub-trials [(I/C) 604/410] used geographic controls.

One hundred service coordinators were trained during the trial, most of who worked in a team based at a single site in each region, with a small number being based in GP practices. Service coordinators had a case load of approximately 100 patients per full time equivalent position.

Table 1: Demographic and health status data for patients in intervention and control groups in each sub-trial

| Patient Profile | Central | | Western | | Southern | | Eyre | |
|--------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|
| | Int. | Control | Int. | Control | Int. | Control | Int. | Control |
| Total Patients | 271 | 138 | 604 | 410 | 887 | 427 | 1353 | 513 |
| Average age in years (at enrollment) | 74 | 74 | 67 | 61 | 73 | 74 | 62 | 63 |
| % Males | 49.4 | 51.4 | 48.2 | 46.2 | 42.1 | 42.9 | 48.6 | 48.3 |
| % Married/de facto | 61.6 | 60.1 | 62.1 | 69.8 | 59.3 | 54.7 | 67.3 | 69.2 |
| % Healthcare card holder* | 82.7 | 77.5 | 83.6 | 75.9 | 75.2 | 75.7 | 47.2 | 70.1 |
| % Veterans | 12.2 | 8.0 | 7.9 | 5.8 | 20.4 | 21.3 | 7.2 | 9.9 |
| Average days in trial | 540 | 571 | 529 | 592 | 568 | 615 | 622 | 621 |
| % withdrawing from trial | 41 | 49 | 52 | 49 | 38 | 39 | 32 | 41 |
| Number (%) with Baseline SF-36 data | 234 (86.3) | 128 (92.7) | 462 (76.5) | 363 (88.5) | 731 (82.4) | 378 (88.5) | 1033 (76.3) | 488 (95.1) |
| Number (%) with follow up SF-36 data | 99 (36.5) | 57 (41.3) | 215 (35.6) | 164 (40.0) | 417 (47.0) | 211 (49.4) | 653 (48.3) | 351 (48.9) |
| Baseline SF-36 (PCS)** | 33.6 | 33.3 | 34.7 | 38.1 | 34.3 | 34.5 | 36.3 | 35 |
| Baseline SF-36 (MCS)** | 45.8 | 45.7 | 44.4 | 46.9 | 46.8 | 47.9 | 46.1 | 46.2 |

*Individuals are eligible for a Healthcare card if they receive government social security payments eg, low income families, unemployment, disability and aged pension. Card holders receive government subsidies for medications and doctors' visits.

**Baseline SF-36 physical component summary (PCS) and mental component summary (MCS) scores are significantly below population norms (49.23 and 49.79 respectively) (Butterworth and Crosier, 2004).

Exit from Trial

Over half the patients enrolled (61% of intervention patients and 57% of control patients) remained in the trial until December 1999. Reasons for withdrawal included death

(5.1% of intervention group patients and 5.8% of control group patients), and dissatisfaction with the trial for a small proportion (2.1% of intervention and 1.3% of control patients.) Many of the 23.2% intervention patients who gave 'other' as the reason for withdrawal did not want the reason to be recorded as dissatisfaction (Centre for Health Care Evaluation, 2000). When re-consent was required in July 1999 due to the trial being extended beyond the original date, more control than intervention patients took the opportunity to withdraw. SF-36 data were available for 79% intervention patients and 91% control patients at baseline and for 44% and 46% respectively at December 1999.

Effects of the trial on patients

The following case study (Centre for Health Care Evaluation, 2000) illustrates the impact of the Problems and Goals approach and care planning process in a man with COPD and complex health problems which had been worsening over the last five years:

Problem statement: *Shortness of breath, being on oxygen 16 hrs per day, and having to take medication at regular intervals means that going out is a "real hassle" therefore I have given up many of my activities.* Rated 8 on how much the problem affected his daily activities: 8 = severe interference, 0= no interference.

Goal statement: *To recommence attending calligraphy activities/workshops for 1 day, once per month. [This would be very difficult for this patient due to his dependence on oxygen and his social circumstances.]* Rated 8 on progress towards achieving this goal; 8 = no progress, 0 = complete success.

The patient found that the problems and goals approach allowed him to express his desire to return to a vocational interest and as a mechanism to reduce his dependency on oxygen to overnight use. His engagement in the process also meant that the goal was realistic and important, meaning he was fully committed to achieving the goal. The patient was also very involved in the care planning process which made him think about what was happening to his health and why. This led to recognition of his priorities and increased his motivation. This form of care planning also led to his general practitioner developing a better understanding of what was important in management to the patient and advising an alternative

way of using his nebuliser to enable him to stay longer off the oxygen. The SC was somebody else to talk to without feeling like he was “causing a problem”. The SC was also a significant resource for problem solving and in planning to go to appointments or visits beyond his home.

As a result, the patient was able to reduce the impact of the problem from 8 to 4, and make complete progress toward achieving his goal (rated 0 at the end of the trial). These outcomes appear to have contributed to the patient’s overall wellbeing as measured by the SF-36; he recorded a positive improvement (+21 points) in his Mental Component Summary Score over time.

Health and well being: SF-36 Results

Patient attrition lowered completion rates at the end of trial for both intervention and control group patients to approximately half the patients who commenced the trial. As patients who withdrew completed no further instruments, ‘intention to treat’ analysis was not possible for the SF-36. Little improvement was expected in self reported health status as measured by the SF-36, as the patients enrolled in these trials were likely to decline rather than improve (Eagar, 1997; Centre for Health Advancement and KPMG Management Consulting, 1999). As reported previously, (Battersby, 2005) however, the intervention group in six projects showed significant improvements in at least one domain relative to the control group. Southern and Western Respiratory Projects showed improvements in mental health domains (mental health, vitality). Central Cardiac, Western Diabetes, Eyre Chronic and Complex and Southern Aged Care showed improvements in both physical and mental domains. The significant differences in SF-36 change scores reflected improved levels of well being in the intervention group over time, compared to the deterioration in the control group.

Health and Well Being: The Work and Social Adjustment Scale

Four items of this disability scale (0-8) and the total score (0-32) were used in the analysis (the ‘Work’ item was omitted as irrelevant to most patients in this study). The WSAS was administered by mail with the SF-36 for the control group, and by service coordinator for the intervention group because the score was used to monitor clinical progress. The patient

was blinded to previous scorings of the WSAS. Using baseline to end of trial mean difference scores, five of the eight projects showed significant improvements for WSAS for intervention group relative to control group over time (Table 2).

Table 2: Work & Social Adjustment Scale, baseline to end of trial mean difference scores which were significantly different ($p < 0.05$) between intervention and control groups (higher score = improved health status)

| | Intervention | | Control | | T Value |
|-----------------------------------|--------------|----------|----------------|----------|-------------|
| | Mean | Std Dev. | Mean | Std Dev. | T |
| Eyre Chronic & Complex | | | | | |
| Social | 0.42 | 2.27 | -0.21 | 2.66 | 3.13 |
| Private | 0.59 | 2.10 | -0.10 | 2.44 | 3.72 |
| | (N= 402) | | (N= 226) | | |
| West Diabetes | | | | | |
| Family | 0.49 | 1.90 | -0.13 | 2.25 | 2.34 |
| | (N= 128) | | (N= 113) | | |
| West COPD | | | | | |
| Total | 1.24 | 8.33 | -1.19 | 7.00 | 1.94 |
| Private | 0.27 | 2.65 | -0.47 | 2.18 | * (F= 5.14) |
| Family | 1.18 | 2.36 | -0.31 | 1.91 | 4.35 |
| | (N= 93) | | (N= 67 - 71) | | |
| Southern COPD | | | | | |
| Home | 0.61 | 1.64 | -0.57 | 2.50 | 2.74 |
| Social | 1.22 | 2.08 | -0.54 | 2.87 | 3.95 |
| | (N= 74) | | (N= 42 & 50) | | |
| Southern Aged Care | | | | | |
| Home | 0.25 | 2.08 | -0.17 | 2.37 | 1.93 |
| Social | 0.68 | 2.18 | -0.43 | 2.50 | 4.96 |
| Private | 0.02 | 2.35 | -0.23 | 2.35 | 5.51 |
| | (N= 291) | | (N= 144 - 168) | | |

*For the western region an analysis of co-variance was conducted to control for the variable *age* (covariate) because the control group was significantly younger. The significant results of this analysis were reported for non-significant t-test results.

Health and well being: Problems and Goals (P&G)

The results indicated that up to 60% of patients (and their service coordinators) rated their main problem as improved between first and final scores (Battersby, 2005), with the somatisation project having the greatest proportion of patients with improved scores, and the cardiac project the lowest proportion. Between 40% and 60% of patients made some progress

towards achieving their first goal between the first and last set of ratings; a period ranging from 50 to 70 weeks in different projects. Up to one third of patients were further from achieving their goals at the end of the trial. There were significant ($p \leq .05$) positive correlations found between the P&G difference scores (from baseline to endpoint) with difference scores of the SF-36; (Spearman correlations $r \leq 0.12$) and WSAS (Spearman correlations $r \leq 0.35$).

Care coordination

SA HealthPlus implemented a consistent model of care coordination through the four sub-trials, combining trial processes (P&G assessment, care plan, monitoring of plan and goals) and staff (GP and service coordinator). Surveys and case studies suggested that the care coordination function was associated with improved patient confidence and well being when patients had a capacity to benefit and were engaged in the process, GPs were fully engaged in the process, GPs and service coordinators worked in partnership with patients, and the service coordinators' style was culturally appropriate to both GP and patient.

Effects of Care Planning

Patients in the intervention group received services recommended by the evidence-based care plan developed by their GP, whereas patients in the control group received services based on the GP's usual care. Analysis of the services received during the twelve month period of the care plan for intervention patients and controls over an equivalent time showed that intervention patients had significantly more lipid tests and bowel cancer screening tests than controls (Heard, Kalucy et al., 2002). Adherence to the care plan depended on voluntary involvement of GPs, patients and service providers as well as the timely availability of services. The service coordinator assisted adherence to the plan by all parties.

Extent of benefit

Service coordinators and GPs recognised that some trial patients had benefited little if at all. Some enrolled patients did not require the degree of coordination provided, and others needed service coordination for a comparatively short time, because their services were

already well coordinated, they were motivated, well supported and had stable health conditions. Service coordinators estimated that about 25% of their patients had made major improvements in wellbeing. They considered that the patients who had benefited most were living in difficult situations, were not previously linked into health and community services, lacked knowledge of their condition and available services, were depressed, lacked motivation to change behaviour, had lifestyle risk factors (eg diet, weight, smoking, alcohol) or had poorly controlled conditions characterised by hospital admissions. GP interviews confirmed these criteria.

Self-management

An un-anticipated consequence of the SA HealthPlus trial was the development of the Flinders Model of self management support (Regan-Smith et al., 2006). A mid-trial review of the model of care with service coordinators identified that the P&G approach was a successful method to implement patient-centred care and initiate behavioural change. However service coordinators were allocating coordination time according to their perception of patients' self-management capacity rather than according to level of severity as intended in the model of care. For example, a patient with several co-morbid conditions, multiple medications, and high disability may have needed little service coordinator time because they were a good self-manager, had excellent family support and shared decisions with their GP. As a result, towards the end of the trial, the CCTU at Flinders University piloted an objective method, the Partners in Health scale and Cue & Response Interview (Battersby et al., 2003) to assess self-management capacity and incorporate this into the care planning process. The 'Flinders Model' of self-management support has since been provided as a training program to over 2,000 clinicians across Australia.

Effects of the trial on service use

Hospital inpatient data were analysed according to total admissions, emergency admissions and elective admissions per time in trial using an 'intention-to-treat' basis, i.e., data from those patients who withdrew from the trial has been included (with permission) with trial completers. Combining all sub-trial data, hospital inpatient usage accounted for

52% of the cost of all services. Differences between intervention and control groups in admissions per trial day were analysed by Poisson regression, with adjustments made for historical service use (see below).

The results indicated no significant change in inpatient hospital admissions in the randomised southern or central regions, while the two regions employing geographic controls showed effects but with contrasting results. In the Eyre trial there was a reduction in admission rates in the intervention group compared to the control group, mainly reflecting an increase in emergency admissions in the control group for the Chronic and Complex project. In the Western trial there was an increase in admission rates in the intervention group, mainly due to increase in elective admissions in both the Diabetes and Respiratory projects compared to the northern suburbs control groups.

Overall, there was no substantive change in Medical Benefits Schedule (MBS; medical attendances and investigations) or Pharmaceutical Benefits Schedule (PBS; subsidised approved medications) use between intervention and control group patients over the course of the trial, however in the somatisation project, there was a 45% reduction in PBS (drug) use in the intervention group compared to controls. For domiciliary (community allied health) services for which data were available, intervention patients made greater use of services than controls, due to improved access to services as a result of service coordination.

Resource use

Accurate estimation of the usual cost of care proved to be a difficult task, especially in projects with geographically isolated controls. Even though geographically isolated control group patients were matched according to project eligibility criteria, they differed in terms of historical use of services in the two years prior to the trial partly due to difference in service access and availability between the regions. Service use data were therefore adjusted for differences between intervention and control groups in the two years prior to the trial. Thus, if for example, hospital inpatient expenditure for the intervention group was 30 percent above that of the control group in the 2 years prior to the trial, the control group expenditure was adjusted upwards by this percentage for the 'live' phase. Table 3 shows the adjusted

difference in all service use categories between intervention and control groups for each sub-trial as cost per patient per day on trial.

Table 3: Comparison of cost per patient per active day on trial between intervention and controls, adjusted for historical service use

| Sub-trial | Control | | | | Intervention | | | |
|----------------------------------|--------------------------|-----------------|----------------|----------------------------|--------------------------|-----------------|----------------|----------------------------|
| | No. active days on trial | No. of services | Expend. \$ | Cost per pt per active day | No. active days on trial | No. of services | Expend. \$ | Cost per pt per active day |
| Eyre | | | | | | | | |
| MBS (medical services) | 281086 | 15664.00 | 558887 | 1.99 | 684402 | 35360.00 | 1156312 | 1.69 |
| PBS (medications) | 281086 | 23727.00 | 555992 | 1.98 | 684402 | 56944.00 | 1338531 | 1.96 |
| Veterans | 281086 | 2290.00 | 195360 | 0.70 | 684402 | 1799.00 | 118164 | 0.17 |
| Hospital inpatient | 281086 | 897.27 | 1820614 | 6.48 | 684402 | 1960.83 | 4058552 | 5.93 |
| Hospital non-inpatient | 281086 | 63.00 | 3654 | 0.01 | 684402 | 37.00 | 2296 | 0.00 |
| Other | 281086 | 10.00 | 370 | 0.00 | 684402 | 4174.00 | 147613 | 0.22 |
| Sub-Total | | | 3134878 | 11.15 | | | 6821469 | 9.97 |
| South/Central¹ | | | | | | | | |
| MBS (medical services) | 300380 | 24901.00 | 817462 | 2.72 | 546747 | 47314.00 | 1579116 | 2.89 |
| PBS (medications) | 300380 | 26275.00 | 546107 | 1.82 | 546747 | 44959.00 | 957582 | 1.75 |
| Veterans | 300380 | 2003.00 | 83427 | 0.28 | 546747 | 8171.00 | 428315 | 0.78 |
| Hospital inpatient | 300380 | 690.48 | 1421987 | 4.73 | 546747 | 1396.22 | 2946586 | 5.39 |
| Hospital non-in patient | 300380 | 273.00 | 16849 | 0.06 | 546747 | 850.00 | 53070 | 0.10 |
| Other | 300380 | 5041.00 | 53872 | 0.18 | 546747 | 8918.00 | 155289 | 0.28 |
| Sub-Total | | | 2939704 | 9.79 | | | 6119959 | 11.19 |
| Western | | | | | | | | |
| MBS (medical services) | 214727 | 16403.00 | 555801 | 2.59 | 236359 | 22676.00 | 712236 | 3.01 |
| PBS (medications) | 214727 | 17701.00 | 391363 | 1.82 | 236359 | 24177.00 | 564507 | 2.39 |
| Veterans | 214727 | 330.00 | 33480 | 0.16 | 236359 | 2567.00 | 162325 | 0.69 |
| Hospital inpatient | 214727 | 458.61 | 975658 | 4.54 | 236359 | 859.66 | 1874480 | 7.93 |
| Hospital non-inpatient | 214727 | 51.00 | 3498 | 0.02 | 236359 | 659.00 | 46562 | 0.20 |
| Other | 214727 | 1017.00 | 16206 | 0.08 | 236359 | 4957.00 | 71156 | 0.30 |
| Sub-Total | | | 1976005 | 9.20 | | | 3431266 | 14.52 |

¹ Central was combined with Southern because of small sample size. ‘Hospital non-inpatient’ indicates emergency department and ambulatory attendances. ‘Other’ indicates community allied health services and home nursing services. Both ‘hospital non in-patient’ and ‘other’ service data were complete only for the Southern sub-trial.

From these analyses of service use data to the end of October 1999, combining all sub-trials and all costs, the intervention group showed a deficit of \$4,842,898 – (adjusted) compared to the control group (usual care). Any savings in admissions to acute care were not sufficient to pay for coordination costs and additional community services.

Table 4: Comparison of hospital savings/deficits (adjusted) between intervention and control groups with cost of coordination by region, and by selecting only those patients who had an admission in the 12 months prior to enrollment (12 month patients).

| Sub-trial | Hospital inpatient int -control cost differences adjusted \$ | % Difference | I/C | Hospital inpatient (12 month patients) int-control cost differences adjusted \$ | % difference (int -control) | Costs of coord'n ¹ \$ | Costs of coord'n ¹ (12 month patients) \$ |
|---------------------------|---|-----------------|-----|--|-----------------------------------|--|--|
| Eyre | +\$447,990 | +9.6% | | +\$965,283 | +24.2% | \$2,027,511 | \$1,153,290 |
| South ² | -\$479,920 | -18.6% | | -\$213,700 | -10.1% | \$1,735,009 | \$958,272 |
| West | +\$270,243 | +12.2% | | +\$312,275 | +17.3% | \$1,009,716 | \$455,712 |

¹This includes costs of recruitment, care planning and coordination costs

² Includes central cardiac because of small sample size

+ indicates a saving and – a deficit in costs for the intervention group compared to the control group.

Targeting Enrollments

In order to meet enrollment deadlines and quotas, the criterion of a hospital admission prior to enrollment was relaxed to include patients that clinicians considered were at risk of hospital admission. As a result, only 58% of enrolled patients had at least one hospital admission prior to enrollment (71% of Central Cardiac to 43% of Eyre Peninsula Diabetes) and 51.7% had a hospital admission during the live phase. This therefore reduced the potential hospitalisation base within the population cohort from which the savings could be generated. One of the effects of this change in entry criteria was that many enrolled patients had less need for coordination than anticipated. Costing data from analysis of those intervention and control patients having at least one admission in the 12 months prior to enrollment are presented in Table 4.

Combining savings from hospital admissions for all sub-trials for the '12 month' group results in changes in net savings in the hospital sector from \$252,584 (2.7%) to \$958,470 (12.2%), closer to the 18% on which cost neutrality modelling was based. Similarly the overall deficit reduces from \$4.8 million to \$1.7 million. This demonstrates the importance of appropriately targeting a particular patient group for coordinated care. The reduction in overall deficit is generated not only from increases in hospital savings but also from substantially reduced costs of coordination.

Which SA HealthPlus patients were most likely to have hospital admissions?

A major assumption of the trial was that coordinated care could reduce unplanned admissions to pay for substituted services. Predictors of unplanned admissions were determined by using data on admissions in the two years prior to coordination and during the intervention phase. Using an intention to treat approach (including those who withdrew during the trial), a Chi-squared Automatic Interaction Detector (CHAID) analysis (SPSS Inc, 1997) was used for all 4603 patients enrolled in the trial. Predictor variables were gender, age group, marital status, language spoken at home, employment status, type of pension received, retirement status, health care card status, veteran status, need for a carer, ownership of private health insurance, number of co-morbidities, and number of hospital admissions during the

historical period. The greatest predictor of unplanned admissions was a history of three or more hospital admissions in the previous two years. This group accounted for 24% of the patient population, and had a 33% chance of one or more unplanned admissions per year. Within this group, the greatest probability of unplanned admissions was for those who also had four or more co-morbidities.

Discussion

In relation to the national trial hypothesis, the first element of 'improved individual client health and well being' was achieved as indicated by improvement in some domains of the SF-36 in six out of eight projects. SF-36 results are supported by WSAS data. It has not been possible to determine precisely which trial components were associated with improvements in wellbeing. The LET concluded that addressing fragmentation of care through patient-centred approaches of P&G monitoring, and service coordination in partnership with GPs was a more successful strategy for SA HealthPlus than the structured care plan or funds pooling strategies.

There are no agreed definitions of the various models aimed at improving chronic illness care such as disease management, case management and coordinated care (Chen *et al.*, 2000). Weingarten *et al* (2002), using a broad definition of disease management, found in a meta-analysis that patient education, education of providers and feedback were the most commonly used interventions. SA HealthPlus adds to the evidence that incorporating a psychological and behavioural component rather than just a focus on disease is an important element of coordinated care.

The P&G approach and associated motivational skills of the service coordinators enabled the patient to be at the centre of the GP-service coordinator interactions. This approach is supported by a review of successful coordinated care interventions by Chen *et al* (2000). However, the use of the patient's life problem rather than a disease specific problem has not been used in previous trials. Using the patient's problem engages the patient in their own care and identifies whether issues other than their health are a priority. The P&G approach works at an individual level, but the trial has also shown that aggregated scores can

measure progress of a group of patients over time and that the degree of goal change can be used to monitor the success of a program of care. The approach enables supporting and monitoring of practitioner competence in behavioural change techniques.

The profound lesson that emerged from the trial was that coordination should be provided according to the patient's self-management capacity not just disease severity i.e., self-management capacity may provide a method of determining who requires coordinated care. The Flinders Model of self-management support has become the basis of chronic disease self-management education for health professionals in the National Sharing Health Care demonstration projects (Australian Government Department of Health and Ageing, 2004). This care planning approach is generic and can be applied to a range of conditions and more than one condition in the same patient. It has been applied in Aboriginal populations with diabetes, mentally ill patients and to resident training in the United States (Lawn et al., 2006; Regan-Smith, Hirschmann et al., 2006). The Commonwealth, States and Territories have announced a \$500 million strategy to address chronic illness in Australia in which education of clinicians in self-management support is a key component (Council of Australian Governments (COAG), 2006).

Cost neutrality

The savings to pay for coordinated care were not achieved. However the assumptions underpinning the evaluation did not reflect the reality of conducting such an ambitious trial. The costs attributed to 'coordination' are largely those of service coordination. Service coordinators had three overlapping roles of clinician, research officer and change agent. An accurate cost comparison with 'usual care' would require the time service coordinators spent in the development of the tools and processes, data collection, research tasks, trial administration, and change management to be disaggregated from their purely clinical role. What has emerged is the considerable cost of facilitating system change (Harvey, 2001). Further research into coordinated systems of care should try to disaggregate change management and research costs from provision of care costs.

Additionally, there was no explicit decision-making process to link the care planned services and anticipated savings from service substitution and reduced hospital admissions. The savings that were generated were automatically absorbed into the costs of providing coordinated care services to everyone in the trial, as well as the provision of allied health services.

The failure to significantly reduce hospital admissions has been described in a number of coordination programs and health service reforms. In the UK, Coulter (1995; 1996) found little evidence that developments in primary care were reducing the demand for secondary care. The general practice fund holding scheme led to investment by fund-holders in new practice-based services without reducing the demand for specialist care, rates of outpatient referral or hospital admission (Coulter, 1995; Coulter, 1996; Sisk et al., 1996). Improvements in primary care may increase demand because new needs are identified that would previously have gone unmet (Coulter, 1995; Coulter, 1996; Sisk, Gorman et al., 1996). In the USA (Sisk, Gorman et al., 1996) managed care for Medicaid beneficiaries resulted in greater satisfaction, yet, despite financial incentives to restrict services, there were no differences between intervention and control groups in overall use and costs of resources. Similarly, a review of disease management programs (Bodenheimer et al., 2005) noted the disease management companies' problem of carving out populations who would deliver cost savings. There was little evidence of programs achieving both improved health outcomes and reduced costs.

Additional reasons for the trial's inability to achieve cost neutrality were firstly that implementation of the care plan required adherence to the plan by GPs, patients and other service providers, as well as availability and accessibility of all necessary services. Secondly, it is doubtful that complications would have been reduced sufficiently in the time period of the trial to bring about the necessary changes in demand and therefore in hospital admissions. Thirdly, an unintended consequence was an increase in service use mediated by thorough assessment, needs identification through service coordinator home visits, increased patient

awareness of services, the planned preventive services and historical under-servicing in some areas.

The fourth factor is patient selection. The trial has demonstrated the need to select patients who need improved coordination of health services, and are willing and able to engage with this model of care. The patients most suitable to achieve cost containment (eg, those with at least three hospital admissions in the previous two years) are not necessarily the same group who are most likely to benefit in terms of improved health and well being. A suggested model would be to limit service coordination to six months. The patient would remain in the care of their primary care team who would follow up on the changes made through the addition of coordination and self-management support.

Strengths and Weaknesses of the model

Strengths of this model of coordinated care were the generic components of assessment, the care plan generator and the care plan which were applied across many diseases with a range of medical and psychiatric co-morbidities, in different populations and regions. The model was feasible and acceptable to both providers and patients. The P&G component was integral to the model, providing a patient-centred approach that added a psychosocial dimension to care planning and assisted motivation and self-management. A core strength was the role of the service coordinator, providing assessment, coaching, communication and change management across all aspects of the trial. The ‘discovery’ of the importance of self-management capacity in determining eligibility for coordinated care and developing a method to assess and target self-management interventions to the individual was central to the continuous improvement aspect of the model.

Weaknesses of the model included the indirect link between care planning, coordination and savings from reduced hospitalisation, and an inability to target coordination to those who would benefit. Once allocated to coordination there was no mechanism to cease provision of coordinated care, which meant that some intervention patients received unnecessary coordination throughout the trial.

Limitations

Overall, the Australian coordinated care trials aimed to test the effectiveness of a new system of health service delivery within the constraints of a controlled trial and with a rigid hypothesis-driven national evaluation framework. The many evaluation challenges included variable selection and eligibility criteria that were relaxed during the recruitment period, variable disease severity, variations in the extent of coordination available in different areas, and widely different contexts for the four sub-trials. In some sub-trials, the same GP acted for both intervention and control patients. The 'black box' effect of the model of care made it difficult to attribute benefits of the intervention group to a particular component of the intervention package.

The trial cohort included patients who were seriously ill as well as those who were not very ill, yet the same intervention processes were deployed for all patients. Secondly, there was no incentive for hospitals to participate in the coordinated care process as they continued to be funded on a throughput basis and any reduction in admissions for 'in trial' patients simply meant that more hospital places were available for 'out of trial' patients. It was not possible to 'cash out' hospital savings because this would have allowed the hospital funding base to be eroded.

The variation in patient selection did enable analyses that demonstrated that in a short time frame of two years, the coordination process may have been cost effective for those who had a history of hospital admission and co-morbidity. In contrast, in 1-2 years, improved quality of life could be achieved with a wider range of patient severity and service use. It can be speculated that because care planned patients received more preventative services than control patients (Heard, Kalucy et al., 2002), potential gains in survival, quality of life and financial costs could be achieved over the longer term.

The trial indicated that over time GPs became increasingly familiar with the care planning process, but the intervention was not in place for long enough for full implementation. GPs needed reminders to order services scheduled on the care plan. Patient adherence was affected by access, distance, understanding, motivation, and cost. Other

service providers were hindered by lack of awareness of the care plan and budget constraints. Purchasing of services through SA HealthPlus was limited by the extent of services included in the funds pool. Communication difficulties between service providers were addressed to some extent through the SA HealthPlus information system. However, the completeness, timeliness and usefulness of the information were limited by lack of electronic links with GPs, and by low numbers of GPs with computers at the start of the trial.

Policy Implications

The coordinated care trials have been successful in beginning the systems and culture change necessary for a preventative chronic care model in Australia. Examples of subsequent system change include the introduction in 2005 of new chronic care MBS item numbers for GPs to fund GP Management Plans (\$120) and Team Care Arrangement (\$95) and a range of item numbers for the provision of allied health services to support the care planning process (Australian Government Department of Health and Ageing, 2005). The Commonwealth Government also introduced funding to employ practice nurses in rural and remote areas and a program to implement a national health information system (Australian Government Department of Health and Ageing, 2006). The National Sharing Health Care demonstration projects (Australian Government Department of Health and Ageing, 2004) have trialed models of self-management support (PricewaterhouseCoopers, 2005). These policy directions have been supported by all governments' commitment to the National Chronic Disease Strategy and its four elements: a) prevention, b) early detection and intervention, c) integration and coordination, and d) self-management support (Council of Australian Governments (COAG), 2006).

A key policy implication is that coordinated care is best provided by a team, not an individual physician. Where care is preventative and planned, most of the tasks can be carried out by nurses and allied health professionals with the physician carrying out medical tasks. This would free GPs to concentrate on more clinically demanding tasks and complex patients. The WHO has recommended nine system elements essential to redesigning care for chronic

illness (Epping-Jordan et al., 2001). In Australia, a change in business processes in general practice is therefore required to facilitate a shift from reactive to preventative care.

Health reform has inherent personal, political and financial risks, often requiring 'hump' funding to trial new models of care and bring about system and attitude change (Harvey, 2000). During the trial, a change of state government led to a loss of momentum for chronic illness health reform and dismantling of the trial management team. A new state government in South Australia instituted the Generational Health Review in 2003, which identified the same factors that led to the SA HealthPlus trial in 1997. The review identified a need to integrate care for chronic illness, enhance primary care networks and implement self-management programs (South Australian Department of Human Services, 2003). Second round national coordinated trials are now in their evaluation stage.

Conclusions

The SA HealthPlus trial of coordinated care demonstrated that improvements in individual health and well-being for some patients with chronic and complex conditions can be achieved through patient-centred care involving GPs working with a service coordinator, using the P&G approach and a structured evidence-based care plan. The two-year trial was not able to demonstrate sufficient reduction in hospital admissions to pay for the costs of coordinated care. A longitudinal study is required to better assess individual health changes and the effects of service substitution on costs and hospitalisation rates where multiple strategies at individual and system level are introduced in a short time frame.

Service coordination was found to be a necessary additional role to that currently available in the health system. Being able to cross all health sector boundaries and incorporate behavioural change skills with a coordination role proved to be critical to the benefits of the trial. Better targeting of coordinated care, primarily those with prior hospitalisation and those who have potential to improve their self-management, are major lessons of the trial. These findings contribute to the emerging knowledge of core components of coordinated care for patients with chronic and complex health needs.

References

- Australian Government Department of Health and Ageing. (2004). "Sharing HealthCare Initiative." Retrieved May 2006, from <http://www.health.gov.au/internet/wcms/Publishing.nsf/Content/chronicdisease-sharing.htm>.
- Australian Government Department of Health and Ageing. (2005). "New Medicare Chronic Disease Management Items Replace Enhanced Primary Care (EPC) Care Planning Items from 1 July 2005." Retrieved June 2005, from <http://www.health.gov.au/internet/wcms/publishing.nsf/Content/pcd-programs-epc-chronicdisease>.
- Australian Government Department of Health and Ageing. (2006). "HealthConnect: A Health Information Network for All Australians." Retrieved May 2006, from <http://www.health.gov.au/internet/hconnect/publishing.nsf/Content/home>.
- Battersby, M., A. Ask, M. Reece, M. Markwick and J. Collins (2003). "The Partners in Health scale: The development and psychometric properties of a generic assessment scale for chronic condition self-management." *Australian Journal of Primary Health* **9**(2&3): 41-52.
- Battersby, M. W. (2005). "Health reform through coordinated care: SA HealthPlus." *British Medical Journal* **330**(7492): 662-665.
- Battersby, M. W., A. Ask, M. M. Reece, M. J. Markwick and J. P. Collins (2001). "A Case Study Using the "Problems and Goals Approach" in a Coordinated Care Trial: SA HealthPlus." *Australian Journal of Primary Health* **7**(3): 45-48.
- Blight, R. (1995). "HealthPlus: a developing model of coordinated care." *Health Cover*: 44-46.
- Bodenheimer, T., K. MacGregor and N. Stothart (2005). "Nurses as leaders in chronic care." *British Medical Journal* **330**(7492): 612-613.
- Butterworth, P. and T. Crosier (2004). "The validity of the SF-36 in an Australian National Household Survey: demonstrating the applicability of the Household Income and

- Labour Dynamics in Australia (HILDA) Survey to examination of health inequalities
" *BMC Public Health* **4**(44).
- Centers for Disease Control and Prevention (1997). Epi Info 6 Stat Calc Centers for Disease
Control and Prevention (CDC) USA.
- Centre for Health Advancement and KPMG Management Consulting (1999). *The Australian
Coordinated Care Trials: Interim Technical National Evaluation Report*. Canberra,
Commonwealth Department of Health and Family Services.
- Centre for Health Care Evaluation (2000). Evaluation of SA HealthPlus Coordinated Care
Trial - Final Report to the Department of Human Services South Australia. Adelaide,
Flinders University & Department of Human Services.
- Chen, A., R. Brown, N. Archibald, S. Aliotta and P. D. Fox (2000). Best Practices in
Coordinated Care. Princeton, NJ, Mathematica Policy Research Inc: 1-176.
- Commonwealth Department of Human Services and Health (1995). Call for Expressions of
Interest in Conducting Trials in Coordinated Care Canberra, Commonwealth
Department of Human Services and Health.
- Coulter, A. (1995). "Editorial: Shifting the balance from secondary to primary care." *British
Medical Journal* **311**: 1447 – 1448.
- Coulter, A. (1996). Shifting the balance between secondary and primary care, Chp 13.
Scientific Basis of Health Services. M. Peckham and R. Smith. London, BMJ
Publishing Group.
- Council of Australian Governments (COAG). (2006). "Council of Australian Governments
Website." Retrieved 14 March 2006, from <http://www.coag.gov.au/index.htm>.
- Eagar, K. (1997). *Outcomes measurement: the issues for the local evaluators and triallists*.
In: Australian Health Outcomes Collaboration 1997. Managing and Measuring
Health Outcomes: from Policy to Practice, Canberra.
- Epping-Jordan, J., R. Bengoa, R. Kwar and E. Sabate (2001). "The challenge of chronic
conditions: WHO responds." *BMJ* **323**(7319): 947-948.

- Fox, J. and P. Conroy (2000). Working with serious mental illness: a manual for clinical practice. C. Gamble and G. Brennan. Edinburgh, Bailliere Tindall.
- Frith, P., M. Battersby, P. McDonald and C. McGowan (2001). Improving Processes and Clinical Care in the SA HealthPlus Coordinated Care Trial. *The Australian Coordinated Care Trials Reflections and Lessons*. Commonwealth of Australia. Canberra, Ausinfo: 69-78.
- Harvey, P. W. (2000). "Coordinated Care Trials and change in rural health systems." *Australian and New Zealand Journal of Public Health* **24**(2): 217-218.
- Harvey, P. W. (2001). Coordinated Care and Change Leadership - inside the change process. *Department of Public Health*. Perth, University of Western Australia: 231.
- Harvey, P. W. (2001). "The Impact of Coordinated Care: Eyre Region, South Australia 1997-1999." *Australian Journal of Rural Health* **9**(2): 70-74.
- Heard, A., E. Kalucy, D. Richardson, M. W. Battersby, P. Frith and C. McGowan (2002). "An Evaluation of the Care Planning Process in Coordinated Care Trials: What Difference Do Care Plans Make to Service Provisions?" *Australian Journal of Primary Health* **8**(1): 52-56.
- Hurley, C., D. Whitford and L. Kalucy (2000). Evaluation of SA HealthPlus Coordinated Care Trial - Thematic Report 3 - The Response of the Wider System to SA HealthPlus. Adelaide, Centre for Health Care Evaluation, Flinders University.
- Lawn, S., M. W. Battersby, R. Pols, J. Lawrence, T. Parry and M. Urakalo (2006). "The Mental Health Expert Patient: The effectiveness of implementing a generic chronic condition self-management program for patients with mental illness." *International Journal of Social Psychiatry* (**in press**)(November 2006).
- Marks, I. (1985). *Psychiatric Nurse Therapists in Primary Care*. London, Royal College of Nursing of the United Kingdom.
- Marks, I. (1986). *Behavioural Psychotherapy - Maudsley Pocket Book of Clinical Management*, Wright, Bristol.

- Marks, I., R. Hallam, J. Connolly and R. Philpott (1977). "Nursing in Behavioural Psychotherapy: An Advanced Clinical Role for Nurses." *Royal College of Nursing of the United Kingdom*.
- McCallum, J. (1995). "The SF-36 in an Australian sample: validating a new, generic health status measure." *Australian Journal of Public Health* **19**(2): 160-166.
- Mundt, J. C., I. M. Marks, M. K. Shear and J. H. Greist (2002). "The Work and Social Adjustment Scale: a simple measure of impairment in functioning." *British Journal of Psychiatry* **180**: 461-4.
- PricewaterhouseCoopers (2005). National evaluation of the Sharing Health Care initiative - Final Report & Executive Summary. Sydney, Australian Government Department of Health and Ageing: 58.
- Regan-Smith, M., K. Hirschmann, W. Iobst and M. W. Battersby (2006). "Teaching Residents Chronic Disease Management using the Flinders Model." *Journal of Cancer Education* **21**(2).
- Richards, D. and R. McDonald (1990). *Behavioural Psychotherapy : A Handbook for Nurses*. Oxford, Heinmann Medical Books.
- Sanson-Fisher, R. and J. Perkins (1998). "Adaptation and Validation of the SF-36 Health Survey for use in Australia." *Journal of Clinical Epidemiology* **51**(11): 964-967.
- Sisk, J., S. Gorman, A. Reisinger, S. Glied, W. DuMouchel and M. Hynes (1996). "Evaluation of Medicaid Managed Care: Satisfaction, access and use." *Journal of the American Medical Association* **276**(1): 50-55.
- Smith, B. J., H. J. McElroy, R. E. Ruffin, P. Frith, A. R. Heard, M. W. Battersby, A. J. Esterman, P. Del Fante and P. McDonald (2002). "The effectiveness of coordinated care for people with chronic respiratory disease." *Medical Journal of Australia* **177**: 481-484.
- South Australian Department of Human Services (2003). Final Report of the Generational Health Review., Adelaide, South Australian Department of Human Services.
- SPSS Inc (1997). *SPSS Base 7.5 for Windows Users Guide*. Chicago, IL, SPSS Inc.

- Wagner, E. H., B. T. Austin, C. Davis, M. Hindmarsh, J. Schaefer and A. E. Bonomi (2001).
"Improving Chronic Illness Care: Translating Evidence into Action." *Health Affairs*
20(6): 64-78.
- Ware, J. E. and C. D. Sherbourne (1992). "The MOS short -form health survey (SF-36)."
Medical Care **30**: 473-483.
- Warren, J. R., J. T. Noone, B. J. Smith, R. Ruffin, P. Frith, B. J. van der Zwaag, G. V.
Beliakov, H. K. Frankel and H. J. McElroy (2001). "Automated attention flags in
chronic disease care planning." *Medical Journal of Australia* **175**(6): 308-12.
- Weingarten, S. R., J. M. Henning, E. Badamgarav, K. Knight, V. Hasselblad, A. J. Gano and
J. J. Ofman (2002). "Interventions used in disease management programmes for
patients with chronic illness - which ones work? Meta-analysis of published reports."
British Medical Journal **325**: 1-8.
- World Health Organisation (2002). *Innovative Care for Chronic Conditions: Building Blocks
for Action: Global Report*. Geneva, World Health Organisation.