CENTRE FOR HEALTH PROGRAM EVALUATION

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Evaluation of the Southern Health Care Network Coordinated Care Trial

Summary Report

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The evaluation team was contracted to the SHCN CCT, with funding through the Commonwealth Department of Health and Aged Care. Additional resources were contributed to the evaluation through the Centre for Health Program Evaluation, by the Health Economics Unit of Monash University and the Program Evaluation Unit of the University of Melbourne.

Research Team and Team Member Roles

Each member of the evaluation team had specific areas of responsibilities consistent with their expertise, as well as a broader peer review role. The particular responsibilities were:

Leonie Segal: Manager of the evaluation and responsibility for the health economics aspects. Preparation of the Executive Summary, Chapter 1 Primary hypothesis-overview, Chapter 5 Resource use and costs, Chapter 7 Care coordination model, Chapter 8 Funds pool, Chapter 10 Risk assessment tool and Chapter 11 Administrative arrangements;

Neil Day: Data manager, responsible for implementation and analysis of the SF36 and AQoL, preparation of Chapter 3 Quality of life;

Susan Day: Survey manager, responsible for field work related to the questionnaires, development and analysis of the patient questionnaire and the diary, analysis of the GP questionnaire. Preparation of Chapter 3 Quality of life, Chapter 4 Patient perceptions, Chapter 6 Patient diary, Chapter 11 Administrative arrangements and Chapter 12 Impact on providers and the service system;

David Dunt: Advisor on evaluation design and epidemiological aspects of the evaluation. Design and interpretation of GP questionnaire. Preparation of Chapter 2, Introduction to the local Evaluation, Chapter 9 Care protocols;

Hannah Piterman: Responsible for qualitative research and preparation of thematic reports.

Iain Robertson: Collation and analysis of all costing data, and assistance with preparation of figures and graphs. Conduct of survival analysis;

Graeme Hawthorne: Analysis of the risk assessment tool, Preparation of Volume IV which formed the basis of Chapter 10.

Final Evaluation Report

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1 Trial aims and the process of Trial establishment

The final report of the Southern Health Care Network Coordinated Care Trial (SHCN CCT) draws together the results of more than three years of research. The local Evaluation team was appointed in October 1996, with an initial brief to develop an evaluation model and evaluation instruments to assess the performance of the Trial. The Evaluation brief also provided for assistance to the newly appointed management team for the SHCN CCT to progress Trial development to the 'live' stage, with an enrolled client population and workable protocols of care coordination and funds pooling. The SHCN CCT is one of two Victorian trials and one of nine national trials that together form the Australian Coordinated Care Trials. Both the evaluation model and the Trial itself were established within a framework determined by the Commonwealth.

There were four primary requirements:

- the Trials were to be addressed to people with complex chronic care needs,
- a funds pool was to be created to reflect expected health service use, with contributions by key providers of services and with health services paid for from the pool,
- the provision of care coordination services, with the GP as the preferred care coordinator,
- a budget neutral context, although separate funds were made available to each Trial for trial establishment and evaluation.

In common with other local Trials, the SHCN CCT seeks to determine whether coordinating care for people with chronic illness and complex care needs, in the context of the pooling of health service funds, can improve the health outcomes of participants within current resourcing.

The task of introducing a health system reform model, of devising a detailed care coordination proposal and translating this into a functioning trial, represents a major undertaking. The fact that this was to be accomplished within a nine-month time frame, dictated by the Commonwealth requirement for an operating Trial by July 1 1997, made the task virtually impossible[1]. (Approval to proceed was only given in October 1996).

The establishment tasks, which were many and complex, included:

i **Establishment of a management structure** to oversee Trial set up and Trial implementation. This saw the establishment of a GP Reference Group, a Consumer Reference Group, a Service Provider Network, a State/Commonwealth Government Trial Monitoring Committee. This was in addition to the SHCN CCT Committee of Management made up of the consortium members, of the Southern Health Care Network, the Dandenong and District, and Sherbrooke and Packenham Divisions of General Practice and five Community Health Centres.

[1] The SHCN CCT was the only trial to formally go live July 1. Most other trials became fully operational towards the end of 1997. As a consequence the end date for the Trials was extended from June 30 to December 31 1999.

ii **Determination of criteria for entry to the Trial**, and based on that criteria an approach to recruitment, likely to be successful given a tight recruitment interval.

iii **Development of a basis for determining the Funds Pool** to reflect expected service use and cost. This required identification of a sample of potential clients and their previous health service use tracked back for two years. These data were used by a firm of actuaries to calculate the appropriate contributions to the Pool by key agencies. Negotiations were then held with these agencies - the Commonwealth Government, in relation to services funded though the Health Insurance Commission (HIC), the SHCN and community based providers, concerning their participation in the Trial and in contributions to the funds pool. Agreement had to be reached concerning the basis on which funds would be pooled.

iv **Establishment of criteria by which services would be accessed and paid** for from the pool in negotiation with the key players.

v **Establishment of a payment system** for the recording of services used by Trial participants and for payments to service providers and timing for activation of payment into and through the Pool.

vi **Development of a care coordination model** - its broad structure and the philosophy underpinning the model, whether alternative levels of care coordination should be provided and what care coordination services should be offered, details of how the care coordination model would work, the role of the various players and the relationship between them. This required on-going negotiations with the Dandenong Division of General Practice and the acute hospitals within the region, Dandenong and District Hospital (DDH) and Monash Medical centre (MMC). The patient's usual GP was allocated the role of care coordinator.

vii **Development of a mechanism to enable participants to access a suitable level of care coordination services** – this resulted in the development of a Risk Assessment Tool (RAT) to allocate clients into different levels of care coordination services. A method for application of the risk tool also needed to be determined.

viii **Establishment of a procedure for completion of care plans** – this required development of a care plan proforma, decisions about the process for completion and peer review and the fee to be paid. An implementation and training program had also to be established. The GP care coordinator was given the responsibility for completing the care plan.

ix **Selection of a suitable evaluation model and particularly the nature of the control group**. The key choices were between a randomised control design and an area control, and whether to randomise on the basis of GPs or participants A randomised Trial design was adopted, with participants randomised once informed consent was obtained. A decision was made for unequal randomisation to increase the chance of participants getting into the intervention group, which it was presumed would encourage participation.

x **Recruitment** of intervention and control participants and of GPs to act as care coordinators. A recruitment strategy had to be devised that would ensure large numbers were enrolled - a Commonwealth requirement of the trials. A decision was made to directly approach (via mail) persons who met the eligibility criteria (identified from hospital records).

Recruitment into the Trial, including obtaining informed consent, was managed through a recruitment agency. Those who consented to participate in the Trial and were randomised into the intervention group, were asked to nominate a GP (expected to be their 'usual GP') to act as care coordinator. The GP was then approached by the Trial to fulfil the role of care coordinator.

xi **Recruitment of staff for Trial set up and implementation** – this required determination of staffing needs (job descriptions etc.), staff training (eg of service coordinators and case managers) and the establishment of a management team.

xii **Setting up of data collection systems** to provide for data management information purposes and for the evaluation.

xiii **The review of Trial objectives** and consideration of opportunities for service development.

The demands of the Trial development phase and the challenge of completing it at all, let alone, within a nine month time frame cannot be overstated. Many of the tasks were reliant on input from other tasks, further compounding the difficulty of completion within the available time. That this Trial, and others, were able to move from the planning to the live Trial stage, with only minor delay, is a credit to the tenacity and commitment of all those involved in the establishment process.

Finding 1: CCT as defined can be implemented

- The many complex tasks of devising and implementing a model of health care which incorporates an enrolled population of persons with complex chronic conditions, the pooling of health services funded through all levels of government and care coordination, can be accomplished successfully within an exceedingly short time frame.

The pressure of the Trial establishment phase was not without cost, in terms of a tenseness in the relationships between the various players, a lack of acceptance by all of the care coordination model, and the introduction of an expensive computing/data management system. However, on balance the achievement is impressive with many of the decisions taken at pace proving to be extremely sound. As an example, the Risk Assessment Tool, which was developed without the opportunity for trialling prior to adoption, proved to be an effective instrument for allocating clients according to need for care planning, at least as an initial designation.

It can also be observed that other similar trials which have had a longer planning period, (such as the NSW Diabetes Integrated Care Trial[2]), have not necessarily managed the establishment phase better, but have often been less successful, with difficulty in recruitment, problems with data collection and similar difficulties with relationship between key parties.

2 SHCN coordination care model

The Southern Health Care Network Coordinated Care model has been described fully elsewhere[3] and also in Chapter 1 in our report of the evaluation[4]. The important characteristics of the SHCN CCT model are therefore described only briefly here.

Eligible population: The eligible population was defined as all residents from nominated post-codes within the Southern Health Care Network catchment who had incurred more than $4,000 of in-patient costs at Monash Medical Centre (MMC) and Dandenong and District Hospital (DDH), over a 24 month period between 1994 and 1997. This resulted in a participant group across all ages, disease classes and states of health.

Care coordination model: The model of care coordination devised, reflects the diversity of the participant group and their need for differing levels of care coordination. Intervention group participants were classified into three risk levels, (low, medium and high), using the specially devised Risk Assessment Tool (RAT). All participants had a Care Plan developed with their care coordinator, (mostly their usual GP) which was reviewed annually. This was the only service provided to the low risk group, unless they were in a special disease group that benefited from the Care Panel activity (see below). This group constituted 70% of intervention clients. Medium risk clients (~25% of intervention clients) received in addition, six monthly reviews of their Care Plan plus access to phone based support from a 'Service Coordinator'. Service Coordinators had a case load of 200 to 250 patients and a brief to assist patients to access services nominated in their Care Plans. While the service coordinator could liaise with the GP concerning the content of a Care Plan, the GP had sole responsibility for its development. Persons identified as high risk (~5% of intervention clients), were offered 3-monthly reviews of their Care Plan and were allocated a Case Manager who provided intensive individualised support and advocacy.

A standard Care Plan form was developed for completion by the GP with the patient. A copy of the completed plan was sent to the Dandenong Division of GP for peer review. The Division also ran training sessions for GPs about their role in the Trial.

Funds pooling arrangements: The Trial management decided to include only the most common and costly services in the Funds Pool - in-patient admissions to MMC and DDH, out-patient services provided by MMC and DDH, HIC funded medical and pharmaceutical services. Part way through the trial RDNS also became a contributor to the Pool. No other community based services contributed to the Pool. The Trial negotiated the contribution rate with each agency. In-patient services were contributed to the Pool and paid for on the basis of DRG (diagnosis related group), at the variable WEIS (weighted inlier separation) rate of $1,175. The expected volume of

2 Segal and Robertson *Economic evaluation diabetes integrated care trial, Midnorth Coast NSW*, Report to the Midnorth Coast Health Service NSW. Health Economics Unit, Monash University, 2000.

3 Commonwealth Dept of Health and Aged Care, *The Australian Coordinated Care Trials, Background and Trial descriptions,* Chapter 9 The Southern Health Care Network Coordinated Care Trial, Commonwealth Dept health and Aged Care, 1999.

4 Dr Leonie Segal, Centre for Health Program Evaluation.

services was based on historic use of a sample of potential trial participants. Expected use of services was based on the mean level of use of a previous period, expect for in-patient servcies, for which a downward adjustment was made in an attempt to take account of the bias in selection criteria for entry to the Trial. No account was taken of individual patient characteristics. Only services that contributed to the Pool were paid for from the Pool.

Basis of access to services: Intervention (and control) group participants were able to access services according to pre-existing eligibility criteria. No discretionary funds were available through GPs, Service Coordinators or Case Managers to purchase services on the behalf of intervention clients, even where additional services were nominated on Care Plans as integral to patient care. Additional services purchased through the Funds Pool were limited to service coordination, case management and respiratory nurse education, an initiative of the respiratory Care Panel.

Special initiatives - Care Panels: Because of the diverse nature of the client population there was difficulty in determining appropriate disease based strategies to promote best practice care. After 12 months into the Trial, five working parties were formed to develop strategies to target key disease groups and health service use issues. These were a Respiratory Panel, a Cardiac Panel, a Mental Health Panel, a Pharmacy Panel, a Diabetes Panel and an expert group to look at unplanned admissions.

3 Local evaluation

The local evaluation of the SHCN CCT follows the National Evaluation Framework and Guidelines. It incorporates formative and summative elements, and quantitative and qualitative approaches to data gathering. The evaluation tasks have been designed to answer the primary research question of the Trial: Does care coordination and funds pooling achieve improved client outcomes within current resourcing? The evaluation is designed to determine which attributes of the health care delivery and funding model have contributed to, and which detracted from performance. The purpose is to draw on this evaluation (and that of the other trials) implications for health system reform. What can be learnt about the types of health funding and delivery arrangements that are most likely to further the capacity of the health system to deliver patient health and wellbeing, for those with complex chronic conditions without an increase in funding?

The Evaluation has proceeded through the collection and analysis of several sources of data:

- ***Socio-demographic profile -*** description and comparison between intervention and control group.
- ***Mortality -*** development of a survival curve to compare outcomes for persons in the control and intervention group, based on Trial information and interrogation of the National Death Index.
- ***Quality of life questionnaire (postal) -*** Completion of the SF-36 and AQoL (Australian quality of life utility instrument), for intervention and control clients at baseline, at 12 months and at Trial completion; comparisons were made between control and intervention group values, between base line and final values and with Australian norms.

- ***Resource use and costs -*** Use and costs of medical and hospital services were collated and analysed for all CCT participants from date of randomisation for control clients and from activation (approval of care plan) for intervention clients, until June 30 1999[5], or withdrawal from Trial.
- ***Review financial data and Funds Pooling arrangements***.
- ***Self-completed client diary for a sample of participants*** to establish the extent of direct patient costs and the role of family members, and others, as carers.
- ***Participant questionnaire*** covering views about their involvement in the Trial and other aspects of their attitudes to the health system and to their own health care.
- ***GP Questionnaire*** at Trial midpoint and end, covering GP participation in care planning and views about the coordinated care model and aspects found to be most valuable.
- ***Case studies*** involving in-depth interviews of patients, their families and where, available and relevant, their GP, Case Manager and Service Coordinator.
- ***In-depth interviews*** with Trial management and key players.
- ***Analysis of the risk assessment tool***.

4 Key observations: characteristics of Trial participants and success of randomisation

A total of 2,741 participants gave informed consent to be enrolled in the Trial, with 2,074 randomly assigned to the intervention group and 667 to the control group. Of the intervention group, 1,789 became 'active participants', which was deemed to occur with the lodgement of a Care Plan. This activated a commitment to the Funds Pool and payment for services from the Funds Pool and access to the care coordination protocol.

The baseline characteristics, socio-demographic indicators, and quality of life scores of the control and intervention groups show no significant differences. This is indicative of a successful randomisation process. This is an important finding as the performance of the Trial has largely been determined by a comparison of intervention and control group participants.

From the socio-demographic data it can be observed that the client group includes many with limited financial resources. Private health insurance is held by only 14% of Trial group participants, which is substantially lower than that for the Victorian population as a whole (30% June 1998[6]) and other the Coordinated Care Trials. (For instance the ACT Trial, Linked Care, Sydney and SA Health Plus Trial, South, report high rates of health insurance at 50%, 42% and 42% respectively[7]). Only 26% of participants are employed (part time or full time) and 30% are identified as retired. The majority, 62% are on a pension or benefit and 81% identify themselves as having an income of less than $20,000.

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5 While the Trial continued to December 31st1999 reconsent was required for participation beyond June 30 with a substantial (~40%) loss of clients between June and December 1999. The loss was uneven between the control and intervention groups and within the intervention group - a higher proportion of persons at high risk remaining in the Trial. Thus confidence in the integrity of the randomisation outcome beyond June 30 1999 was lost. Thus data collection and analysis beyond that date would have weakened any comparison between intervention and control clients.

6 Private Health Insurance Commission, Web Page, 1999.

7 *The Australian Coordinated Care Trials Interim Technical National Evaluation Report*, Department of Health and Aged Care.

Health status, at base line is poorer than that of the general Australian community. The SF-36 the mean summary score for physical health for the Trial population at base line was 42.4 and for mental health 45.8 (age adjusted), which compares with the standardised 50 for the Australian population.

Finding 2: Characteristics of enrollees – success of randomisation

- Participants in coordinated care can be successfully randomised into an intervention and control group. In the SHCN CCT success is clear in the equivalence in all measured attributes of the control and intervention group.
- Socio-economic parameters of participants and health status in the SHCN Trial indicate a relatively deprived client group, in poor health.

5 Key observations: health outcomes

Two quality of life instruments were used to measure quality of life of participants at Trial commencement, at 12 months and at Trial completion. The two instruments were:

- **SF-36**, a generic health status instrument that reports quality of life in 8 dimensions plus 2 summary scores for mental (MCS) and physical health (PCS); and
- **AQoL**, the Assessment of Quality of Life utility instrument developed in Australia, by the Centre for Health Program Evaluation, which calculates a single score of between -0.04 and 1.0, which represents a quality of life adjuster to time lived in the relevant health state, (-0.04 represents the worst possible health state, zero denotes death and 1.0 excellent health).

Both instruments discriminate well between very different health states, such as between persons with or without selected diseases and between those at different risk level.[8] However, whether these instruments are sensitive to the type of changes in health related quality of life potentially achieved through coordinated care is unknown. The differing level of intensity of the intervention and the poor and deteriorating health status for many of those in the Trial receiving the most intensive care coordination may reduce the likelihood of detecting improvement, especially as the evaluation protocol did not include the application of the risk tool to the control group, (a decision of Trial management). Thus it was not possible to compare change in quality of life of intervention and control participants within risk levels.

Three further approaches to identifying possible change in health and wellbeing attributable to the Trial have been employed:

- a series of closed and open-ended questions to all Trial participants concerning their involvement in coordinated care, and their views about whether the Trial has made a difference to their quality of life,
- a series of in-depth face-to-face interviews with 40 persons enrolled in the Trial to understand how their participation in the Trial has affected their lives, and
- a survival study to assess whether the Trial has had any discernible impact on mortality.

[8] See ABS Cat 4399.0 and Figure 2.

Quality of life Instruments

There is no significant difference between the mean SF-36 or AQoL scores of the control and intervention cohort at either Trial commencement or Trial end (Table 1). The turnover value, which computes the change in score for each participant between Trial end and beginning also shows no significant difference between the control and intervention group (Table 2). A small non-significant improvement observed in the intervention group relative to the control for the AQoL and the mental health component score of the SF-36 may suggest a trend (Figure 1). As noted above, a comparative analysis of results by risk level could not be conducted, which would be valuable as risk level is an indicator of both health status and level of care coordination received. The problem is that the risk assessment tool was applied only to intervention group participants.

Finding 3: Quality of life

- No net change in health status was observed between Trial commencement and Trial end in mean SF-36 scores or mean AQoL score for either the control or intervention groups.

No difference in health status was observed between control and intervention group clients at each time the instruments were applied.

Table 1 Mean SF-36 and AQoL scores, baseline and Trial end

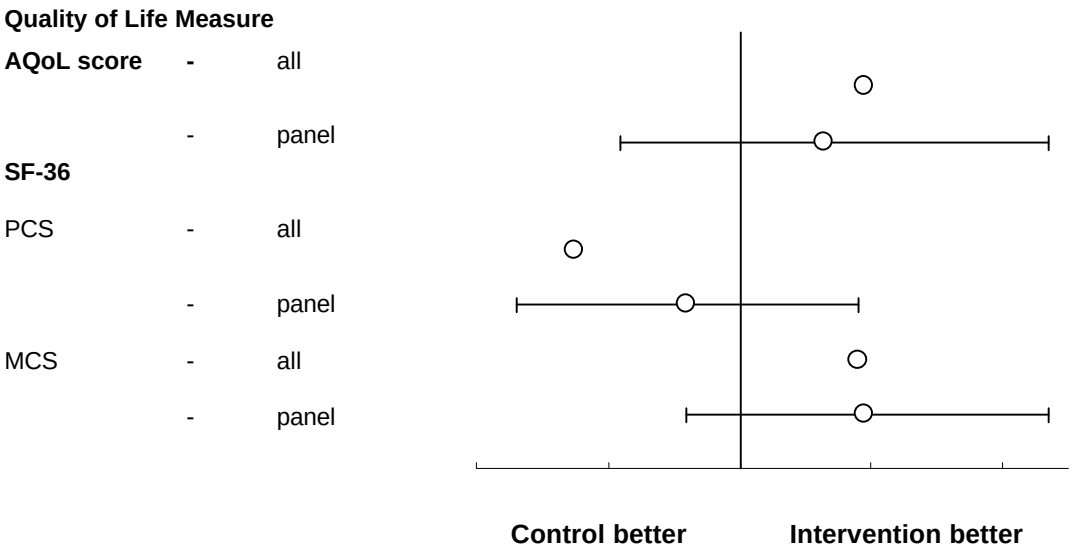
Quality of life measure			Intervention group		Control group	
			Trial start	Trial end	Trial start	Trial end
AQoL	Total score	- all	0.6213	0.6408	0.6284	0.6362
		- panel	0.6493	0.6398	0.6553	0.6375
SF-36	PCS	- all	42.64	42.92	41.87	43.23
		- panel	42.7	42.8	42.6	43.2
	MCS	- all	45.71	46.68	46.03	45.98
		- panel	46.7	46.7	46.5	46.1

Notes: PCS Physical component summary score,
MCS Mental component summary score,
all All participants
panel Those participants who completed waves 1 and 3 of the surveys (at commencement and end)

Table 2 Change in quality of life score: Trial end less Trial commencement

Quality of life measure			Intervention group mean	Control group mean	Difference: Intervention – Control mean and confidence limits score			%		
AQoL score	-	all	+ 0.02	+ 0.01		+0.012			+1.9	
	-	panel	- 0.01	- 0.01	-0.001	+0.008	+0.029	-2.1	1.3	+4.4
SF-36										
PCS	-	all	+ 0.28	+ 1.36		-1.08			-2.5	
	-	panel	+ 0.11	+ 0.45	-1.45	-0.34	+ 0.772	-3.4	- 0.8	+1.8
MCS	-	all	+ 0.77	- 0.05		+0.82			+ 1.8	
	-	panel	+ 0.28	- 0.57	-0.429	+0.856	+2.142	-0.9	+1.9	+4.6

Figure 1 SF-36 physical component score, mental component score and AQoL: change in mean score between Trial commencement and Trial end



Notes: % per cent change in mean score of intervention group score (end compared with base line), less per cent change in mean score of control group.
panel based on individual comparisons for those for whom baseline and end scores available.
all based on mean scores for all who completed baseline, and for all who completed end

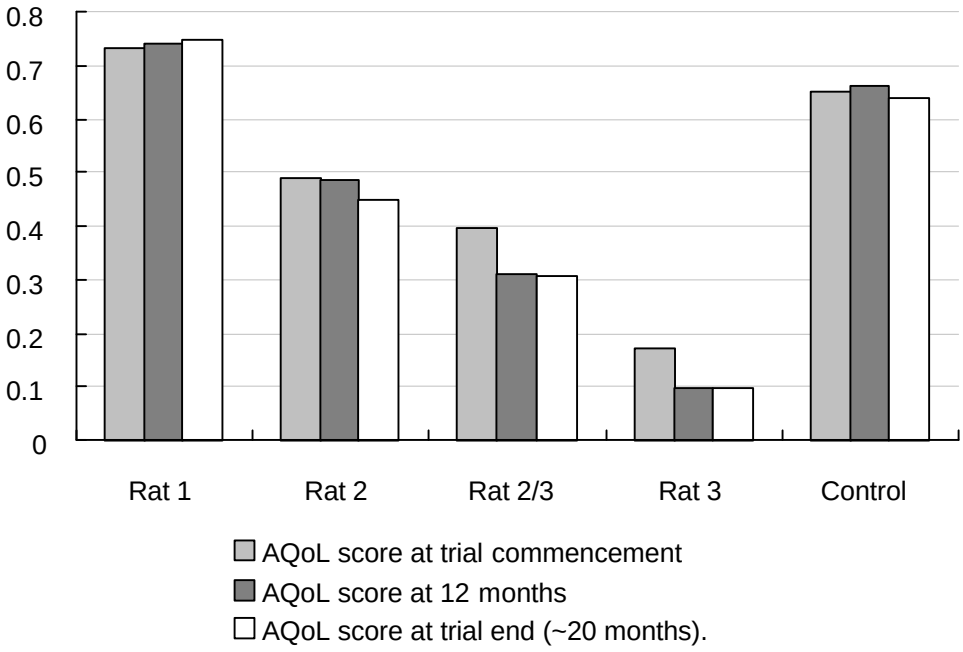
Quality of life score, by risk level can be observed for the intervention group and shows a strong relationship with risk level (Figure 2). The results also suggest a reduction in quality of life over time in those at higher risk levels. This suggests an overwhelming influence of the underlying health condition, on which the effect of the intervention is not discernible, especially in the absence of a control group allocated to risk level. The RAT category 2/3 includes persons who move from a lower to a higher risk level over the course of the Trial, denoting a worsening of their health state (or an incorrect allocation in the first instance). All those in level 3, (high risk) are in

very poor health as seen in the very low mean AQoL score of 0.2. It is likely that the observed drop in mean score reflects the progressive nature of many of the conditions.

Finding 4: The risk assessment tool (RAT)

- There is a strong relationship between RAT score and health status measured by the AQoL.
- Within each RAT level a change in mean score is observed between Trial commencement and Trial end with a worsening in health state in those at higher risk levels, while the health of those in the lower risk levels improved slightly. As there are no RAT scores for the control group, a comparison by RAT level could not be made.

Figure 2 AQoL scores by risk level and time - panel study
Intervention and control group participants who completed AQoL on three occasions



Rat 1 Risk level 1 (low risk) throughout the Trial n= 658
Rat 2 Risk level 1 or 2 (medium risk) throughout the Trial, n=231
Rat 2/3 Risk level 3 (high risk), but also 2 (or1) at some stage during the Trial, n=20
Rat 3 Risk level 3 (high risk) throughout the Trial, n=26

Mortality

As the Trial was targeted at persons who had incurred high acute care costs, the Trial population included many persons who were very ill with a higher than average death rate. It was thus decided to test for an impact of the Trial on survival, as a central determinant of health and wellbeing.

A total of 116 deaths were reported to the evaluation team over the course of the Trial. A further 32 deaths were identified through a search of the National Death Register in March 2000, 148 deaths in total. This consisted of 108 deaths in the intervention group (5.2% of the 2,074 persons randomised to the intervention group), and 40 deaths in the control group (6.0% of the control group). A survival analysis has been computed, taking account of the dates of death. The results of this analysis are reported in Figure 3 and illustrated in Table 3.

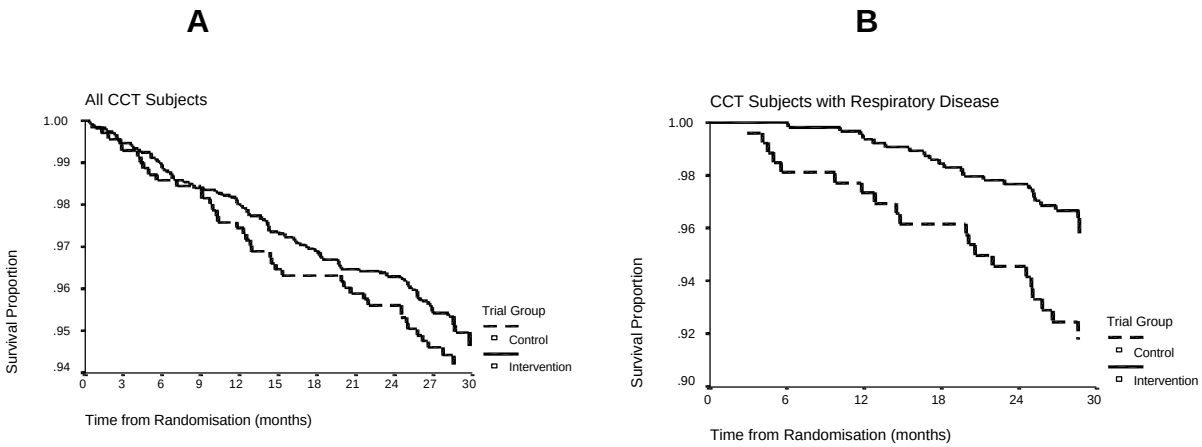
This analysis shows a non-significant mean reduction in the death rate for intervention group participants of 15% (Cox hazard proportional ratio of 0.853). As the Trial covered only a two-year time frame, it is plausible that the failure to reach traditional levels of significance is due to the short-term nature of the intervention. When deaths were analysed by major clinical groupings, a large and significant difference in mortality is observed in persons with respiratory illness (but not for any other condition). Persons were classified into major disease groupings on the basis of use of pertinent drugs and/or relevant medical services, derived from the PBS and MBS data bases. The mean reduction in mortality rate for persons with respiratory illness in the intervention group is 54% (Cox hazard proportional ratio of 0.457 and p value of 0.012). Further work is needed to confirm this result.

We were not able to classify into disease groupings, intervention clients who died after randomisation but before activation. We are seeking access to their health service use data to enable such a classification and will then redo the analysis. However, the results are plausible. Respiratory illness was a focus of the intervention and a group for whom the adoption of better quality care could improve health outcomes within a relatively short time frame.

Finding 5: Mortality

- There was an observed improvement in survival rate for the intervention group as a whole, but this was not statistically significant.
- For persons with a respiratory illness the death rate was 54% lower in the intervention than control group (statistically significant p=0.012). But due to missing data the result is provisional.

Figure 3 Survival analysis: intervention group compared with control group (A) all participants and (B) participants with respiratory disease (a)



Notes:

(a) The respiratory result is provisional. The analysis is to be recalculated once data is obtained to allocate intervention clients who died between randomisation and activation to disease class.

Table 3 Survival analysis: SHCN CCT subjects over a 30 month period (a)

	Deaths (b)						Cox Hazard Ratio (c)	p =	95% Confidence Intervals	
	Intervention			Control			Intervention v Control		Lower	Upper
	Nd	Ns	%	Nd	Ns	%				
All Subjects	108	207	45.2	40	668	6.0	0.853	0.391	0.592	1.228
All Respiratory disease (d)	24	327	7.3	20	150	13.3	0.457(e)	0.012	0.248	0.839

Notes:

(a) The respiratory result is provisional. The analysis is to be recalculated once data is obtained to allocate intervention clients who died between randomisation and activation to disease class.

(b) Analysis was performed on an intention-to-treat basis from the time of randomisation until 31st Dec 1999.

(c) Nd = number of deaths, ascertained by a search of the National Death Register in March 2000.
Ns = number in sample frame, % deaths of sample to end December 1999.

(d) Cox Hazard Ratio adjusted for age group in each case. A hazard ratio of 1.0 indicates no effect of intervention, and a ratio below 1.0 indicates a beneficial effect of the intervention.

(e) Respiratory Disease was defined by the use of PBS data to include all persons on respiratory drugs: b_2-stimulants, inhaled corticosteroids, theophyllines and mast-cell stabilisers,

(f) Results should be considered provisional, analysis to be recalculated once extra data obtained to enable intervention clients who died between randomisation and activation to be allocated to disease class.

Patient perceptions

Patient views of coordinated care were established from:

- a questionnaire to all intervention and control group participants, covering a range of issues about their experience with coordinated care, about their health and access to health care, using closed and open-ended questions, and
- in-depth interviews with 40 Trial participants.

The questionnaire was answered by 1,499 Trial participants. In response to a question about whether they thought their quality of life had changed as a result of their participation in the Trial, most participants said there had been no change. But, a higher proportion of the intervention group (24%), reported a positive impact on wellbeing, compared with 16% of control group participants. The difference was statistically significant.

In written comments concerning the reasons for improved wellbeing, intervention group participants were more likely to nominate factors central to the care coordination process. For instance, after allowing for the unequal randomisation, intervention group respondents were more likely to nominate assistance with access to services (3.3 times expected), appreciation for concern shown (2.7 times expected), and improved GP care and better liaison between services (4.3 times), than control group respondents (see Table 4).

Table 4 Participant perception of impact of CCT on quality of life and source of positive experience

Perceived impact of CCT on quality of life	Intervention group		Control group	
	n	%	n	%
Worse	5	1	3	1
No change	807	75	356	83
Improved a little	180	17	37	8
Improved a lot	78	7	33	8
For those who improved: Comments classified by response type				
	Number	**Ratio(a)**	**Number**	**Ratio(a)**
- Assisted with access to services	81	3.3	10	1
- Appreciated concern shown and having some-one to talk to	39	2.7	6	1
- Increased understanding to better manage own health	27	1.8	6	1
- Improved GP care, better liaison between services	21	4.3	2	1
- Reassurance, extra knowledge about services	28	1.6	7	1
- Helping others	9	1.2	3	1
- Liked newsletter	8	1.6	2	1

Notes:

(a) Relative to expected ratio of 2.45 intervention to control group, with response from control group set at 1.0. For instance 3.3 means intervention group 3.3 times as likely to have made the comment in the context of a perceived improvement in quality of life attributable to the CCT as control group participants.

Respondents from the intervention group were far more likely to indicate CCT had improved their quality of life if they were actively involved in the care planning process. For instance in response to a question on the usefulness of the care plan, 61% of participants who indicated their care plan was very useful also indicated that their quality of life had improved through their involvement in coordinated care. While 38% of persons who found the care plan moderately useful and only 4% of those who found the care plan of little use reported an improvement in quality of life due to coordinated care (see Table 5).

Table 5 Intervention group participants' quality of life and perceived involvement in the care planning process

Care planning activity and level of involvement		Perceived change in quality of life %			
		improved a lot	improved a little	no change	All (c)
Did GP review care plan with them (n=1048)					
- yes	n=731	10	20	70	100
- not sure	n=145	3	15	82	100
- no	n=100	1	11	86	100 **
- no care plan (a)	n=106	0	2	98	100
Level of involvement in review of care plan (n=713) (b)					
- very involved	n=483	12	21	67	100
- moderately involved	n=143	8	22	69	100
- slightly involved	n= 67	3	12	85	100
- not at all involved	n= 20	0	10	90	100
Usefulness of care plan n=647					
- very useful	n=209	29	32	38	100*
- moderately useful	n=219	6	32	62	100
- of little use	n=153	0	4	95	100

Notes:

(a) Presumably these participants did have a care plan, but were unaware of it.

(b) Only answered by those who were sure they had a care plan.

(c) Including persons who said their quality of life had got worse, identified at 1%* or 2%**.

That access to services is enhanced by the Trial, is also supported by a comparison between the views of those in the control and intervention groups about whether the Trial assisted them to access needed services. For instance, in relation to allied health services, 29% who indicated a need for such services, said that the Trial had assisted with access, compared with 10% of control group participants. Similarly intervention participants were far more likely to have been assisted with access to personal items, personal care and other services. This result is interesting as the Trial did not have discretionary funds with which to purchase services, relying on the advocacy role of care coordinators, service coordinators and case managers. These results are presented in Table 6.

Finding 6 : Perceptions of participants

- A higher proportion of patients in the intervention than control group identified an improvement in their quality of life due to coordinated care.
- Those who were more actively engaged in the care planning process were more likely to report that their quality of life had improved.

Table 6 Access to services relative to indicated need

Type of Service	**Intervention group** (n=1100)			**Control group** (n=442)		
	Needed services Number	Obtained Number	**% who needed and got**	Needed services Number	Obtained Number	**% who needed and got**
Dental including dentures	144	10	**7%**	61	0	**0%**
Allied health services	148	43	**29%**	59	6	**10%**
Personal health care items, (eg spectacles, personal alarm)	136	37	**27%**	33	5	**15%**
Financial help	94	10	**11%**	28	0	**0%**
Personal care support (eg home help RDNS)	84	28	**33%**	24	4	**17%**
Home maintenance	61	14	**23%**	16	3	**19%**
Other(a)	56	21	**38%**	13	1	**8%**
Total	**723**	**163**	**22%**	**234**	**19**	**8%**

Notes: (a) Includes surgery, put on waiting list for surgery, transport, help for carers, etc.

A series of in-depth interviews were held with Trial participants drawn from both the intervention and control groups, to gain further insight into the nature of their experience and the effect of the Trial on their lives. Client interviews were supplemented by in-depth interviews with a family member, the participants GP (Care Coordinator) and their Service Coordinator or Case Manager where applicable.

This research identified mixed experiences of coordinated care. Some had difficulty in reflecting on care coordination as it was a minor experience for them. This particularly applied to low risk clients, for whom the intervention amounts to, from their perspective, no more than a single visit to the GP for a Care Plan. For patients in level 3 who have a Case Manager, because of their more complex care needs and serious health problems, coordinated care is more visible. Their view of coordinated care depends very much on their personal experience with the Case Manager and the support they obtain. Many found access to a Case Manager invaluable, particularly the advocacy role. Thus some respondents found it reassuring to have some one to call on who understood their circumstances and assisted them to navigate what was often found to be an unfriendly and impenetrable service system. For instance, some participants were helped to get financial support (eg a carer's pension), access to services, (such as counselling services or home help), and direct advice and support to assist them to comply with treatment (eg what drugs to take and when). However for others, especially those who were more articulate and assertive, advocacy without financial support or special access to services was of limited value.

Responses to the participant questionnaire and the qualitative research identified a wide range of concerns with the health system. Many related negative experiences in their use of hospital services and a difficulty in gaining access to much needed services. Those most often identified were dental, prescription glasses and other health products not subsidised through Medicare (such as non-prescription medicines), personal care support and allied health services.

The content of participant diaries, in which 418 participants, recorded their health care services (other than medical services), including carer support, for one month, also suggests access to services is an issue. Mean per participant expenditure on health care purchases and services was recorded at $47 for the month with 25% spending more than $61 per month, equivalent to $564 and $732/annum respectively. Given the low income status of Trial participants this represents a substantial impost. Support in meeting health care needs by unpaid carers (usually a spouse), while highly variable, with 60% identifying no such support, for the users of informal care and support the time involved was often substantial. For this group, a mean of 36 hours of informal care support was identified per month covering a range of tasks such as assistance with bathing, dressing, taking of medication, preparing meals and transport.

From the data it is clear that the combination of poor health and poverty seriously undermines the quality of life of many. While coordinated care has provided for a small number to access some additional services and gain the support of a Case Manager, there has been no effect on the use of informal care and support, which was as high in the intervention as the control group.

Finding 7: Out-of pocket costs and use of informal services

- Participants in both control and intervention groups incurred high out-of-pocket costs in relation to their health, at a mean expenditure of $47/month,

6 Key observations: health service use and cost

The use and cost of medical services on the Medical Benefits Schedule (MBS)[9], hospital in-patient and out-patient services, drugs on the Pharmaceutical Benefits Schedule and services provided by RDNS were collated and analysed. Data were collected for all Trial participants from date of commencement in the Trial (individually determined) until June 30th 1999, or withdrawal. Hospital in-patient data covers admissions to all Victorian public and private hospitals, although data capture is likely to be more complete in relation to Monash Medical Centre (MMC) and Dandenong and District Hospital (DDH). Out-patient visits relate only to MMC and DDH. The use and costs of these health services by Trial participants are reported in Table 7 and Figure 4. Because of the success of the randomisation process a comparison between the costs of intervention and control group participants provides a reasonable insight into the impact of coordinated care on health service use and cost.

Mean service use and cost for standard health services, (MBS, PBS, hospital and RDNS) were equivalent (in statistical terms) for intervention and control clients, with an observed differential of 1.4%. Total cost was $2,758 and $2,695 respectively for intervention and control clients per equivalent participant year with in-patient services costed at price paid, or $3,609 and $3,558 with in-patient services at full average cost.

[9] All private medical services funded through the Medical Benefits Schedule, (include GP and specialist consultations, (including procedures), radiology, pathology, and optometry. Medical services funded through other agencies such as Veteran Affairs, Transport Accident or Workcover have not been captured.

Table 7 Average service use and cost per equivalent participant year(a) control and intervention group clients, July 1st 1997 to June 30th 1999(b)

Type of service	Number of services per participant year			Average cost $ per participant year		
	Intervention	Control	p	Intervention	Control	P
In-patient admissions (d)				1 177 c_1 2 028 c_2 2 043 c_3	1 194 c_1 2 057 c_2 2 031 c_3	0.92 0.92 0.92
PBS (e)	18.6	19.4	0.5	486	479	0.84
MBS	27.6	26.4	0.3	944	882	0.21
Pathology services	9.0	8.2	0.2	154	136	0.09
Out-patient services DDH & MMC	0.75	0.65	0.3	112	90	0.24
RDNS	1.51	1.45	0.9	40	50	0.61
Sub-total Mainstream services	**49.6**	**49.0**	**0.8**	**2 758 c_1** **3 609 c_2**	**2 695 c_1** **3 558 c_2**	**0.82** **0.88**
Care planning (f) Service coordin./case m'gment (f).				126 164		
Subtotal - all services including care coordination				**3 048 c_1** **3 899 c_2**	**2 695 c_1** **3 558 c_2**	
Trial management (g)				430		
Grand Total				**4345 c_2**	**3 558 c_2**	

Source: See Chapter 5

Notes:

(a) Annualised patient cost based on mean cost per participant day x 365.25,

(b) Health service use and cost data analysed until June 30 (see text for explanation).

(c) c_1 - cost of in-patient services based on DRG price paid into and charged to the pool of $1,275/WEIS
c_2 - cost of in-patient services based on DRGs priced at full average cost of $2,200/WEIS
c_3 - inlier admissions adjusted on the basis of patient length of stay, outlier admissions as costed.

(d) In-patient services/costs, all admissions in Victoria: direct tracking of MMC and DDH admissions, other admissions derived from the Victorian Minimum In-patient Data collection. Matching is thought to track ~ 60% of these admissions. Any loss of capture should be similar between control and intervention.

(e) PBS partial data only as captured by the HIC.

(f) Care coordination for care planning, covers payments to GPs of $283,000 plus 50% of payment to GP Division of $150,000 divided by 2837 equiv. participant years. Service coordination/case management $465,000, divided by 2,837 equivalent participant year. Individual services not recorded only their cost.

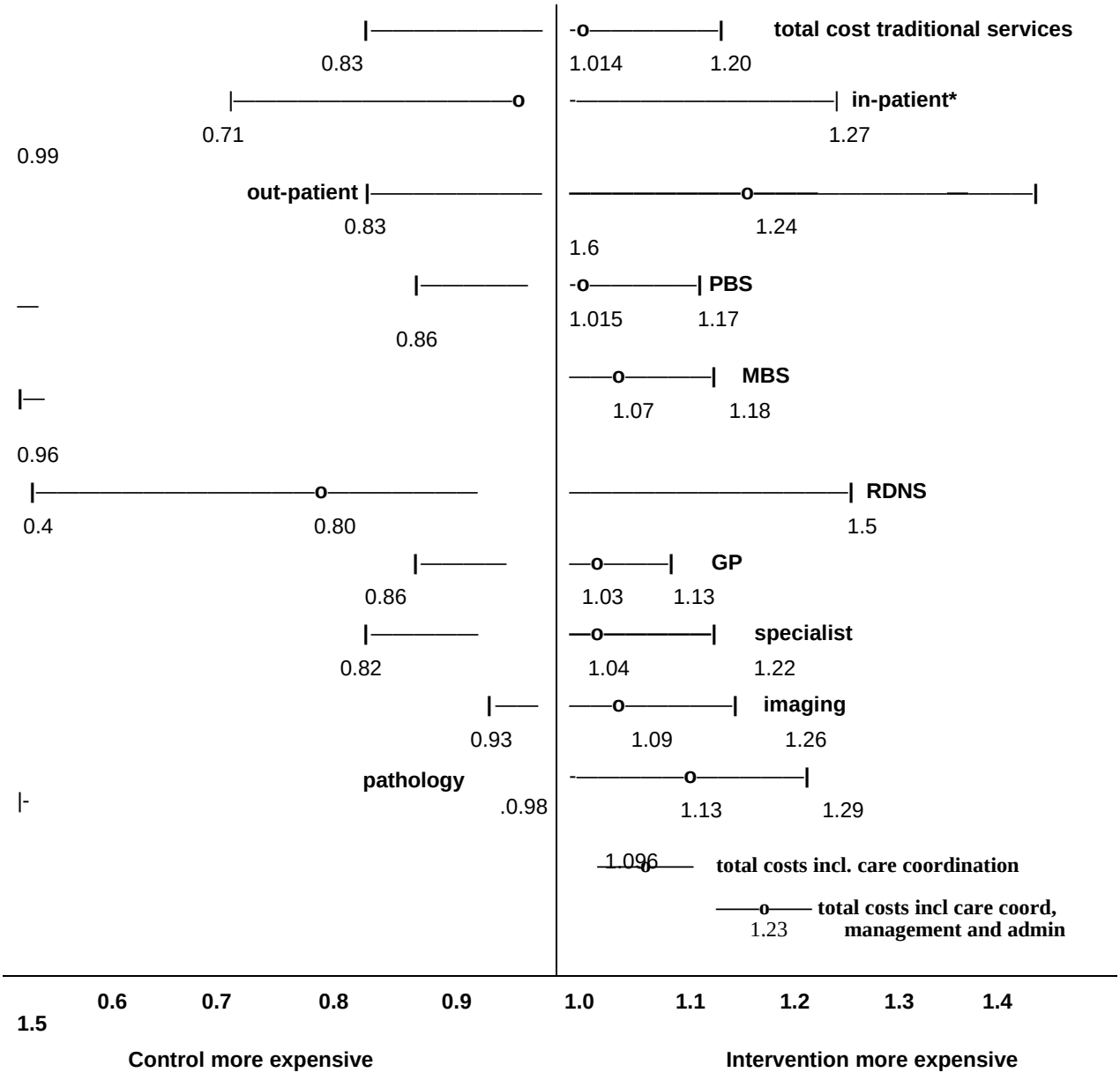
(g) Trial management: estimated on-going management of $852,236, plus an apportionment of Trial establishment costs taken at $370,000 over 2 years.

The mean cost of the intervention group was higher for all health service categories except RDNS. The largest observed difference are for out-patient services and for imaging. Once care coordination costs are included the cost differential increases, with the mean total cost of health services intervention group participants 9.6% above that of the control group. If the costs of management are also included, the mean total cost of the intervention group is 23% greater than the control. This includes payments to the GP for care planning and for service coordination and case management amounting to $823,000 (incurred since Trial commencement till end June 1999). This is equal to $290 per participant year for intervention group clients.

The relative cost of services for control and intervention group clients, by type of service, is illustrated in Figure 4. The cost of management and administration that would be on-going (excluding for instance costs related to the pilot such as evaluation) plus a share of establishment costs has been estimated. This was equal to $430 per participant year for intervention group clients, with establishment costs attributed over 6 years, not the 2.5 years of the Trial. The costs for administration and establishment are equivalent to 12.1% of the costs of services for control group participants (with in-patient services costed at full average cost) or 16% if in-patient services are costed at price paid.

This means that to fund care coordination and management costs out of the Funds Pool, a substantial saving in the cost of other services is required. With the SHCN CCT after two years, the cost the intervention group for mainstream services is at best equivalent to that of the control group. So there are no savings to pay for care coordination, management and establishment costs. Whether cost neutrality could be achieved over a longer time frame, can not be determined from this Trial. Although the downward trend in in-patient and medical costs for intervention group clients relative to control group clients (see Figure 6) suggests this might be possible, or at least the cost differential may reduce.

Figure 4 Relative cost (a) control and intervention group clients, total and by service type



Notes:

(a) 1.0 control and intervention group costs are equivalent, 1.05 would mean intervention group 5% more expensive/client day over course of the Trial or 0.8 intervention group 20% less costly.

o Mean annualised cost over the Trial (to June 30 1999), relative value for intervention compared with control group.

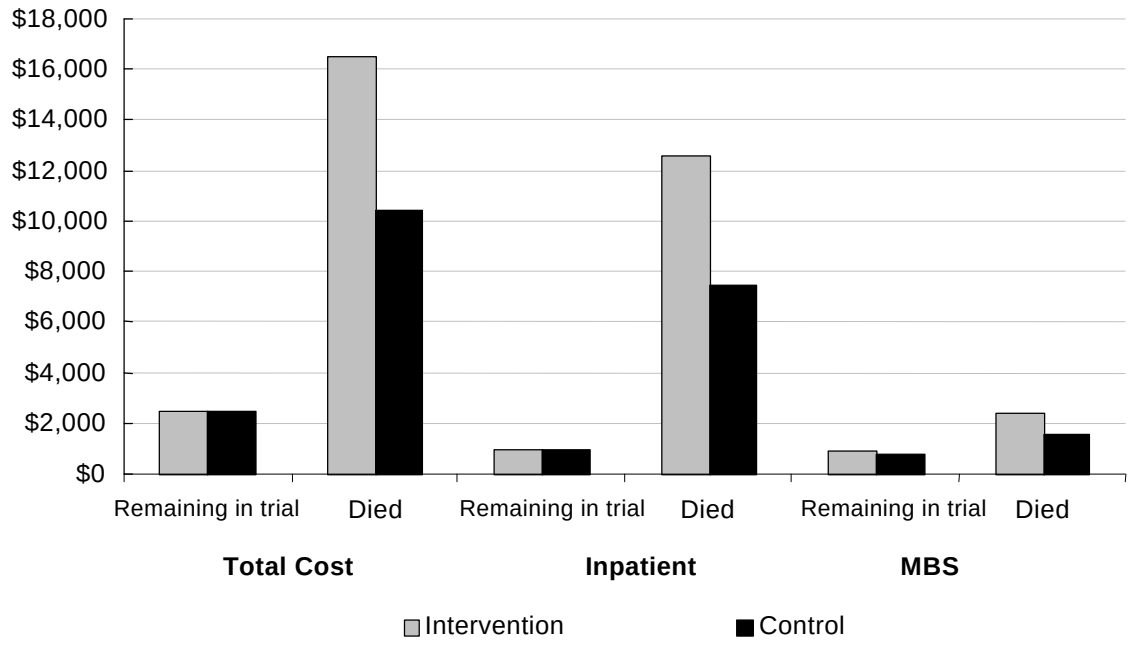
|——o———| confidence limits

* WEIS @ $2,200 for in-patient costs

Mean cost for those who died

The difference in cost between control and intervention clients is most apparent in the patients who died during the Trial, especially for in-patient costs (a mean $7,500 in the control group compared with $12,800 in the intervention group). In Figure 5 is shown mean annualised cost for control and intervention group clients, by survival status and key service categories. Health service costs of persons who die are several times that of those who survive (see also Table 8).

Figure 5 Mean annualised cost per participant total cost, in-patient and MBS for persons remaining in the Trial and persons who died



The observed difference in mean cost between the intervention and control group, in participants who have died and for the group overall, may be due to the care coordination process, not simply random variation. Many of those who died will have had a Case Manager, who through their advocacy role may have achieved greater access to services for those who are very ill, also potentially extending their lives (and their use of services). In relation to the wider participant group, as care plans are developed and reviewed by the GP, it appears that additional tests are ordered and specialist referrals made. This is supported by the observed cost differential which is greatest in relation to imaging and pathology (see Figure 4 above).

Table 8 Total cost health service by participant characteristic excluding costs of care coordination/management/establishment

Participant characteristic	Intervention group $		Control group $	
	(a)	(b)	(a)	(b)
All Trial participants:	$ 2,758	$16,777	$ 2,695	$10,545
Subjects remaining in the Trial:	$ 3,609	$25,916	$ 3,558	$15,942
Subjects who died whilst in the Trial	$ 2,490	$ 2,625	$ 2,457	$ 2,502
Subjects who exited alive prior to June 30 '99	$ 3,170	$ 3,514	$ 3,187	$ 3,209

Notes:

(a) in-patient @ $1275/WEIS

(b) in-patient @ $2200/WEIS

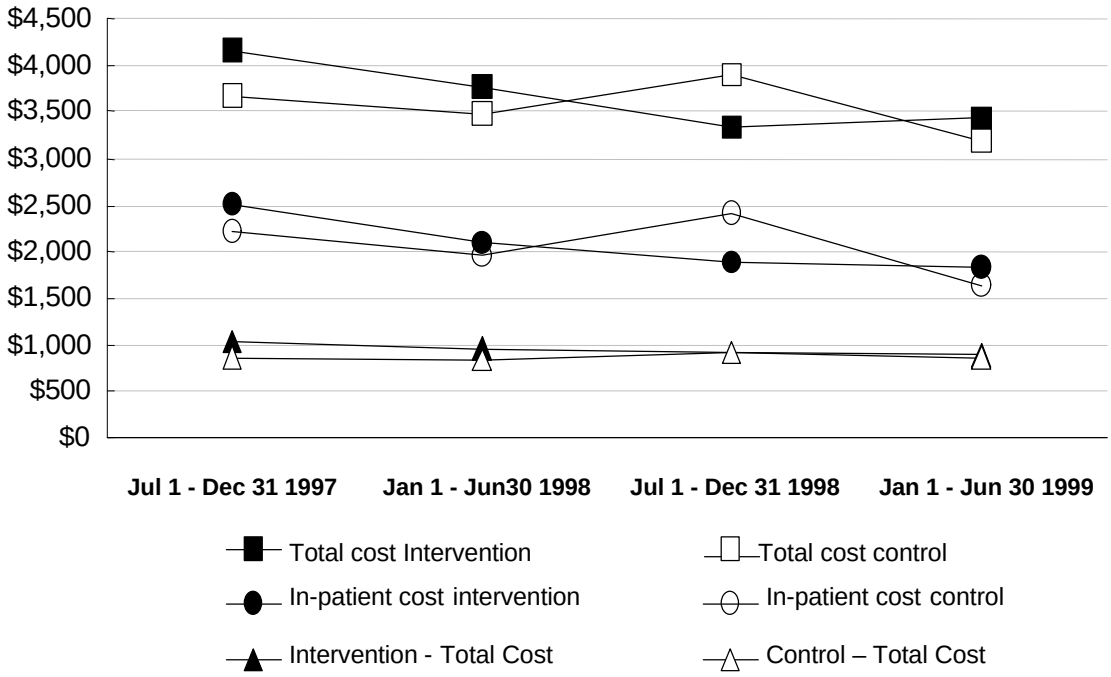
Mean cost over the period of the Trial

We also observe that over the course of the Trial, the cost difference between the control and intervention group in relation to medical costs has disappeared, suggesting the increase in cost may have been a once-off response to the care planning activity (see Table 9 and Figure 6).

Table 9 Annualised mean cost of medical services, intervention and control group participants, September 1st 1997 to June 30th 1999, by 6-month period

Period	Intervention	Control	P value
Jul 97 to Dec 97	$1,045	$ 875	0.015
Jan 98 to Jun98	$ 972	$ 857	0.090
Jul 98 to Dec 98	$ 913	$ 923	0.871
Jan 99 to June 99	$ 893	$ 872	0.726

Figure 6 Annualised mean cost of medical services, intervention and control group participants, September 1st 1997 to June 30th 1999, by 6-month period



Findings 8: Resource use

- The Trial has had no net effect overall on mean use and cost of hospital in-patient services.
- For those who have died, in-patient costs are substantially and significantly higher.
- The Trial has resulted in greater use of medical services, within the first 12 months.
- Including cost of care coordination services, cost of health services by intervention clients is $341 higher than for control clients per equivalent person year, a 9.6% premium. Including also the cost of management and establishment the cost differential is 23%.

Funds Pool - net effect on resource use

The Funds Pool for the SHCN consisted of funds contributed by the Department of Health and Aged Care to meet the expected use of HIC services, by the SHCN to meet the expected use of services provided by MMC and DDC and by RDNS in relation to their services. Payments were made from the Pool for these services on behalf of intervention group clients. The financial viability of the Funds Pool is simply determined by the balance between contributions in and payments out. This will reflect service use, but also the list of services that can be charged against the Pool, the rate negotiated for contributions into and from the Pool and predicted health service use.

Despite the greater use and cost of health services by the intervention group, the Pool was financially viable. This occurred because of an over-funding to the Pool, especially in relation to in-patient admissions. The model for predicting the use of in-patient services on the basis of recent service use of a similar group proved unsatisfactory. The initial in-patient contribution estimate was 80% too high (based on a comparison with control group costs), resulting in a revision to the Funds Pool contribution. By Trial end the SHCN had contributed to the Pool 12% more than appropriate as indicated by control group spending, (19% more than expenditure on intervention group clients). The HIC contribution was closer to control group expenditure (at 3.7% over) and equivalent to spending on the intervention group.

Finding 9: The Funds Pool

- The SHCN Funds Pool was financially viable, but would not have been if contributions had more closely reflected expected cost, based on control group experience.
- SHCN contribution was 19% higher than costs of intervention group clients and 12% higher than spending on control group clients.
- The contribution by the HIC was equal to expenditure on intervention group (up 4% for MBS but down 5% for PBS), but 8% higher relative to the control group.

7 Performance of the risk assessment tool

Analysis of the risk assessment tool (RAT) found it to be a reliable means of allocating participants, in the first instance, to differing levels of care coordination need. This is confirmed by the relationship between RAT score and quality of life score, and between RAT score and health service use and cost and also the analysis of GP responses (see below). Some flexibility in movement between risk level is clearly desirable, both to reflect changes in health status over time and an inappropriate allocation in the first instance. As shown in Table 10, the relationship between risk score, as it varies from 9 (no discernible risk) to 27 (maximum risk), and average health service use and cost is strongly positive.

Table 10 Total cost and service use by per participants year, by grouped risk score

Risk score	Number	Mean total cost*		Mean in-patient days	
		$/participant year	Relative risk*	Number/participant year	Relative risk
9	427	833	1.0	0.61	1.0
10, 11	518	1,598	1.9	1.25	2.0
12, 13	305	3,180	3.8	3.55	5.8
14, 15	194	5,500	6.6	6.98	11.4
16 to 21	310	7,919	9.5	14.18	23.2
22 to 27	37	10,358	12.4	19.87	32.6

Notes:

* total cost includes MBS, PBS, RDNS, hospital in-patient (costed at mean WEIS value at $2200), out-patient services.

\# minimum risk level of 9 set at 1.0.

For instance a person with a high risk score of 23 or above, had on average over 30 times as many days in hospital as a person with the lowest risk score. Similarly total cost of health services, for a person in the higher risk range, is on average nearly 12 times that of a person with the lowest risk score. This suggests the RAT may provide a more precise way of predicting service use and cost for the purpose of a Funds Pool, than the actuarial method used.

Finding 10: Risk assessment tool

- The risk assessment tool (RAT) proved an effective means to allocate participants between level of care coordination need

The RAT score was also predictive of use and cost of health services.

8 Care coordination model

One of the questions for the evaluation concerns the care coordination model, especially the future role and function of the Care Coordinator. In exploring the Care Coordinator role into the future, the existing demands on general practice and of other proposed changes in the funding and delivery of health care need to be considered. Care coordination provides a process and some extra resources to support management of the chronically ill patient with complex care needs. For other persons, typified by the low risk patient in the SHCN CCT, the benefits to either the Care Coordinator or the client are less apparent.

The success of elements of the care coordination model has been determined from various research tasks:

- a review of the health system reform literature relating to care coordination, managed care and case management,
- in-depth interviews with GP Care Coordinators, Service Coordinators, Case Managers and Trial management, and
- a survey completed by 330 GP care coordinators at 12 and 24 months into the Trial, in which their views about the care coordination model were elicited.

Views of general practitioners

At the commencement of the Trial, there was substantial scepticism from GPs about coordinated care. GPs did not volunteer to participate in the Trial, but rather were brought in by their patients. If they chose not to take on the role of care coordinator their patient would either have had to withdraw from the Trial or accept an alternative care coordinator. GPs were paid $120 to develop the patient's initial care plan and implement the RAT and $40 for Care Plan reviews. The Trial did not offer discretionary funds with which GPs could purchase services for their patients. Despite some initial tensions, on the whole GPs participated as required in delivering coordinated care.

GP response rate to the 2 questionnaires was over 70%. In response to questions about the value of coordinated care, approximately half the GPs reported that the Trial assisted in a range of ways, such as with the identification of medical or other needs and ensuring access to

necessary services for their medium and high risk clients. However less then 20% found it useful for their low risk patients. Fewer GPs, but still around one third thought it useful in reducing unnecessary duplication or inappropriate care for medium and high risk patients and around 20% for low risk patients. Almost all responses were slightly more supportive in the second survey (at 24 months) than the first survey (at 12 months). The change in support over the course of the Trial depended on the mix of patients. Increased support was more apparent for those with only medium and high risk patents with a fall in support for those with only low risk patients. Key responses are summarised in Table 11.

Table 11 Impact on GP practice of coordinated care – percent helped in relation to nominated attribute

Attribute	GPs with only medium and high risk patients n=30		GPs with medium, high and low risk patients n=114		GPs with just low risk patients n=62	
	1998	1999	1998	1999	1998	1999
Identify medical needs	38%	52%	52%	48%	33%	15%
Identify services to meet medical needs	48%	48%	48%	46%	25%	16%
Identify other needs	41%	44%	36%	42%	19%	12%
Identify allied health services	41%	52%	47%	54%	19%	7%
Organise social and welfare services	50%	52%	44%	52%	17%	7%
Organise medical services	49%	56%	47%	49%	25%	21%
Make sure patients get services	41%	56%	44%	45%	27%	19%
Reduce unnecessary duplication	34%	48%	28%	3%	25%	23%
End inappropriate care	28%	32%	17%	24%	25%	16%

An overview of the performance of the various elements of coordinated care has been analysed, based on the various sources of information, and reported in Table 12. Overall the care coordination model has worked well, with, for instance strong support for access to the Service Coordinator and Case Manager for more complex patients. The role of GP as care coordinator was found to have both strengths and limitations, with the adequacy of training for GPs a concern. The decision to preclude access to discretionary funds was highly contentious, and is the subject of on-going debate.

Finding 11: The care coordination model

- All elements of the care coordination model were mutually reinforcing and necessary.
- Most supported elements were payment for care planning, access to service coordination and case management for more complex clients,
- Less satisfactory elements were training in care planning and the peer review process.

Table 12 Elements of care coordination model

Care coordination element	Performance	Views of GPs
Enrolment method: postal, client driven	Very effective and efficient, ensured involvement of large number of GPs and patients	Many GPs had only 1 or 2 clients in CCT. This presents difficulties.
Eligibility >$4,000 in-patient admission over 2 year period and location within selected postcodes	Ensured complex patients identified, but also many who did not need care coordination. Provided the research base to refine target.	Eligibility criteria considered too broad. GPs thought coordinated care should only be offered to medium and high risk patients.
Use of risk assessment tool (RAT)	Effective, in identifying those in need of more intensive care coordination support, and service use. Capacity to move between levels important, to reflect either changing circumstance, or initial incorrect allocation.	GPs were generally supportive of the RAT: 58% of respondents considered its retention important while only 6% considered it unimportant.
GP as Care Coordinator	Mixed capacity to undertake care planning, training limited and only attended by about 50% GPs, but ensured liaison with GP by other service providers. Conduct of role variable, from dismissive to thorough.	GPs strongly supported their role as Care Coordinator: 86% of respondents considered this important.
Care Plan/Care Plan proforma	Developed in short time frame. Adequate but possibly too narrowly focused on medical care. Quality of care plans very mixed.	Most (86%) of GPs considered the fee for care panning important.
GP Division audit of Care Plan	Provides a peer review process, useful but relatively uncritical.	Nominated by 39% of GPs as important and by 16% as unimportant.
Care Panels	Difficult task to develop strategies in time frame of the Trial. Some success with respiratory panel, and mental health. Bringing together a group of experts as part of the panel was valuable. May contribute to adoption of better quality care in some areas.	Those GPs who engaged with the care panels found to be of some use. Many had little or no involvement.
Case Managers	Valuable support to high needs clients. Some tension in relationship with GP, but model ensured some dialogue took place. Lack of capacity to purchase services made role more difficult, with a strong advocacy element.	GPs valued support provided by case managers for high needs patients. Respect for their role increased over time: 75% of GPs considered this role important
Brokerage /discretionary funds	Brokerage funds not available, to contain costs. Intervention clients still obtained slightly better access to services. Access to a limited pool of discretionary funds may be desirable to allow a response to individual circumstances.	GPs and Service Coordinators and Case Managers disappointed at lack of brokerage.
Service Coordinators	Little precedent for role of a purely telephone based service. Is a useful mechanism for identifying who might need case management assistance.	Knowledge of services found to be valuable: 80% of GPs said retention of this role important.

9 Key conclusions

Based on the extensive data collection and detailed analysis, it is possible to draw conclusions about the performance of the SHCN CCT against the basic aims and to draw inferences about the desirable direction for coordinated care in Australia.

Primary hypothesis

Based on two years of follow-up of the SHCN CCT, it is not possible to demonstrate support for the primary hypothesis. It is probable that, on balance the health and wellbeing of the participant population has been enhanced. While this is not supported by the SF-36 or AQoL scores, it is indicated by both the patient questionnaires and the qualitative research, which suggests that for a minority of participants their quality of life had improved as a result of the Trial. (Very few attribute a reduction in quality of life to the Trial.) However, any improvement in quality of life (if real), has not been achieved without cost. A slight increase in the cost of 'usual' services ($51/participant year) is observed, and when the costs of care coordination plus management and (annualised) establishment costs are included the increase in cost is substantial, at an estimated $813 per participant year, an extra 23%.

At the same time we have observed that the differential in medical costs and in-patient costs were greatest early in the Trial, with more recent costing data suggesting an equivalence. However, the extra costs for care coordination, plus management, etc., still mean a substantially higher cost of care. Thus while it is probable that cost savings may be realised over time, it is not certain that these would ever be sufficient to cover the additional cost of care coordination and the extra management costs of the alternative funding and delivery model. Whether any gains in health and wellbeing might justify additional costs of care could not be determined from our evaluation.

A central proposition of coordinated care is that it leads to more appropriate service use. This does not necessarily mean a reduction in health service cost, although this is often presumed. The results of published studies are equivocal, with some suggesting an increased rate of in-patient admission with no improvement in health outcome measured by SF-36 (eg Weinberger *et al*, 1996), while others report a reduction in use of acute services, and improved survival (Stewart *et al* 1998[10]). Most of these studies, including the Veteran Affairs Trial identify favourable perceptions of participants, which is consistent with the findings of the SHCN CCT evaluation.

Finding 12: The primary hypothesis

- The primary hypothesis was not supported.
- Health service delivery involving Care coordination and funds pooling could not be achieved within current resources, at least not within a 2 year time frame.

[10] Stewart, S., Pearson, S., Luke, C., Horowitz, J. 1998, 'Effects of home based intervention on unplanned readmissions and out-of-hospital deaths', *Journal of the American Geriatric Society*, vol 46, pp. 174-180.

Secondary hypotheses

The care coordination model

The SHCN care coordination model achieved many of the objectives of coordinated care, including some broader system impacts, which seem to rely on the combination of initiatives and elements. It would seem desirable that care planning is established as part of a broader care coordination system. Otherwise it is likely to be conducted in an ad hoc fashion and without peer review. If Service Coordinators or Case Managers are not part of the system, the process for implementation care plans is not clear. The GP as Care Coordinator with responsibility for development of the Care Plan, created some tensions with other health professionals. It is strongly supported by GPs and given their role in the Australian health system for medical management and referrals, their engagement in the care planning process is arguably important. It seems to have been relatively successful in the SHCN CCT. We were not, however, able to establish whether an alternative approach to meeting the Care Coordinator role might not have been as, or more, effective. Certain aspects could have been enhanced, notably the training of Care Coordinators and the Care Plan proforma to make it more comprehensive and to ensure completion with greater diligence.

The place of clinical protocols and other initiatives

The use of clinically based initiatives was adopted as a central element of the SHCN CCT model, but took some time to establish, and failed to include an audit of care plans around clinical protocols. Mechanisms to support the adoption of best practice was a late focus of the Trial, that really required a longer time frame for more active development. It was not possible to assess the effectiveness of this component of the Model. An important factor influencing whether clinical guidelines have an impact on general practice is whether they are accompanied by strategies to overcome barriers to their take-up. These may include GP education, financial incentives, audit and feedback, consumer input, resourcing of complementary services. A number of these strategies were used in the care panels of the SHCN CCT.

One factor limiting the application and use of clinical protocols in the first round of Trials was the apparent diversity of medical conditions involved. However, even with the extreme diversity of conditions in the SHCN CCT, it became clear that a small number of diseases were more common in the client population. A concern of GPs is that the use of clinical protocols may restrict management choices of patients/GPs, by restricting choice. Complementary initiatives that promote choice, such as access to Case Managers and Service Coordinators and care planning that emphasis patient involvement could provide a balance to the potential restrictiveness implied by the adoption of clinical protocols. Support for effective self-management of chronic illnesses is an increasing theme within the chronic disease literature it could be incorporated more comprehensively into future coordinated care models.

Selecting the client population most able to benefit from coordinated care

It is possible to make some general observations about the need for, and the capacity to benefit from coordinated care. Need may be defined in terms of the existence or severity of disease state(s), complexity of health problem and the complexity of the options for management. Whether for those who may benefit from coordinated care, the level of benefit would justify the additional cost, or whether some offsetting cost savings may accrue is more problematic.

Given our current state of knowledge it might be wise to entertain a wide range of possible client groups as being suitable for coordinated care. Although we can say that some persons, particularly those with no health problems, equivalent to those who scored a 9 (or possibly a 10) on the RAT do not warrant access to care coordination services. It is also important to consider possible levels of care coordination support and the process for allocating people into various levels. Care coordination could be implemented as a population-wide program, for reasons of equity and efficiency, but with a process for allocating the population into alternative care coordination levels, (including no care coordination). An instrument like the RAT could be used for this purpose.

There is debate in the literature about whether programs should be aimed at clients with a single disease or a number of diseases. A combined model might be preferable, with sub-groups treated differently, as occurred via the Care Panel activity of the SHCN CCT.

The Funds Pool

Determination of the Funds Pool on the basis of the actuarial model proved unsatisfcatory. While historic data provides a reasonable basis for estimating PBS and MBS use and cost, it proved unreliable for estimating in-patient services and cost, at least using the simplistic approach that was applied. The control group proved both essential and robust as a means to test the validity of the Funds Pool calculations.

An important research question remains concerning the usefulness of the Funds Pool element of the Care Coordination Model. In theory greater flexibility in resource allocation between services should be achieved by the pooling of services in a Funds Pool. However unless the basis on which service can be accessed is changed it is not clear that any flexibility is introduced. The SHCN CCT had a restricted Funds Pool, and a restricted approach to access to services. This limited the extent and type of resource shifts that could occur. The only way the Trial influenced resource use was through the direct provision of care coordination services. This could have been done, far more simply and cheaply through an extra payment.

The shift in the mix of health services that occurred reflected the additional money for care coordination and the extra medical services obtained through standard Medicare entitlements as a result of the care planning process. This could be supported, only because the original Funds Pool estimate was too high. If a more accurate funds pool calculation had been made, the Trial would have made a substantial loss.

A challenge for the SHCN CCT was to improve health outcomes in cost neutral setting with a client population of low socio-economic status, given the evidence that persons of lower socio-economic status tend to access services less relative to their needs than do those from higher socio-economic status. Added to this a hospital expenditure per head in Victoria which is lower than the Australian average, the potential for cost savings in this client group was always limited.

Finding 13: The use of historic costs to determine the Funds Pool

- If the Funds Pool is to be based on 'expected cost' determined from recent history or control group experience and not reflect needs, health problems/clients which are poorly funded will struggle with a requirement for budget neutrality and financial viability.

Management and administrative arrangements

Implementation of coordinated care requires many compromises to have health professionals work in a more collaborative way and agreement from agencies to contribute to a funds pool at some risk their own financial viability. It will not always be possible to develop common goals, and it is not always possible to allocate the time to development that might be desirable. A number of attributes can be identified that seem to be central to an effective development and implementation process, which include the following:

- Strong leadership, with a clearly articulated vision.
- A management structure that allows the key participants to contribute to the decision making process in an effective fashion, but still allows the Trial manager to make executive decisions when necessary.
- Skilled staff who understand the coordinated care model and for a Trial, the principles of evidenced based research.
- A primary focus on enhanced care and client outcomes, rather than cost. If the model is valid the improved care will result in a better financial outcome. If not, a direct focus on cost may well be self defeating if it prevents access to precisely those services that may allow downstream cost savings.
- An adequate time frame for the Trial to be able to test the research principles, preferably at least a 5-year time frame. (For instance studies of chronic disease management of short duration are often inconclusive. The high establishment cost also supports a longer time frame to spread these costs).
- An adequate planning time frame, preferably of at least 12 to 18 months.

10 Future of care coordination: an alternative model?

Implementation of the Trials and the quantitative and qualitative data that was gathered has, regardless of performance in the narrow sense (delivery of enhanced outcomes within current resourcing), added immeasurably to the state of knowledge of alternative health planning and delivery arrangements.

Care coordination is able to deliver benefits, to at least some participants and contribute to the adoption of best practice care by general practice. However, that benefits are achievable within current resources or that benefits warrant the additional costs, or that any alternative model could achieve the enhanced outcomes within current resourcing is not established. One option is to consider retention of elements of the model most central to observed gains while refocusing other elements. That funds pooling can fulfil the designated role of breaking down program boundaries to allow resource shifts has not been established, and given the significant administration costs of this activity, exploration of the possibility of other arrangements is desirable. Some thoughts about the possible future direction for coordinated care, based on our evaluation and other research on health system reform issues are provided below.

A model that would seem to offer many of the projected benefits of coordinated care, but obviate the need for negotiation of a Funds Pool with individual providers would seem to be an improvement. The application of care coordination in a regional context, taking a whole of population model may facilitate this.
Possible elements of an alternative model would involve:

- ***Population coverage:*** A regional boundary, within which the entire community is to be covered by the new health funding and delivery arrangements;
- ***Enrolment/Assessment*** of the public for access to specific care coordination services via completion of a risk assessment tool (similar to the RAT used in the SHCN CCT). A single risk tool would be developed and applied by a GP or other primary care provider. Only those seeking access to special care coordination services, (beyond the care planning item on the Medicare Schedule) would complete the risk tool. A means for training and providing a peer review process for GP care planning would be introduced.
- ***Care coordination services:*** On the basis of the results of the risk assessment tool, individuals would be allocated to 3 levels for care coordination, level 1 no care coordination service, level 2 a largely phone based service similar to the service coordination offered by the SHCN CCT and level 3 case management. The case management and service coordination service would be offered across the region. Ideally all existing case management services would come under the umbrella of the regional model. Once an individual was identified as probably suitable for case management a more thorough assessment would be completed, after which the individual would be allocated a suitable case manger, to reflect distinct specialty groups (such as frail elderly, children with special needs, persons with acquired head injury, families at risk).
- ***Funding:*** There are a few broad options. Regions could be funded according to recent health services experience of the region or based on a risk-adjusted formula, adjusting for population characteristics and supply side variables. This would contribute to equity as well as efficiency objectives. Funds would need to be contributed by the Commonwealth and State Government, with agencies receiving their funds through the region, rather than through State or Commonwealth programs.
- ***Disease based initiatives:*** Specific disease based initiatives to promote best practice care would also be desirable.
- ***Regional health planning/access to services:*** A strong focus on regional health planning would support the model. Planning would cover the level of need for services (for example based on the population profile and knowledge of best practice guidelines) and using formal approaches to priority setting to ascertain services that should be expanded and those which should be contracted. In this way, a better match between services on the ground and the needs of the community would be achieved. A population focus would enable greater attention to public health interventions and health promotion and disease prevention strategies.

A regional based model as outlined above, is suggested as the way to breakdown program boundaries and ensure funding for regions can be both equitable and promote efficiency.

Finding 14: The value of an RCT

- A final observation of the evaluation team is that the use of a randomised control has proved invaluable in demonstrating the impact of the Trial on health service use and cost, on quality of life and survival. The insights gained could not have been obtained in the absence of the RCT design. This creates a dilemma for system based reform.