APPENDICES

APPENDIX 1
Selected Data Sets and Code Sets from the Macarthur Ambulatory Project 'MAP"

Clinical Service Type

Definition A classification of the clinical stream in which services are delivered to a patient within an ambulatory care department

Source Allied Health Data Dictionary Version 1.0

Codeset

Code	Description
AH	Adolescent Health
AOD	Alcohol and Other Drugs
AC	Aged Care
BC	Breast Clinic
BUR	Burns
CTS	Cardio Thoracic Surgery
CAR	Cardiology
CP	Child Protection
DEN	Dental
DER	Dermatology
DS	Developmental Services
ENT	Ears Nose and Throat
EME	Emergency
END	Endocrine
GAS	Gastroenterology
GA	Gait Analysis
GM	General Medicine
GS	General Surgery
GEN	Genetics
GYN	Gynaecology
HAE	Haematology
HAN	Hands
HN	Head and Neck
HEP	Hepatology
HIV	HIV
IMM	Immunology
ID	Infectious Disease
LD	Limb Deficiency
MET	Metabolic
MS	Musculo Skeletal
NEO	Neonatology
NEU	Neurology
NEUS	Neurosurgery

OBS	Obstetrics
OH	Occupational Therapy
ONC	Oncology
OPH	Opthalmology
ORT	Orthopaedics
PAEM	Paediatric Mdicine
PEAS	Paediatric Surgery
PM	Pain Management
PC	Palliative Care
PS	Plastic Surgery
PCH	Primary and Community Health
PSY	Psychiatry
PSYG	Psychogeriatric
REH	Rehabilitation
REN	Renal
RES	Respiratory
RHE	Rheumatology
SA	Sexual Assault
SPI	Spinal
SM	Sports Medicine
URO	Urology
VAS	Vascular

Format Alpha drop down screen.

Collectivity Mandatory field to be entered on the AHS V4. Collected for each referral per quantum of care. Field name – Clinical Service

Justification It has been identified that this is a simple indicator to classify the presenting problem and services performed.

Use in MAP This field can provide information to predict resource usage in the Ambulatory Care setting. It will support the development of the Costing Matrix.

Main Problem

Definition

Nature of the trigger responsible for occasioning the attendance of the person at that particular department. A condition or complaint either coexisting with the principal diagnosis or arising during the quantum of care.

Source

National Health Data Dictionary V8.0

Codeset

Code	Description
AC	Accommodation
ADL	Adl/Self Care
ALAR	Alaryngeal Speech
ANX	Anxiety
CH	Child Protection
CID	Chronic Illness/Disability
COGN	Cognition
CV	Cardio Vascular Fitness
DB	Diabetes
DD	Delayed Development
DFAG	Dysphagia
DFAS	Dysphasia
DFLU	Dysfluency
DFON	Dysphonia
DPRA	Dyspraxia (Speech)
DS	Decrease Strength
DV	Domestic Violence
DYSA	Dysarthria
EB	Emotional/Behavioural Problems
EN	Environment
EQ	Equipment
GL	Grief & Loss
HD	Heart Disease
HEAR	Hearing
HM	Home Management
LDD	Language Disorder - Devt
LDDM	Language Disorder - Dementia
LDEV	Language Delay - Devt.
LDPC	Language Disorder - Psych/Confusion
MAL	Malnutrition
MC	Medical Condition
MO	Mobility
NADB	No Apparent Disorder - But At Risk
NADN	No Apparent Disorder - Not At Risk
NHH	Nursing Home/Hostel
NR	Need To Be Referred
OS	Ongoing Support

PF	Physical Function
PL	Play/Leisure
PN	Pain
PRAG	Pragmatic Disorder
PS	Psychosocial
RA	Raction/Adjustment To Illness
READ	Reading Disorder - Devt
RES	Respite
RESD	Resonance Disorder
RI	Relationship Issues
RM	Range Of Movement
RSC	Removal Of Clips/Sutures/Iv Device
SDEL	Speech Delay
SDIS	Speech Disorder
SLAG	Saliva Control
SM	Sensory/Motor
SOC	Social
SR	Sputum Retention
ST	Stiffness
STR	Stress
SWM	School/Work Management
VC	Victim Of Crime
VT	Ventilation
WP	Weight Problem

Format Alpha codeset. Four Main problems can be added per referral.

Collectivity Entered for each new referral for the same quantum of care on the AHS V4.5. Field name – 'Main Problem'**.** Four spaces available to complete from a predefined drop down menu.

Justification Main Problem gives information on factors which may result in increased length of stay, more intensive treatment or the use of greater resources.

Use for MAP Possible future classification of the ambulatory episode of care according to patient perspective. Able to describe more accurately services being delivered on a departmental basis. This provides the opportunity for the patient to have input to why they are accessing ambulatory care services.

Activity

Definition

The type of service/contact made by the therapist that is performed for/to the patient during the current episode of care. This includes direct and indirect patient care.

Source

Allied Health Data Dictionary Version 1.0

Codeset

Code	Description	DOH Flag
FC	Family conference	G (Group)
HV	Off site visit	H (Home Visit)
NA	Non attendance	N (Non attendance)
OT	Other	
SV	School visit	
T	Therapy	
TC	Telephone call	T (Telephone Call)
WC	Written communication	

Format

Collectivity

A mandatory field entered on the AHS V4.5. Field name - Act.

Justification

This field provides a simple and clear breakdown of activities performed for/on behalf of the patient. For reporting Occasions of Service as required by the NSW Department of Health

Use for MAP

Allow quick and easy categorisation of activities undertaken in the Ambulatory Care setting. To be used in the development of the costing matrix.

Intervention

Definition An intervention carried out to improve, maintain or assess the health of a person, in a clinical situation. Clinical interventions include invasive and non-invasive procedures, physical therapy and cognitive interventions.

Codeset

Code	Description
01	Diagnostic/Assessment
02	General Therapeutic Techniques Intervns
03	Exercise (General)
04	Mobilisation (General)
06	Electrophysical Agents
07	Plaster/Splint/Tape/Prosthetics
08	Cardio-Respiratory Intervention
09	Neurological/Neurodevelopmental Interven
11	Education
12	Counselling
14	Crisis Intervention
15	Liaison
16	Case Conference
17	Referral
18	Resourcing
20	Advocacy
21	Treatment
24	Assessment
25	Followup
26	Wound Management
27	Intravenous Antibiotic
29	Blood Transfusion
30	Venesection
31	Multidisciplinary Assessment
32	Rehabilitation
33	Diabetes Stabilisation
35	Post Day Surgery
36	Day Procedure
37	Day Infusion
38	Nutritional Support
39	Therapeutic Diet
40	Enteral Nutrition
41	Psychosocial
42	Clinical Programming
44	S/C Low Molecular Weight Heparin
45	Pathology Only
46	Cannulation Only

47	ADL/Self Care
48	Environmental Adaption
49	Play/Leisure
50	Provision Of Aids And Appliances
51	School/Home/Work Management
52	Malnutrition Screening
53	Modified Barium Swallow
99	No Further Treatment Required **

Format Numeric drop down screen, predefined list

Collectivity Completed by therapist following each intervention on the AHS V4.5. Field name – Intervention. The existing codeset was developed in consultation with Ambulatory Care Continuum therapists and in conjunction with existing codesets. This list will be culled on the basis of usage to reflect the interventions offered in a quantum of care. The numbers are sequential except where a code has been made obselete. This was done to minimise repetition of intervention choices.

Justification To measure the type of interventions to gather information on what is contained in a quantum of care. Allows the analysis of health service usage, especially in relation to specialised resources, such as equipment or human resources.

Use for MAP This information will be used to monitor and measure resource allocation and will form the basis of a resource allocation based on activity costing matrix

** The code '99' was added to the intervention list to act as a flag for other therapist that the patient required no further intervention by the therapist who had added that intervention. This was to alert other therapists that facilitate smooth discharge of patients.

APPENDIX 2
Ambulatory Care Guideline

SWSAHS AMBULATORY CARE GUIDELINE

GUIDELINES FOR MANAGEMENT OF THROMBO-EMBOLIC DISEASE (DEEP VEIN THROMBOSIS $^{+}$/- PULMONARY EMBOLUS)

Aim:

To provide area-wide guidelines to assist a range of health professionals including general practitioners, hospital medical staff, ambulatory care, hospital and community nurses and pharmacists in management of anticoagulation with least risk of further thrombosis or emboli and least risk of adverse reactions.

These guidelines are based on the literature but there is a lack of level 1 evidence (randomised controlled trials) in this area. Periodic review of the guidelines will be needed to take account of new research findings. The guidelines are seen as assisting but not replacing clinical decision making and it will be necessary to vary from them in particular clinical situations.

Patient Assessment:

Thorough clinical assessment is needed looking at symptoms and signs as well as risk factors such as immobility, obesity, pregnancy, malignancy, atrial fibrillation, congestive cardiac failure, varicose veins, smoking and oestrogen therapy (including oral contraceptive pill). Assessment also involves the patient's general health, social situation and level of support to determine suitability for ambulatory care.

Investigation will be at the discretion of the supervising physician. The standard diagnostic test is a venous doppler study. A venogram or red cell scan may be necessary where there is a high index of suspicion and the doppler study is uninterpretable or inadequate. Pulmonary V/Q is indicated on the basis of symptoms and signs or when the supervising physician is concerned about high risk of pulmonary embolism. A Spiral CT scan of the chest may be helpful if the pulmonary V/Q is indeterminate in probability for pulmonary embolism, or if V/Q is not readily available, or in patients with underlying lung disease.

Other investigations may be clinically indicated to assess for underlying disorder eg coagulopathy in situations such as:

- recurrent DVT without apparent cause
- family history of clotting disorders

- difficulties with anti-coagulation
- other situations as clinically indicated

Other studies that may be indicated in these situations are:

- Protein C, Protein S, Activated Protein C (APC) resistance, Antithrombin (AT) III, homocysteine

- Gene studies: Factor V Leiden, Prothrombin gene mutation, MTHFR (methylene-tetrahydrofolate reductase) mutation.

- Immunology: ANA, Anticardiolipin antibodies, beta-glycoprotein Ab, Lupus anticoagulant,

- Investigations for malignancy as clinically indicated.

Management of proximal versus distal DVT:

Proximal deep vein thrombosis (above the knee) is more likely to be associated with clinical or sub-clinical pulmonary embolism and heparin followed by warfarin is required. An option for distal DVT is to treat with low molecular weight heparin for 10-14 days then reassess with a follow-up doppler study. If there has been no progression then LMWH can be ceased and warfarin may not be required.

Guideline: Thrombo-embolic disease (DVT +/- Pulmonary embolus)

Process	Treatment	Comments
Assess patient suitability for LMWH	Contraindications include : • renal failure • thrombocytopenia, • concurrent NSAID therapy, • significant bleeding risk, • symptomatic pulmonary emboli (with respiratory distress)	Suitability for home treatment: - safe accessible home: GP or MO supervision of therapy; patient or carer understands treatment and; home phone. Concurrent NSAID therapy is a relative contraindication. Consider stopping it if possible or gastric protection if not.
Baseline investigations	1. **Investigation to confirm DVT as above** 2. **FBC, platelet count, U&E, Creatinine, APTT, INR**	Other investigations may be indicated if increased risk of bleeding or suspected underlying coagulopathy.
Low Molecular Weight Heparin LMHW	**Enoxiparine (Clexane) 1.5mg/Kg once daily** or **1mg/Kg twice daily** by SCI for at least 5 days (max. dose 200mg/day); OR **Dalteparin (Fragmin) 100^{IU} units/kg twice daily** for at least 5 days (max. dose 20,000^{IU}/day). Choice of medication and dose may be varied by the supervising physician. LMWH is ceased when the INR is in the	Enoxiparine requires reduction in dosage (to 1.0mg/kg/day) in renal impairment (Creatinine >0.15mmol/l) and for advanced age (over 80yrs). Patients with renal impairment should be assessed by an appropriate specialist.

	target range (2-3) for 2 consecutive days.	Caution should be used in those patients over 80 years old.
Warfarin stabilization	Warfarin commence with 5mg per day on day 2 of LMWH therapy. Start at 5mg daily for first two days. (A lower dose may be required if elderly, on antibiotics etc). Second daily INR and adjust dose of warfarin according to INR from day 4 according to schedule:- INR < 1.5: Increase dose by 1mg. INR 1.5-2: Increase dose by 0.5mg **INR 2-3: Continue (Target Range)** INR 3-3.5: Decrease dose by 0.5mg INR 3.5-5: Decrease dose by 1mg INR 5-8: If no bleeding cease for 24-72 hrs and recommence at half dose once INR<5 INR >8: Consult Haematology or Emergency urgently and administer Vitamin K 1mg (IV or SC) or FFP as advised.	For patients over 80 yrs increase by 0.5mg if below target range. Adjustment of warfarin dose for age may decrease time to stabilisation Check for drug interactions All patients need to receive warfarin education.
Investigations	**INR at least second daily from commencement of warfarin.** ABC on Day 6 if LMWH to be continued beyond Day 5. Repeat weekly if LMWH is continued. Xa levels not needed for short term LMWH therapy.	Cease LMWH if platelet count below 150 X 10^9/L APTT is not useful as a guide to LMWH.
Stockings	**Graduated compression stockings** are advised to reduce risk of post-phlebitic syndrome. Ideally should be worn for 2 years. TED stockings are less effective.	
Clinical monitoring	Monitor symptoms of respiratory distress and swelling of patients thigh and calves.	Give oxygen and transfer by ambulance to hospital if respiratory distress.
Laboratory monitoring	Monitor INR. A typical regimen is weekly for 4 weeks once in target range then monthly while stable. Increase monitoring frequency if there is intercurrent illness, change in drug therapy, change in alcohol intake and diet.	Consider reintroduction of LMW heparin if INR drops below 2.
Duration of treatment for thrombo-embolic disease	First episode - 3 months warfarin or duration of risk factor If no identifiable risk factor – 6 months warfarin Second episode – 6 to 12 months warfarin or longer if at increased risk of further recurrence Three or more episodes – long term	Consider reintroduction of LMW heparin if INR drops below 2. Length of treatment may be varied by supervising physician.

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APPENDIX 3
Greenwich and RNSH Home Based Rehabilitation Satisfaction Survey

Patient Survey n=22

Between December 1997 and April 1999, 22 patients were interviewed by phone or home visit one to two months following completion of home-based rehabilitation. Patients were selected to represent all six designated impairment groups. Six patients had been transferred to HBR from RNSH and sixteen from Greenwich Hospital. Five patients (22%) were male and seventeen (79%) were female. (The gender mix of the overall HBR program was 25% and 75%). Two patients were unable to complete interviews due to cognitive or language difficulties.

Summary of survey findings:

- 19 out of 20 patients reported a general understanding of the concept of HBR when it was first suggested. When asked about their response to the idea of HBR when it was first suggested, 18 out of 20 gave a positive reply.
- Patients in early stage recuperation or who were non-mobile were more likely to be reluctant to the idea of HBR.
- Support and encouragement of the Case Manager was a significant factor in patients' understanding and subsequent acceptance of HBR
- Patients who were appropriately recruited (ie. according to the selection criteria) had set themselves realistic rehabilitation goals, were motivated to improve once transferred to HBR and were optimistic about long-term recovery.
- The experience of HBR was satisfactory for 18 out of 20 patients (Some comments included: *"better than I first thought ..... much better than hospital"*, *"was so well cared for, Ian and Sue were wonderful" "I was much happier at*

home ....I think it makes a difference to the way you feel when you're surrounded by familiar things" and *"Could not have been better – I was better in 4 weeks")*

- Social isolation and domestic difficulties were reported to interfere with satisfaction of HBR.
- 4 patients reported that their GPs had not visited during the course of HBR. Non-complying GPs were all attached to medical centres. 16 patients were visited by their GPs during the course of HBR with frequency ranging from three times a week to once during the course of HBR. Patients were generally satisfied with the frequency of GP visits.
- GPs who complied with the HBR protocols were likely to be members of the Division of General Practice who had expressed interest in participating in HBR at the commencement of the project and had attended some or all training sessions.
- There was unanimous satisfaction with the service provided by the rehabilitation team in terms of frequency of visits and quality of individual attention received. Both Case Manager and physiotherapist were reported as being extremely helpful in providing significant motivation to assist patients continue with their rehabilitation programs.
- There were consistent perceptions of the advantages of HBR which related to:
  a) The benefits of being in familiar surroundings with improved patient comfort, privacy, quality of life and opportunity to resumption of normal social and family activities.
  b) The return to previous levels of functional independence in their own environment
  c) Reduction in stress caused to family and carers by regular hospital visits
  d) Opportunities to exercise more control over daily routines and life style

- Perceived disadvantages included:
  a) Potential for socially isolated HBR patients to be disadvantaged
  b) Potential for complications to be overlooked after transfer to HBR
  c) Loss of motivating network once removed from hospital setting

- Most patients endorsed HBR and indicated a willingness to undertake rehabilitation through HBR if they required rehabilitation in future.

General practitioner Survey n=15

Fifteen GPs were randomly selected for interview, the only condition being current financial membership of the Northern Sydney Division of General Practice. Two GPs had attended one patient each whilst the remaining GPs had attended between two and five patients. Patients represented each of the six designated impairment groups.

Summary of findings:

- GPs endorsed the model of home-based rehabilitation that has been adopted. Early involvement of the GP, and specialist support service provided by a rehabilitation team, were seen as essential features of this service model.
- Key factors in the success of the HBR program were commonly identified as:
  a) Careful selection of patients in accordance with the existing patient selection criteria
  b) Daily rehabilitation and nursing care provided by the multi-disciplinary HBR team
  c) Co-ordination, communication and liaison role of the Case Manager, whose role was seen as pivotal in the successful implementation of HBR.

d) Early GP involvement; GP knowledge of patients' broader social, environmental and health issues leads to more satisfactory outcomes.

- All GPs identified their on-going training needs with most supporting a program that familiarised them with the members of the rehabilitation team, their roles and local resources. Training in fundamental rehabilitation techniques was seen as essential by half of the GPs interviewed. GPs with extensive expertise in managing rehabilitation patients were less likely to view special skills training as a priority but saw benefits in updating information from time to time.
- Few GPs had complied with the guidelines requiring them to visit patients twice weekly following transfer to their homes. Most GPs felt that frequency of home visits should be matter of negotiation between GP, patient and Case Manager following assessment of patients' medical stability at the time of transfer to HBR. Those that had visited twice weekly found it difficult and believed it unnecessary except where there was an indication that additional medical supervision was required.
- Regular communication between the HBR team and GP was seen as an essential requirement for successful HBR. Fourteen GPs reported a positive and favourable relationship with the Case Manager and praised his helpfulness and commitment to the patients.
- All GPs believed that co-operation between hospital and general practice services was essential for satisfactory transfer of care between hospital and home. The Case Manager and rehabilitation specialists were seen as instrumental in ensuring adequate transfer of patient information to the GP prior to patients' transfer to HBR. This contact was seen as significant in terms of continuity of care.

- All but one GP were satisfied about the suitability of their patient's inclusion onto the program. One patient had been seen as too frail to be included and the GP suggested that this had occurred as a result of pressure to recruit imposed by the randomised control trial which briefly operated in parallel to the service.
- There were consistent perceptions about the benefits/advantages of HBR. These related to:
    a) The importance of a familiar environment on improved health outcomes
    b) Earlier HBR leading to a reduction in the likelihood of patients becoming dependent on the institutional structures of hospital
    c) Reduction in the risk of complications as a result of prolonged hospital stay
    d) Enhanced patient confidence and motivation which facilitates rehabilitation and encourages patients to avoid the sick patient model
    e) Ability to provide more effective and individually tailored programs for people in their own homes; provision of one-to-one therapy.
- The problems of disadvantages of HBR related to
    a) The requirement of GPs to visit twice weekly
    b) The potential for inappropriate recruitment of patients or unsuitable home environment
- There was unanimous support from GPs for the retention of the HBR program as an option to be offered to patients fulfilling the selection criteria.

Greenwich staff survey n=20

Twenty staff at Greenwich Hospital and the HBR team were interviewed to ascertain their perceptions and experiences of the Home-Based Rehabilitation program. The role of staff not directly attached to the HBR team was to identify possible recruits via

the regular team meetings. Medical and social work staff and the HBR Case Manager were directly involved in patient recruitment on a regular basis.

Summary of findings:

- Most staff generally understood the concept of HBR, however, those not directly involved in the project were more uncertain about the project's objectives. These staff members needed additional support and encouragement from the Case Manager whose role in filling the gaps in staff knowledge and providing continuing education and advice was seen as essential.
- Staff saw GP involvement as a strength of the model, given the GPs' greater familiarity with the broader health and living situation of elderly patients and their ability to provide continuity of care. In practice this was seen as a source of difficulty such as the exclusion of HBR patients whose GPs would not visit and irregular and limited GP follow-up visits. In general, staff recognised that the effectiveness of the model depended ultimately on the role and commitment of the GP.
- Cooperation between hospitals and general practice services was seen by staff as very important. However, the Case Manager was the only staff member who reported increased contact between GPs and hospital staff during the course of the project. Few GPs had visited patients prior to discharge from hospital and one view was that although the GP role in HBR was a good idea, it was doubtful whether they had the time to perform the role effectively.
- Accreditation of GPs was seen to indicate an interest in rehabilitation, willingness to participate, and hence to be a valuable part of the program

- There were consistent perceptions of the main benefits/advantages of HBR. These related to:
  a) The ability to set more appropriate goals and deliver more individualised programs for people in their own homes
  b) The ease of patients returning to their previous level of functional independence in their own environment
  c) The broadening of options available for patients, allowing them to exercise more control
  d) Improved patient confidence and motivation, facilitating the rehab process
  e) Improved hospital stays, increased cost efficiency relative to inpatient options.
- Some disadvantages consistently identified by staff included:
  a) The limited levels of allied health support available to HBR patients; these were perceived to be too low for HBR to be a real alternative to inpatient rehabilitation and excluded some patients who needed more frequent therapy or access to certain equipment
  b) Problems arising from referral of patients not really suited to HBR (due to pressure of increased recruitment created by the processes of the RCT)
  c) The process of HBR as an alternative to rather than a continuation of inpatient rehabilitation was seen to be limited by the delays in transferring patients to HBR due to time involved in completing the assessment process

- There was unanimous support among staff for the retention of the HBR program as an option to be offered suitable patients with the following changes incorporated:
  a) The retention of the service rather than the research project

b) Referral of patients earlier and expand referrals from RNSH to avoid delays which arise from the transfer and (re)-assessment process

c) Ensuring adequate documentation (protocols etc) is maintained

d) Increased physiotherapy service to 5 days per week

e) More active GP involvement

APPENDIX 4
Consort Statements

Consort Statement for the trial described in Chapter 8

PAPER SECTION and Topic	Description	Reported on Page #
TITLE & ABSTRACT	Title: Home-Based Rehabilitation Randomised Controlled Trial	101
	Abstract: A RCT of multidisciplinary community care for people who would otherwise have had treatment in a subacute rehabilitation hospital recruited 31 residents from the lower North Shore of Sydney in cooperation with the Royal North Shore and Greenwich Hospitals.	vi
	Study type: Participants were randomly allocated to interventions or control	108
INTRODUCTION Background	In Australia, rehabilitation of older persons following conditions such as hip fracture, joint replacement and stroke usually occurs in hospital. However, in many countries most, if not all, rehabilitation is carried out in the community. This is particularly the case in developing countries with guidelines for community-based rehabilitation published by the World Health Organisation [129]. In Canadian rural communities, multidisciplinary rehabilitation consultation services provided on an outreach basis are associated with a high level of consumer satisfaction [130]. An alternative view is offered by a Cochrane review of Hospital in the Home (2000), regarding avoidance of admission following stroke. This review concluded that there was no evidence to support a home hospitalisation program as a substitute for hospital care [74]. In Australia, some hospitals have successfully initiated home-based programs, e.g. Julia Farr Centre Adelaide [131] and Hornsby Ku-ring-gai Hospital in Sydney. Similarly, the Central Sydney Area Health Service's Hospital in the Home Project successfully offered acute care in the home to older people as a pilot program [132,133]. Domiciliary rehabilitation has been reported to be safe and cost-effective in an early discharge program for proximal femoral fracture in Queensland [134]. One United Kingdom RCT has shown that outcomes at six months following home rehabilitation for older people are similar to an inpatient program [98]. Early supported discharge home-based programs for rehabilitation of stroke patients have potential for reducing the length of hospital stay [135]. Patients who participate in these programs may benefit by receiving rehabilitation that is tailored to their own goals and undertaken in their own environment. It is anticipated that this approach may also further enhance the patients' quality of life and physical function as well as reducing the cost of rehabilitation. There may be the additional option of co-ordinated rehabilitation care being managed by the patients' own GPs.	102, 103
	The author developed a model of care based on the rehabilitation principles of multidisciplinary care, functional measurement, case conferencing and progressive patient care planning. The	104

	novel feature was to include the patient's GP as an active member of the multi-disciplinary team. The expected outcome was to deliver an increased period of rehabilitation in the community with a corresponding reduction of inpatient rehabilitation. The barriers between inpatient and community rehabilitation were expected to break down with a support infrastructure and rehabilitation program tailored to the individual patient's needs. Thus the patient would have the opportunity and choice to access rehabilitation as an inpatient, day hospital patient or home treatment patient. This service would be delivered as a continuum of care managed by a single team using a single medical record. Hospital-based occupational therapists and physiotherapists would be enabled to deliver treatment at home or in the hospital. Consultant rehabilitation management would be complimentary to medical management that would become the responsibility of the GP when the patient was at home. A home-based rehabilitation (HBR) service for the lower North Shore of Sydney, based at Greenwich Hospital, was established while the author occupied the role of Director of Rehabilitation in May 1997. This new service provided an opportunity for the author to evaluate the functional outcomes of a group of home-based rehabilitation patients. This was conducted through a randomised controlled trial design. The Aged Care and Rehabilitation Medicine Department of the Royal North Shore Hospital (RNSH), the rehabilitation team at Greenwich Hospital and lower North Shore GPs who were members of the Northern Sydney Division of General Practice agreed to collaborate in providing the support infrastructure for this program. In addition, the establishment of this service was associated with the closure of ten inpatient beds at Greenwich Hospital.	
METHODS: Participants	Participants: Participants were required to satisfy the Home based rehabilitation inclusion criteria listed below in Table 8.1. Settings and locations where the data were collected: This study was conducted concurrently at Royal North Shore Hospital (RNSH), Greenwich Hospital, and in the Lower North Shore community by the Aged Care & Rehabilitation Medicine Departments of RNSH and Greenwich Hospital.	107 106
Interventions	Intervention: The intervention group received Home based rehabilitation. The control group received Hospital based rehabilitation	108
Objectives	Aims and objectives: This project sought to evaluate rehabilitation in the home as an alternative to hospital-based rehabilitation. The aim of the project was to compare home-based rehabilitation with hospital-based rehabilitation. The three areas of study were quality of life, physical function and health care costs. The project tested the hypothesis that there would be no significant difference in outcomes in these three areas between in-home versus inpatient rehabilitation.	106
Outcomes	Outcome Measures: Measures of function (FIM), quality of life (SF36) and cognition (MMSE) were collected from all patients within 48 hours after allocation to the HBR or control group. Functional measures (FIM) and quality of life (SF36) were collected again at completion of rehabilitation and at six-month follow-up. A measure of cognition (MMSE) was also collected again at six-month follow- up. A glossary of outcome measures is contained within the publications and CD in Appendix 5.	108

	A direct comparison of costs of the two patient groups' rehabilitation was performed for home-based versus hospital rehabilitation. Daily (per diem) costs for inpatient rehabilitation beds and acute beds were available through personal communication with health-service finance managers. The use of average daily bed costs and Medicare item numbers was used to establish a crude costing for inpatient and non-admitted components of care.	110
Sample size	The Australian SNAP[63] data were used to determine a mean and standard deviation (SD 26.6) for rehabilitation discharge FIM. The study was designed to have 80% power, using a two sided 5% significance test, of detecting a difference of 10 (hospital) discharge FIM points. This required a sample size of 111 participants in both arms of the study.	
Randomisation --Sequence generation	Generation of random numbers: Random numbers were generated by a computer software program (SPSS) by a statistician within the pharmacology department at RNSH in blocks of 100.	
Randomisation --Allocation concealment	Random numbers were placed in sealed envelopes by an administrative assistant and given to the nurse project officer for allocation to intervention or control once consent and eligibility was determined. The sequence was concealed until interventions were assigned.	
Randomisation Implementation	The allocation sequence was generated by a statistician, the numbers were placed in the envelopes by the rehabilitation administrative assistant at Greenwich hospital and stored in order with a number of 1 to 100 appearing on the external envelope. The project nurse enrolled participants. The project nurse assigned participants to their groups in the presence of the administrative assistant depending on the contents of the envelope once opened.	
Blinding (masking)	Both participants and members of the treating team were aware of the allocation. Blinding was not possible due to the different settings for treatment .	
Statistical methods	Statistical analysis: Data were analysed to compare the mean scores for each of the outcome measures for the two independent samples. A two-tailed t test was used to determine the significance, if any, for differences in the means. Data were analysed on an intention-to-treat basis. One patient was excluded from analysis following randomisation. This patient had been referred from a hospital other than RNSH and did not fulfil the selection criteria. The overall analysis was facilitated by use of the SPSS statistical software package.	110
RESULTS: Participant flow	Flow of participants through each stage: Please see Figure 8.2 titled : Flow diagram of RCT.	109
Recruitment	Patients were enrolled from January 1998 until June 1998 with data collection for 6 month reviews completed by December 1999.	
Baseline data	Base line demographic and clinical characteristics appear in Table 8.2	111
Numbers analysed	Thirty one patients were randomised. One patient was discarded from further analysis as this patient had not satisfied the selection criteria and had been inappropriately enrolled. Data for the residual thirty patients was analysed by intention to treat. Thirty patients were recruited, with 13 in the HBR group, and 17 in the Control group. All measurements occurred on the full sample at recruitment. Functional data was incomplete at the end of rehabilitation (13 HBR, 16 Control) with one patient lost in the Control group.	110

	There were seven HBR and ten Control who were lost for six-month follow-up, with data available for analysis in six HBR and seven control. The MMSE exam was completed at recruitment on the full sample (13 HBR, 17 Control), and incomplete with seven HBR and ten Control lost for follow-up at six months. The SF36 was incomplete at the end of rehabilitation (11 HBR, 16 Control) with two HBR and one Control lost.	
Outcomes and estimation	Data are reported in a series of tables with values, standard deviation, p values and 95% confidence intervals displayed. Tables 8.3, 8.4 and 8.5 display FIM data. Tables 8.6, 8.7 and 8.8 display SF 36 data. Tables 8.9, 8.10 8.11 and 8.12 display data related to resource utilization. There is a graphical summary of costs in Figure 8.2.	 112, 114 115, 116 117, 118, 199 122
Ancillary analyses	No subgroup analysis was performed due to low sample numbers.	
Adverse events	This study did not record any adverse events. However, a subsequent study of home-based rehabilitation which was reported in Chapter 9 has recorded adverse events and client, GP and team satisfaction.	146, 147
DISCUSSION: Interpretation	Interpretation of the results: There are limitations to this study as the sample size was small. The intention was to recruit over 200 participants rather than the small number of participants who were finally recruited. Unfortunately a change in leadership within the Division of General Practice was combined with staff concerns involving a perception that patients not selected for home-based treatment would be disadvantaged. This resulted in the abandonment of the RCT. A descriptive study of all patients treated on HBR was continued, and is reported in the chapter 9 of this thesis. In spite of the small sample, there were some interesting and unexpected findings. There were 58 GPs appointed as Associate Medical Officers, many of whom were willing to participate in learning the basic principles of rehabilitation of older people. They also demonstrated their ability to communicate and participate as part of a multidisciplinary team. The two patient groups were reasonably well matched for age, sex, and diagnostic problems. There was a greater number of stroke patients treated in the Control group (n=4) than in the HBR group (n=1). Conclusions can be formed from results at the completion of rehabilitation even though there were a number of dropouts in both the HBR (n=2) and Control (n=1) groups. The six-month follow-up sample was small, and no reliable inferences can be drawn from these data. The lengths of stay for both groups, HBR and Control, were similar for sub-acute inpatient care. This study has demonstrated that substitution of HBR for sub-acute hospital care failed in the model developed. The resource implications are that HBR was an additional cost to hospital rehabilitation and significantly ($p<0.001$) increased costs by about one-third for the rehabilitation component of care. This was partly due to the increased length of acute stay, although there was no indication from the functional scores that the HBR and Control groups were different when commencing rehabilitation. This also supports the observation that HBR developed as an “add on” to existing care. There were only two patients who satisfied the criteria for entry to HBR while in an acute hospital bed. Both of these patients	123, 124

	stayed 12 days from the date of assessment to the date of commencement of HBR. These delays were entirely due to failure of attendance by the patient's GP. In one case, it transpired that the patient's GP was on leave and the locum was not prepared to visit the hospital. In the other case, a delay of 12 days occurred for no apparent reason. There was also delay for the remaining 11 HBR patients when two GPs failed to visit and one GP took 12 days to respond. The remaining patients had a GP visit on the same day (n= 5) or next day (n=3). The non-attending GPs' patients were still accepted onto the program if the GP agreed to treatment by phone. Discussion with the project nurse suggested that GPs with sessional work in group practices or medical centres may have experienced a problem in relation to their ability to provide timely visits or response. The functional data at the completion of rehabilitation demonstrated a significantly better score in the HBR group when compared to the Control group (p=0.038). This was almost entirely due to a significant improvement in the FIM motor score (p=0.023). There was only an insignificant improvement in the FIM cognitive score. This suggests that there may be a better improvement of motor skills for patients treated in their own environment. It could also mean that motor skills continue to improve in all patients following discharge from hospital. The significantly poorer mental component score on the SF36 scale (p=0.011) suggests that the support networks provided by HBR are not as good as that provided in hospital care. It may also indicate that many patients have a decrease in Mental Component Score and mood after discharge from the supportive hospital environment. This study did not test on discharge factors such as the patients' own realisation of long-term disability or loneliness on discharge. It may be that older people after a period of supportive care enjoy being in hospital.	
Generalisability	The small sample size does not indicate that these findings are generalisable.	
Overall evidence	General interpretation: The overall outcome has demonstrated that HBR successfully provided an extra period of rehabilitation in the home with a multidisciplinary team including the patient's own GP in most cases. The period of HBR demonstrated improvements of motor function using the FIM score. The patients' Mental Component Score was worse at the completion of rehabilitation than patients treated in hospital. This home-based rehabilitation was provided in addition to traditional inpatient subacute rehabilitation with no reduction in average length of stay. It was also associated with increased costs for this additional care.	125

Consort Statement for the trial described in Chapter 10

PAPER SECTION and Topic	Description	Reported on Page #
TITLE & ABSTRACT	Title: Multidisciplinary care in hospital outpatients randomized controlled trial Abstract: Multidisciplinary case conferencing and production of management plans was compared, by a RCT design, to the current practice of single discipline physiotherapy and occupational therapy assessment in the Campbelltown Hospital outpatients department.	150 vii
INTRODUCTION Background	Outpatient services make up a considerable proportion of the work load of hospital-based allied health practitioners as revealed through development of the MAP system (chapter 3). The Macarthur Health Service (MHS) at Campbelltown Hospital provided 34,834 occasions of service (OOS) for 5873 patients through its Ambulatory Care Continuum & Allied Health Services between June 2000 and May 2001. Outpatient services accounted for 65.2% of the OOS, and 67.2% of referrals. The disciplines providing these services were allied health professionals and ambulatory care nurses. The terminology currently used defines services delivered in a patient's home as "community care" and non-admitted services in a hospital setting as "outpatients". Some outpatient therapy referrals are made following hospital discharge, and the rest are from outside referral sources such as GPs and specialists. However, patients with chronic and complex health care needs who are admitted to hospital are often, following discharge, not the recipients of well-coordinated community care and do not access these services [140]. It is proposed that multidisciplinary care provided within a hospital outpatients therapy department, and driven by hospital health care providers, will enhance the care received by these patients, improving their quality of life, and maintaining their wellness within the community. The idea for the simple intervention of a multidisciplinary team meeting and management plan came from the triage system which the author has personally experienced and which is commonly used by aged-care assessment teams (ACAT) [141]. An ACAT such as the one based on the lower North Shore of Sydney may have up to 10 referrals per day and twenty on a Monday. The team meets for 30 minutes to identify, from the referral information for each patient, who is the most appropriate allied health nursing or medical professional for first contact. The documented plan in the patient's notes may designate one or more providers, and may suggest referral to other agencies. This coordinated approach is not applied in discipline-specific outpatient therapy services, e.g. physiotherapy, occupational therapy, speech pathology and social work.	151
METHODS: Participants	Adult patients presenting to the outpatients department at Campbelltown Hospital referred for physiotherapy or occupational therapy requiring more than one treatment were eligible for multidisciplinary case conferencing.	152
Interventions	Intervention group: These patients' files were subjected to a multidisciplinary case conference following their assessment by the therapist of first contact. The case conference was conducted before the patient's next attendance. The case conference identified treatments thought likely to be most beneficial to their current condition, in addition to those items already addressed by the therapist of first contact. This intervention package was intended to result in a recorded plan in the outpatients section of the hospital file, written by any team	153

	member at the multidisciplinary team meeting. The recording member may have been any member of the team and was delegated on a rotating basis. In some instances, suggestions were made by the team for referral to another allied health professional within the health service or an outside provider. Control group: These patients received care in the "normal" manner. The allied health professional of first contact treated the patient as they would normally, referring onwards to another professional if they felt it was required (Figure 10.1).	154
Objectives	The study was designed to determine if there would be an increase in multidisciplinary care associated with the conduct of a multidisciplinary case conference which produced a management plan. This intervention was applied to patients referred to the outpatients allied health service for the disciplines of physiotherapy and occupational therapy in the Campbelltown Hospital.	152
Outcomes	The allied health information data system (MAP database), which was developed prior to this study, was used as the data collection tool (Chapter 3). It was used to collect activity data on interventions or types of treatment, number of treatment sessions, and time units. Session time units included the time allocated to a range of activities which were linked to the patient and may have included phone calls, making referrals, or writing reports. Direct time units referred to "face to face" treatment time. One time unit equals five minutes. Functional (Barthel Index [BI]) and Quality of life measures (SF 36) were collected by a study nurse before the commencement and following the completion of the episode or "quanta of care". This nurse had experience with all measurement tools and no clinical responsibilities for patient care. Subsequent file reviews, for quantitative and qualitative data, reviewing outcomes of the recorded plan, were conducted by the same project nurse. The nature of this study did not allow blind assessment, as any file review would reveal the input of the multidisciplinary team through the recorded file entry. The MAP data system was interrogated by the study nurse for activity data for each patient and cross checked with the file review. Where two values were different, then the higher figure for activity was recorded for the purpose of this study. Occupational therapists and physiotherapists were treated as one single group of therapists for the purpose of this study. However, referral from a physiotherapist to an occupational therapist or vice versa would be considered as a "referral to another therapist".	155
Sample size	The existing MAP data (chapter 3) were used to determine a mean and standard deviation (SD 28) for outpatient therapy time units. The study was designed to have 80% power, using a two sided 5% significance test, of detecting a difference of 15 time units. This required a sample size of 55 participants in both arms of the study.	
Randomisation -- Sequence generation	Random numbers in blocks of 10 were generated by a computer software program (SPSS) by a project nurse within the ambulatory care department at Campbelltown hospital.	
Randomisation – Allocation concealment	The random numbers were sealed in envelopes for use by the allied health outpatient administrative booking clerk.	
Randomisation -- Implementation	When the patient attended the booking clerk to make a second booking they were invited to consent. Those patients who consented were randomly assigned to either intervention or control. The booking clerk determined assignment by opening a consequative numbered envelope. The process was monitored daily by the project nurse.	

Blinding (masking)	Treating therapists were unaware of the selection of patients to intervention or control. They became aware of this allocation through reading the patients file which contained a case conference record ion cases assigned to the intervention . Patients assigned to the control group would have no evidence of a multidisciplinary care plan in the patient's record.	
Statistical methods	Differences of numbers of treatment interventions, periods of treatment time and numbers between groups, were analysed. An independent samples t-test was used to evaluate pre- and post-quality of life scores to determine if there were statistically significant differences between the control and intervention groups. Differences in proportions were analysed with a chi-squared test. All data were analysed by intention to treat.	156
RESULTS: Participant flow	Figure 10.1 displays a flow diagram of multidisciplinary outpatient RCT.	154
Recruitment	Recruitment of participants occurred from December 2001 until October 2002. Follow up was completed at the end of April 2003.	
Baseline data	Baseline characteristics of control and intervention groups appear in Table 10.1	157
Numbers analysed	A sample of 90 patients was recruited. This group consisted of 15 patients from occupational therapy referrals and 75 patients from physiotherapy referrals. The intervention group consisted of 47 patients allocated to multidisciplinary case conferencing and development of a care plan. The remainder (control) group of 43 patients were assessed in the normal manner by a single therapist.	156
Outcomes and estimation	Data are reported in a series of tables with values, standard deviation, p values and 95% confidence intervals displayed. Quality of the service is displayed in Table 10.2. The mean time, OOS and treatment period per patient is displayed in Table 10.3. Functional gains of the case conference vs normal care group is displayed in Table 10.4.	 159 160 161
Ancillary analyses	No subgroup analysis was performed. All therapists whether occupational or physical therapists were regarded equally.	
Adverse events	The intervention did not involve direct patient contact and thus no record of adverse events was kept.	
DISCUSSION: Interpretation	The intervention of a multidisciplinary team conference and management plan was a relatively simple intervention which was delivered within existing staffing levels and resources. The outcome of this study did not demonstrate a dramatic impact on either group for workforce-related resources. The treating therapists' input for occasions of service, direct and indirect time allocated to their patients was not significantly different for either group. It is not surprising that more issues per patient were identified by the multidisciplinary team in the intervention group than by the single therapist in the control group. The recording in a management plan of a significantly greater number of issues per patient was associated with a corresponding, though insignificant, greater proportion of referrals to other providers. There were no other indicators of differences for patient outcomes. The two groups did not show any significant changes in the Barthel Index (activity of daily living score) which unfortunately suffered from the "ceiling affect" of the scale. It was an unexpected finding that so many adults of a younger age group with normal or nearly normal scores would attend for treatment. The Barthel Index is not a useful test for detecting clinically significant problems in musculoskeletal conditions such as back pain. However, the therapist-recorded "goals achieved" were not significantly different for the two groups. The	

	proportion of only 47% goals achieved in the intervention group raises questions regarding suboptimal management. A systematic review of outpatient lower back pain studies suggested patients may need up to 100 hours of therapy to get good outcomes. The review supported multidisciplinary care as optimal management [142]. In response to this review, an audit of 176 MHS patients with back pain was performed in 2000 showing even lower rates (35%) of goals achieved [143]. There was a number of reasons suggested from this audit for suboptimal care, which may also apply to this study. These included the lack of therapy services such as behaviour therapy and hydrotherapy when developing the multidisciplinary case management model. Another reason was the possible "dose effect" of therapy, where patients do not have the opportunity of completing treatment due to waiting lists and other pressures. The MAP pilot data demonstrated an adequate range of therapy services for outpatients. Therapists decide the period of treatment and discharge for their patients. In view of these circumstances, it appears the lack of multidisciplinary care is the most likely contributor to sub-optimal treatment. There may be an explanation for the large numbers of seemingly functionally well patients attending for musculoskeletal complaints. The Campbelltown area serviced by the outpatient service has a low socioeconomic profile. There is a corresponding low proportion of people with private health insurance in the region (8%). It is likely that the only access to therapy for this community may be the hospital's outpatient department. This type of patient would normally be treated by private practices in more affluent communities. This study has provided evidence that the intervention had little influence on the outcome for patient care. The failure of the intervention to impact on work practices suggests that the passive application of the plan had little effect on the treating therapist. Several other approaches may have been tried such as enforcing implementation of instructions or orders in the plan by the therapist. This approach has had varied success with the introduction of care plans and pathways in hospital practice [144]. Any future study design should explore more active involvement of the treating therapist and possibly the patient in discussion of patient issues and developing of a management plan.	
Generalisability	The department outpatient analysed was typical of a New South Wales metropolitan hospital and results may be relevant only to similar institutions.	
Overall evidence	This study recruited a relatively young group of adults with high scores in basic personal activities of daily life functioning who had an average of five hours treatment and demonstrated only a 47% recovery. The range of services offered by the acute hospital in this study has been under extreme scrutiny with a focus on acute care [145]. This study raises questions about the efficiency and efficacy of hospital-based outpatient departments treating conditions of low acuity. The hospital may not be the best place for outpatient departments, and these services may be better situated within the communities they serve.	

APPENDIX 5
Reprints of publications, radio transcript and audiovisual material

Refereed papers:

Wilson SF, Chapman M, Nancarrow L, Collins J. Macarthur Model for Ambulatory Services. *Australian Health Review.* 2001; 24: 187-192

Wilson SF, Ruscoe W, Chapman H, Miller R. General Practitioner – Hospital Communications: A Review of Discharge Summaries. *Journal of Quality in Clinical Practice.* 2001; 21: 104-108

Wilson SF, Miller R, Collins N, Comino E, Harris M. Factors associated with frequent admission to hospital for patients with chronic airflow limitation. *Australian Family Physician.* 2001; 30: 822-824

Wilson SF, Collins N. Ambulatory alternatives exist. Letter to the Editor. *British Medical Journal.* 2002; 325:389

Disler PB, Cameron ID, Wilson SF. Rehabilitation Medicine. Editorial. *Medical Journal of Australia.* 2002; 177: 385-386

Wilson S, Middleton J, King C, Cameron I. Rehabilitation of Trauma. In: Sherry E, ed. *Trauma*. New York: Oxford University Press 2003; 678-707

Wilson SF, Eccleston M, Marks R, Isouard G. Evaluation of Domiciliary Services and Hospital Discharge for Older People with Chronic and Complex Conditions. *Geriaction Journal.* 2003; 21: 5-8

Wilson SF, Marks R, Donohoe. S, Chapman M, Zwar N. General practitioner multidisciplinary skills for enhanced primary care. *Australia Family Physician.* 2004; 33: 479-480

Wilson S, Marks R, Collins N, Warner B, Frick L. Benefits of Multidisciplinary case conferencing using audiovisual compared with telephone communication: a randomised controlled trial *Journal of Telemedicine and Telecare* 2004;10: 351-354

Wilson SF, Shorten B, Marks R. Costing the Ambulatory Episode: Implications of total or partial substitution of hospital care. *Australian Health Review.* 2005; 29: 360-365

Radio transcript:

Fry R. ABC Radio National interview with Wilson SF, Pickett S. Hospital in the Home Program. *The Health Report.* 1999

Compact disc:

Macarthur Division of General Practice. Enhanced Primary Care: Patient management program. Designed by Wilson SF. Production by Concept Media, Campbelltown. 2000