National Allied Health Benchmarking Consortium

Clinical Project: Stroke

Executive Summary

The National Allied Health Benchmarking Consortium established in 1997 includes hospitals from Australia and New Zealand. Its objectives are: -

- To maintain a network of collaborative teaching hospitals to compare information on allied health resource utilization; which assists members to identify better practices.
- To develop and maintain a standardised methodological approach to allied health benchmarking in conjunction with other organisations.
- To develop a model which links benchmarks with inputs, process, outputs and eventually outcomes of allied health service and activities.
- Establish validated benchmarks for allied health business.

This project aimed to identify best practice models for Allied Health service provision to patients who have sustained a stroke (DRG 37 & 38). The objectives were:

1. To determine performance measures to utilise in benchmarking allied health service provision to client group (DRG 37 & 38).
2. To identify patterns of allied health clinical service management for DGR 37 & 38 and analyse differences
3. To determine the impact of different patterns of allied health service provision on the outcome of patients with acute stroke (DRG 37 & 38)
4. To develop guidelines for best practice allied health service provision for acute stroke (DRG 37 & 38)

Initially, a data repository of clinical activity and the development of reports to compare centres were developed. A questionnaire to capture other data relevant to the DRG Group between Oct 98 to June 99 was circulated. Results represent a combination of questionnaire and consortium data.

Benchmarking from responses received has so far elucidated: the unit to which the client group is admitted; the health specialties involved; staffing levels; full time equivalents and hours; referral methods; range of services provided; length of stay; percentage seen in first half of stay; hours per episode; attendances per episode; relative stay index; variation in complexity; rehabilitation; decision making and facilities; discipline specific outcome measures; use of clinical pathways; percentage of client group discharged home and percentage of emergency admissions.

3.1. Admissions Process

Most admissions were emergency admissions (average 88%) and the majority of acute admissions had input from at least 1 allied health professional (average 75%).

The patients with DRG37/38 were frequently admitted to more than 1 ward area including medical, surgical and neurosurgical units. Three (3) sites had an acute stroke unit with provision for 4, 8+ and 13 beds.

3.2. Care Management

Wide variation occurred between the **specialist** seeing patients during the admission. Although only “sometimes” seeing the patients, the neurosurgeon, rehabilitation consultant, geriatrician , neurologist and general physician were the health specialists most frequently cited. The **referral** approach to specialists and allied health was highly variable but included request, referral or admitting staff member.

Admissions for DRG 37/38 were **most likely seen by** a physiotherapist (65%) then occupational therapist (45%) and speech pathologist (45%). Social work (33%) and dietetics (29%) were least likely to have involvement.

Physiotherapy then speech pathology showed the least **variation between sites** of the percentage of admissions seen by allied health. Dietetics then social work/occupational therapy showed the greatest variation.

Variability in the service provided by allied health disciplines existed between **sites**. A 5 day service was available for most (but not all) allied health disciplines at most sites. Most sites provided a weekend oncall service. Some disciplines had not provision for weekend service.

Physiotherapy showed the greatest variation in the **number of hours** spent per client by a factor of 3.4. Occupational therapy was the next most variable with a factor of 3.1. Dietetics, social work, and speech pathology each varied by a factor of approximately 2.

Characteristics of allied health stroke management were investigated by the complexity and average length of stay for patients receiving allied health interventions. Although 4 fold increase in length of stay was associated with clients seeing allied health, these patients represented a 46% increase in the average complexity.

Sites with **acute stroke units recorded the lowest average length of stay** for allied health. NAHBC sites with acute stroke units had the greatest percentage of patients seen in the first half of the stay. Interestingly, sites with acute stroke units also recorded the lowest average allied health visits per day and the average hours spent per inpatient were on the lower side of responses. Sites with designated stroke units also recorded the lowest ALOS for those not receiving allied health intervention.

The reduced ALOS can not be contributed to age as the patient profile was not younger. The relative stay index for 1998-1999 was amongst the lowest. Percent emergency was less than average and amongst the lowest. The study results support the literature on development of dedicated stroke units.

Referrals were most frequent requested from doctor, allied health and nursing. Blanket referral occurred least frequently and definitions ranged from an implicit expectation that all clients were seen to seeing a client if a need was identified.

Clinical pathways were utilised by 3 sites, 2 other sites utilised care plans and 5 employed no care maps.

Clinical meeting were held weekly (7sites) or twice weekly (2 sites). The meetings' purpose was consistent and included review of treatment and management and patient care plans, screening or suitability for rehabilitation or other units eg, discharge planning including social issues, progress and referral to other professionals.

Outcome measures used included clinical team measures (3 sites), length of stay and swallowing impairment (2 sites), mortality rates, discharge outcomes and variances from clinical pathways (1 site each).

The Royal Brisbane Hospital Outcome Measurement for Swallowing was used by 3 **speech pathology** departments. One site utilised Enderby Therapy Outcomes Measure and Westmead/Parramatta Hospital Outcome Measures for language assessment.

Assessment tools used **physiotherapy** included the Motor Assessment Scale (4 sites), Unspecified gait and balance tools (4 sites), Berg balance test (2 sites), Elderly Balance test (2 sites).

No tools were identified as being utilised by **social work** at any site. The FBBC Nutrition Screening Tool and SGA Nutritional Assessment was used by **dietitians** at 1 site while another stated achievement of optimal nutritional status.

Occupational therapy at 4 sites used tools including MBI (Modified Barthel Index). MMSE (Mini Mental Status Examination), AMPS (Assessment of Motor and Process Skills), Cognisant (Neuro Behavioural Cognitive Status Examination), Rivermead Perceptual Assessment Battery, Rivermead Behavioural Memory Test.

No **databases** exists, but 3 sites record outcome measures and 6 sites did not use a data base to record the data. One site is in the process of developing a database.

Research being conducted included projects to impact on client treatment (4 sites), drug trials (2 sites) evidence based practice for management of hemiplegic and education packages, imaging trials, sleep apnoea, oral intake survey and a stroke study (1 site each)

3.3. Rehabilitation

Decisions made regarding need for ongoing patient rehabilitation occurred via team meetings (all sites), allied health medical chart recommendations (9 sites), availability of rehabilitation beds (6 sites) and predominately consultants (1 site). All methods were used at sites.

On campus rehabilitation **facilities** were available at 7 sites. Access to a campus occurred at 3 sites. All sites had a waiting list for rehabilitation beds. A priority system was in place at 8 sites.

The main factors impacting on **waiting time** included medical status, stability, complications (5 sites), other medical issues, co-morbities and determinations, awaiting procedures or specific diagnosis, level of nursing dependence (4 sites), type and level of rehabilitation required (2 sites), seasonal factors (2 sites). Average waiting time was approximately 7 days but ranged from a few days to a few weeks.

Three sites used formal **criteria** for selection to rehabilitation. Criteria included medical stability, ability to participate (eg cognitive ability, sitting and balance, continence) geographical area and age or family support. Informal or no criteria was used by majority of sites. Informal assessment was based on perceived cognitive status, functional skills and endurance, potential for recovery, level of support service required, quality of life and family support, continence, age, medical stability.

The **wait** for transfer to interim or residential care ranged from days to weeks. For those transferred to interim care or nursing home bed most (5) remained in the medical or acute wards while awaiting placement (5 sites), respite care (1 site).

3.4. Post Acute Phase

Ambulatory rehabilitation facilities were available on campus (6 sites) or another campus (1 site). Waiting time fluctuated from days to weeks

Additional comments emphasised the need for timely links with other services or programs. The provision of assistance to regional areas and difficulty accurately estimating staff time involvement was noted.

Abbreviations

The following abbreviations may occur through the document:

AH or AHP	Allied health or allied health professional
ALOS	Average length of stay (for episode of care)
AMPS	Assessment of Motor and Process Skills
Barthel Index	ADL Assessement
Berg	Balance Test
Boston	Naming Test
CNC	Clinical Nurse Consultant
CVA	Cerebral Vascular Accident
D/N	Dietitian Nutritionist
EBP	Evidence Based Practice
Episode	During 1 admission
FBBC	Ferguson, Bauer, Banks, Capra Nutrition Screening Tool
FIM	Functional Independence Measure
Frenchay	Dysarthria test
FTE	Full Time Equivalent
HRT	Health Round Table
MAS	Motor Assessment Scale
MBI	Modified Barthel Index
MMSE	Mini Mental Status Examination
NAHBC	National Allied Health Benchmarking Consortium
OT	Occupational Therapist
Physio	Physiotherapist
RBHOMS	Royal Brisbane Hospital Outcome Measurement for Swallowing
RBMT	Rivermead Behavioural Memory Test
RIND	Reversible Ischemic Neurological Deficit
SGA	Subjective Global Assessment (Nutritional Assessment)
Speech	Speech Pathology
SW	Social Work
TIA	Transient Ischemic Attack
TOE	Tracheoesophageal Episodes (via Ultrasound)
TOM	Therapy Outcome Measures (diagnosis specific outcome descriptors - author Pam Enderby
WAB	Western Aphasic Battery

Contents

5. Appendices

Appendix 1.
Health Round Table Data Oct 1998 to Jun 1999 Allied Health Data**.**
Linked IPA Summary for F037 Cerebrovascular disorders except TIA. Page F-7.
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Appendix 2.
Health Round Table Data Oct 1998 to Jun 1999.
F037 Cerebrovascular disorders except TIA. Hospital comparisons by DRG. Page F-1.
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Appendix 3.
National Allied Health Benchmarking Consortium
DRG 37& 38 Project Questionnaire

Appendix 4.
Best Practice Literature

Appendix 5.
Validated and Standardised Tools

Appendix 6.
References

1.Introduction:

The National Allied Health Benchmarking Consortium was established in 1997. The consortium includes Hospitals from Australia and New Zealand. The hospitals involved include Flinders Medical Centre (SA), St George Hospital (NSW), Central Sydney Health Service (NSW), Austin and Repatriation Medical Centre (Vic), Princess Alexandra Hospital (QLD), The Canberra Hospital (ACT), Geelong Hospital (Vic), Royal Hobart Hospital (TAS) and Wellington Hospital (NZ). The objectives of the consortium are:-

- To maintain a network of collaborative teaching hospitals to compare information on allied health resource utilization; which assists members to identify better practices
- To develop and maintain a standardised methodological approach to allied health benchmarking in conjunction with other organisations
- To develop a model which links benchmarks with inputs, process, outputs and eventually outcomes of allied health service and activities
- Establish validated benchmarks for allied health business

In the initial phase of the benchmarking project was the establishment of a data repository of clinical activity and the development of reports to compare centres.

In 1999, the NAHBC agreed to use the data repository as means of comparison of clinical practice for higher volume diagnosis groups which include a wide range of Allied Health professionals. The DRG Family of Stroke (DRG 37&38) was 1 of 2 groups chosen. While the Central Sydney Health Service –Royal Prince Alfred and Concorde Hospitals, have not been able to supply data to the consortium data base an attempt has been made to include them in the survey undertaken at all sites.

2.Project Proposal

Project Aim

To identify best practice models for Allied Health service provision to patients who have sustained a stroke (DRG 37 & 38)

Project Objectives

1. To determine performance measures to utilise in benchmarking allied health service provision to client group (DRG 37 & 38)

   Benchmarking from responses received has so far elucidated:
   - Unit to which client group is admitted
   - Health specialties involved
   - Staffing levels; full time equivalents and hours
   - Referral methods
   - Range of services provided
   - Length of stay
   - Percentage seen in first half of stay
   - Hours per episode
   - Attendances per episode
   - Relative stay index

- Variation in complexity
- Rehabilitation decision making and facilities
- Discipline specific outcome measures
- Use of clinical pathways
- Percentage of client group discharged home
- Percentage of emergency admissions

2. To identify patterns of allied health clinical service management for DGR 37 & 38 and analyse differences

    - The development of this document has commenced this process. Further study of disciplines would provide insight to intervention approaches and clinical patterns.
    - Encouraging provision of detailed information by sites strengthens possible conclusions

3. To determine the impact of different patterns of allied health service provision on the outcome of patients with acute stroke (DRG 37 & 38)

    - Difficult to ascertain
    - Project will assist with formulating hypothesis to be developed for further investigation

4. To develop guidelines for best practice allied health service provision for acute stroke (DRG 37 & 38)

    - Information concerning current practice will enable comparisons with best practice literature.
    - Completion to occur after consultation with participating sites and stakeholders.

Project Scope

The project will investigate data related to DRG 37 & 38 and as such will be restricted to acute inpatients only. Analysis will be for the 9months of data collection October 1998 to June 1999. The larger allied health professional groups who provide services to DRG 37 & 38 will be included in the project.

Project Reference Group

- One allied health contact from each consortium member. This clinician would be involved in service provision to this group and able to liaise with other key allied professional on that campus who works in service delivery to this group of patients.

Methodology

- Data Analysis

All sites to review reports and understand local content

- Survey Instrument

Develop a survey instrument to seek feedback from all sites on a range of performance measures and benchmarks not included in the data analysis report.

- Collation of Information

Collate information from the surveys and the data reports and prepare a draft document. The survey was completed by 10 hospitals. Results were tabulated in the alphabetical order of code names.

- Evaluate

Circulate report and seek feedback. Prepare report on model including difficulties encountered and suggestions for improvement

Table 1
Project Plan

Activity	Date
Project Plan Endorsed	3/3/00
Develop Survey Instrument	30/4/00
Survey Completed	30/5/00
Data Analysis	31/7/00
Results Evaluation Completed	15/9/00
Guidelines Developed	6/10/00

Costs/resources

- It is expected that all participating hospitals will provide additional survey data required at own costs.
- Anticipated teleconferences cost to be met by each site
- 0.2 FTE for 12 weeks to undertake data analysis

3.Data Analysis

An Allied Health group at Eagle who worked in this clinical area initially compiled a questionnaire. The questionnaire was intended to capture other data relevant to this DRG Group for the period Oct 1998 to June 1999.

The questionnaire was then sent to the key contacts at each site for further feedback A teleconference between the sites was held before the finale questionnaire was sent out.

The results represent a combination of the questionnaire information and the data from the consortium data repository. Emerald & Sapphire have not been able to provide data to the data repository for the time period involved. However information provided via the questionnaire has been included.

Table 2
1/10/1998 to 30/6/1999
DRG Family 37 & 38 Total Acute Episodes #

Hospital	No of Acute Episodes (Ref 1)	% Emergency (Ref 2)	Avg. Age (Ref 2)	No of Any AH Episodes (Ref 1)	% of All Episodes
1. Centauri	217	96%	73.1	155	71%
2. Cyperus	138	91%	68.3	115	83%
3. Eagle	255	86%	65.8	204	80%
4. Electra	284	79%	68.7	203	71%
5. Gemma	171	81%	69.3	106	62%
6. Polaris	337	86%	72.3	277	82%
7. Regulus	200	89%	74.5	144	72%
8. Rigel	298	96%	72.8	240	81%

#The following table is the total of all acute episodes that occurred at consortium hospital during the period 1/10/1998 to 30/6/1999.
Patients admitted prior to the 1/10/1998 and discharged during this period are not include as are patients admitted prior to the 30/6/2000 but discharged after that date

- The above table indicates that majority of these admissions at all sites are emergency - range 79% to 96%. Average 88%.
- The majority of acute admissions had input from at least 1 allied health professional - range 62% to 83%. Average 75%.
- Average age ranged from 65.8years to 74.5 years. Average 70.7 years
- Regulus had the oldest average age (74.5 years) while Eagle had the youngest average age (65.8 years)

Table 2a
1/7/1999 to 30/6/2000
DRG Family B70 (Stroke) Total Acute Episodes

Hospital	*No of Acute Episodes*	*% Emergency*	*Avg. Age*	*No of Any AH Episodes*	*% of All Episodes*
1. Centauri	*291*	*94%*	*70.9*	*211*	*73%*
2. Cyperus	*184*	*96%*	*66.9*	*149*	*81%*
3. Eagle	*315*	*89%*	*67.8*	*246*	*78%*
4. Electra	*408*	*86%*	*67.6*	*310*	*76%*
5. Gemma	*271*	*80%*	*68.3*	*167*	*62%*
6. Polaris	*513*	*85%*	*71.9*	*410*	*80%*
7. Regulus	*273*	*96%*	*73.3*	*180*	*66%*
8. Rigel	*419*	*96%*	*74.0*	*347*	*83%*
9. Storm	*534*	*95%*	*68.5*	*443*	*83%*

3.1. Admissions Process

3.1.1 Ward admissions

The patients with DRG37/38 were most frequently admitted to more than 1 ward area. Bed availability could be a contributing factor (Cyperus).

The **Medical unit** was most frequently utilised by 7 sites (Centauri, Cyperus, Electra, Gemma, Regulus, Rigel, and Emerald). The **Neuroscience's Unit** was utilised by 4 sites (Centauri, Cyperus, Electra, and Emerald). The **Surgical Unit** was utilised by 3 sites (Cyperus, Gemma, and Emerald). Three (3) sites had an **Acute Stroke Unit** (Eagle, Polaris, and Sapphire).

At two sites (Centauri, Electra), the patient would remain in the **Ortho/surg** post surgery if they suffered a stroke while on ward.

Table 3
Question 1.1 Are patients with DRG37/38 admitted to: -

• An Acute Stroke Unit	(3) - Eagle, Polaris, Sapphire
• To a Neuroscience's Unit	(4) - Centauri, Cyperus, Electra, Emerald
• To any available bed in a Medical Unit	(7) - Centauri, Cyperus, Electra, Gemma Regulus, Rigel, Emerald
• To any available bed in a surgical unit	(3) - Cyperus, Gemma, Emerald
• Other please describe	

Site	**Other comments:**
1 Centauri	Can be admitted to either neuro ward under neurologists or general medical ward under general medical consultants–depending on bed availability may be nurse on either a surgical or medical ward. If patient has a stroke while on Ortho/surg post surgery they will stay on that ward
2 Cyperus	Clients admittance patterns reflect bed availability.

3 Eagle	
4 Electra	If patient has a stroke while on Ortho/surg post surgery they will stay on that ward until referred to rehab ward and transferred as appropriate. If on CCU, they would be transferred to the medical ward once stable from a cardiac perspective and be referred/transferred to rehabilitation if appropriate.
5 Gemma	
6 Polaris	
7 Regulus	Generally patients in 1 of 3 wards but may be in many other wards
8 Rigel	
9 Emerald	
10 Sapphire	

3.1.2 Dedicated acute stroke units

All 3 sites with an Acute Stroke Unit had admission criteria (Eagle, Polaris, and Sapphire). A stroke unit was planned but yet to open at Regulus.

- Admission at **Sapphire** was dependent on the diagnosis made in emergency department with TIA's, new CVA's, inoperable haemorrhages accepted.
- **Polaris** admitted all with primary diagnosis of stroke.
- **Eagle** accepted all patients presenting with TIA, RIND, CVA onset within 5 days with the following exclusions applied:
    i) Resolved TIA's – first events, risk factors for recurrence absent
    ii) Severely demented patients who reside in nursing homes, with poor prognosis
    iii) Severely feeble elderly patients with TIA or minor CVA with multiple problems
    iv) Poor functional status for who direct admission to rehab may be more appropriate

These exclusion criteria may contribute to Eagle's younger age group range.

Table 4
1/10/1998 –30/6/1999
Average LOS & Complexity for patients seen and not seen by Allied Health

Hospital No	AH ALOS	Complexity **	NON AH ALOS	Complexity **	ALOS difference
1 Centauri	10.91	4.43	5.47	3.66	5.44
2 Cyperus	14.49	3.66	3.64	2.33	10.85
3 Eagle *	10.7	4.06	2.38	2.23	8.32
4 Electra	11.56	3.50	3.04	2.49	8.46
5 Gemma	13.88	4.46	2.00	2.38	11.88
6 Polaris *	10.74	3.14	1.71	1.79	9.03
7 Regulus	15.63	3.91	3.91	2.84	11.72
8 Rigel	12.72	3.86	2.39	2.72	10.33
Mean	12.21	3.79	3.05	2.59	9.5

**** Health Round Table – NAHBC sites with acute stroke units (Ref 1)***
*****"Complexity" – HRT defines the complexity of a patient by the number of disease classifications recorded for that patient. A patient with 1 or 2 body systems affected by disease is considered non complex, 3 or more is considered complex eg a patient with heart disease,***

lung disease and diabetes would have a count as 3. The number of diseases has been shown as a useful predictor of length of stay and resources usage.

- For clients seeing allied health, the ALOS ranged from 10.7days to 15.65 (mean 12.21 days)
- For clients not seeing allied health, the ALOS ranged from 1.71days to 5.47 (mean 3.05 days)
- Complexity for clients seeing allied health ranged from 4.43 to 3.14 (mean 3.79)
- Complexity for clients not seeing allied health ranged from 3.66 to 1.79 (mean 2.59)
- The complexity of patients in both groups was lowest at Polaris (3.14 vs. 1.79) while Centauri (4.43 & 3.66) had the highest complexity levels for both groups
- For interest it is noted that the complexity of patients seen at 1 site (eg Cyperus) was at times equal to the complexity of patients not seen at another site (eg Centauri).

At all sites there is a significant difference in the ALOS and complexity for patients seen by allied health as opposed to those not seen.

Table 4a
17/99 – 30/6/00
Average LOS & Complexity for patients seen and not seen by Allied Health

Hospital No	***AH ALOS***	***Complexity *****	***NON AH ALOS***	***Complexity *****	***ALOS difference***
1 Centauri	*12.20*	*4.57*	*2.51*	*3.11*	*9.69*
2 Cyperus	*13.62*	*2.90*	*3.95*	*2.16*	*9.67*
3 Eagle	*9.51*	*4.15*	*4.26*	*3.26*	*7.05*
4 Electra	*8.73*	*3.00*	*2.97*	*2.08*	*6.65*
5 Gemma	*12.08*	*4.80*	*2.38*	*3.15*	*9.70*
6 Polaris	*11.19*	*3.76*	*2.20*	*2.13*	*8.99*
7 Regulus	*14.21*	*4.34*	*4.27*	*2.77*	*9.94*
8 Rigel	*11.37*	*4.13*	*3.38*	*2.80*	*7.99*
9 Storm	*13.24*	*3.92*	*5.55*	*2.26*	*9.69*
Mean	*11.79*	*3.63*	*3.07*	*2.64*	*8.82*

3.1.3 Bed numbers

Stroke unit sites (Sapphire, Eagle and Polaris) respectively provided 4, 8+ and 13 stroke unit beds with designated care. If no bed available, patients were admitted to another wards.

Table 5
Question 1.3 How many beds are designated to this unit?

Site	**Number of beds and any other comments**
1 Centauri	Neurology is a 28 bed unit which also caters for neurosugery, haemotology, oncology, and ENT units – bed available is based on “first come, first served” and if no bed availability patient admitted to another ward but remain under neurology unit care
2 Cyperus	N/A
3 Eagle*	8+ ASU
4 Electra	N/A
5 Gemma	N/A
6 Polaris*	13

7 Regulus	N/A
8 Rigel	N/A
9 Emerald	N/A
10 Sapphire	4

**** Health Round Table- NAHBC sites with acute stroke units (Ref 1)***

3.2. Care Management

3.2.1 Health specialists seeing the patients

Although only "sometimes" seeing the patients, the **neurosurgeon (8), rehabilitation consultant (8), geriatrician (6), neurologist (5) and general physician (5) were the health specialists** most frequently cited as seeing the patients during their admission. No site indicated that the neurologists, neurosurgeon and geriatrician "never" saw the patient or were excluded from involvement.

Neurologists were sited as "always" seeing the patient during the admission at Eagle, Polaris, Rigel, and Sapphire. Patients were seen at Centauri & Emerald if under care of neurologists. Neurologists were involved "sometimes" at Centauri (if under the care of the medical unit), Cyperus, Electra, Gemma and Regulus.

Neurosurgeons did not "always" see patients at any site, however were "sometimes" involved at all sites except Regulus. If a neurosurgeon is required, off campus consultation is available for patients of Regulus.

Geriatricians were regularly involved at 2 sites, Emerald and Sapphire. Geriatricians were always involved at Emerald if the patients were admitted under the geriatric unit. Geriatricians were "sometimes" involved at all other sites.

Either a **rehabilitation consultant** or else a geriatrician saw patients at Sapphire. Rehabilitation consultants were "never" involved at Gemma due to lack of availability. They were "sometimes" involved in patient care at all remaining sites.

The involvement of the **general physician** was the most variable. General physicians were "always" seen at Eagle. At Centauri, involvement would occur if not under the neurologist. The general physician was not involved at 4 sites (Rigel, Emerald Centauri,- if under neurologist, Electra - if under neurosurgeon). General physicians involvement was more likely to occur if admitted under a general medical ward, and was less consistent if neurologists or neurosurgeons were involved. The remaining 6 sites (Cyperus, Electra, Gemma, Polaris, Regulus, Sapphire) saw a general physician "sometimes".

Table 6
Question 2.1 Which other Health Specialists would see the patient during their admission.

	Always	Sometimes	Never
Neurologist	1 Centauri, if under care of neurologists 3 Eagle (always) 6 Polaris 8 Rigel	1 Centauri, if under care of general medical unit 2 Cyperus 4 Electra 5 Gemma	

	9 Emerald, if adm under neurology 10 Sapphire	7 Regulus	
Neurosurgeon		1 Centauri, consult only if tumour found, increased intracranial pressure 2 Cyperus 3 Eagle 4 Electra 5 Gemma 6 Polaris 7 Regulus (off campus) 8 Rigel 9 Emerald	
Geriatrician	9 Emerald, if adm under geriatrics 10 Sapphire, or below	1 Centauri, rarely 2 Cyperus 3 Eagle 4 Electra 5 Gemma 6 Polaris 7 Regulus 8 Rigel	
Rehabilitation Consultant	10 Sapphire, or above	1 Centauri, if referred for either inpatient or in home rehab 2 Cyperus 3 Eagle 4 Electra 6 Polaris 7 Regulus 8 Rigel 9 Emerald	5 Gemma
General Physician	1 Centauri, if adm under general medical ward but not if under care of neurologists 3 Eagle (always), 4 Electra	2 Cyperus 4 Electra 5 Gemma 6 Polaris 7 Regulus 10 Sapphire	1 Centauri, if under care of neurologists 4 Electra, most would see a general physician but may not if under a neurosurgeon 8 Rigel 9 Emerald

3.2.2 How specialists are referred patients

A clients' route of admission (eg emergency) or the admitting officer's referral patterns was observed to influence admitting patterns.

- Frequently the consultation was requested by the **medical team** This occurred at 4 sites (Centauri, Eagle, Gemma, Regulus) with referrals made to neurologists, neurosurgeon, geriatrician. This may following team discussion or be co-ordinated by CNC.

- **Geriatricians** were involved with all patients at 2 sites, Sapphire and Gemma. 1 was involved with all in the rehabilitation ward and specific acute medical team (Gemma), the other via clinical pathways (Sapphire)

- Two sites, Centauri and Sapphire, utilised **rehabilitation consultants,** 1 following team discussions (Centauri) and the other via clinical pathways (Sapphire).

- A blanket referral existed for the **neurologist and general physician** at 1 site, Eagle **.**

- Consulting neurologists at 1 site, Rigel, made referrals.

- Stroke patients are admitted under **a consultant/specialist** at 2 sites, Emerald and Electra. Specialty was not stated.

- **Specialist consultants** became involved by referral at 3 sites, Regulus, Sapphire and Emerald

- Patients were admitted under **neurology** through emergency department at 1 site, Sapphire.

- **Stroke Registrar** admitted clients at Polaris**.**

A variety of referral patterns were seen to be in use. The medical team or team discussion represented the majority (Centauri, Gemma, Regulus, Eagle, Electra), admission under a specialist (Regulus, Sapphire, Electra), referrals initiated by consultants (Rigel, Sapphire), clinical pathways (Sapphire), blanket referrals (Eagle) and via consultation (Sapphire).

Table 7
Question 2.2 How do these specialists become involved with or are referred these patients?

Site	How specialists become involved or referred patients? Comments.
1 Centauri	Referral to neurologists, neurosurgeon, geriatrician made by medical team caring for pt, referral to rehab consultant made following team discussion, often nurse co-ordinating ward makes referral (written).
2 Cyperus	Who sees the client depends on admitting officers referral patterns and/or presenting needs All clients presenting to A&E are admitted via specialist. If stroke is presenting issue, direct referral to Neurologist. If already admitted, with stroke occurring while an inpatient, managing medical team will either seek consultation or refer on to either neurologist, geriatrician and/or rehabilitation consultant.
3 Eagle	(always = a blanket referral). Others = Case conference requested or at medical referral
4 Electra	Patients are either admitted directly under a consultant or referred to them for consultation
5 Gemma	Consultation requested by medical team Geriatrician involved with all patients on rehab ward Geriatrician also involved with patients admitted to his specific medical team (in acute phase)
6 Polaris	via the stroke registrar
7 Regulus	admitted under specific medical unit then specialist consultant require referral
8 Rigel	referral made by consulting neurologists
9 Emerald	Stroke patients are admitted under a specialist in emergency. Other consultants become involved on specific.
10 Sapphire	Patients are admitted under neurology under emergency department. Geriatrician and rehabilitation consultants via the clinical pathway. Other specialists via consultation.

3.2.3 Designated allied health staffing levels for this DRG group

It was difficult to ascertain staffing due to admission processes at sites without dedicated stroke unit as patients are admitted to a variety of wards. The inability to provide a response is indicated by a dash in the following table.

Table 8
Question 2.3 Designated Allied Health Staffing levels for this group of DRG

Additional comments received:
1 Centauri -is difficult to ascertain given patients are admitted under both neurology & general medical units
hence patients will be seen by either neuro AH team/specialist or general medical units teams (have 4) – no
AH dept have staff specifically dedicated to DRG 37/38.
4 Electra - a service is provided by all clinicians on an "as needed" basis.
9 Emerald - difficult to determine FTE given that stroke patients admitted under a number of different teams

* **Acute Episodes:AHP Episodes** – Number of acute episodes vs Number of acute episodes which included the involvement of any allied health professional.
** **Av Hrs/Episode** by each Professional Group for DRG 37/38 (CVA with & without Complications) (Health Round Table NAHBC data) ie average hours spent by each discipline with patient during the admission.
*** **Number of Episodes** with that allied health profession (Health Round Table NAHBC data) ie number of individuals seen at least once by that particular AHP discipline during admission
**** **Percentage of total admissions seen by that AHP discipline** at each site for DRG 37/38 (CVA with & without complications) (Health Round Table NAHBC data)
***** Percentage of admissions seen by any AHP, who was **seen by that particular discipline**

Department (*Acute Episodes: AHP Episodes) 1 Centauri (217 : 155) 2 Cyperus (138 : 115) 3 Eagle (255 : 204) 4 Electra (284 : 203) 5 Gemma (171: 106) 6 Polaris (337 : 277) 7 Regulus (200 : 144) 8 Rigel (298 : 240)	**** Av Hrs/ Episode &** ***** No. of Episodes**		****** % Adm Seeing that AHP** *******% Seen by that Discipline**		**FTE**	**Hours/ week**	**5 day service yes/no**	**7 day service yes/no**
Physiotherapy	**	***	****	*****				
1 Centuri	4	138	63%	89%	-	-	Yes	Yes, if they met criteria to be seen
2 Cyperus	4.3	89	64%	77%	-	-	Yes	Yes, if require WE chest physio
3 Eagle	4	172	67%	84%	0.75	38	Yes	Yes, if require W/E physio
4 Electra	6.7	158	56%	78%	N/A	N/A	Yes	Yes, if pt meets criteria to be seen
5 Gemma	7.9	96	56%	90%	2	37.5x2	Yes	Yes, if pt meets W/E criteria
6 Polaris	2.3	246	73%	89%	0.8		Yes	Yes, if require WE chest physio
7 Regulus	5.1	144	72%	100%	0.6	-	Yes	Yes, if require WE chest physio
8 Rigel	4.5	201	67%	84%	1	38	Yes	Yes, if require WE chest physio
9 Emerald					-	-	No	Yes, if require WE chest physio
10 Sapphire					0.4	15.2	Yes	Yes, only if respiratory problem
Occupational Therapy								
1 Centuri	1.5	72	33%	46%	-	-	Yes	No
2 Cyperus	4.7	73	53%	63%	-	-	Yes	No
3 Eagle	3.2	155	60%	76%	0.4	15	Yes	No
4 Electra	14.4	114	40%	56%	N/A	N/A	Yes	-
5 Gemma	3.6	58	34%	55%	1.5	56.25	Yes	-

6 Polaris	1.6	219	65%	79%	0.8	-	Yes	No
7 Regulus	-	-	-	-	-	-	Yes	No
8 Rigel	3.1	88	30%	37%	0.3	as referred	Yes	-
9 Emerald					-	-	Yes	-
10 Sapphire					0.5	19	Yes	No
Social Work								
1 Centuri	2.6	60	30%	43%	-	-	Yes	No
2 Cyperus	3.3	62	45%	54%	-	-	Yes	Yes, if crisis as per W/E criteria
3 Eagle	2.5	115	45%	56%	0.3	12	Yes	No
4 Electra	7.8	55	19%	27%	N/A	N/A	Yes	-
5 Gemma	2.3	20	12%	19%	1	37.5	Yes	-
6 Polaris	3.2	114	34%	41%	0.6	-	Yes	No
7 Regulus	-	-	-	-	-	-	Yes	-
8 Rigel	5.2	140	47%	58%	1	38	Yes	-
9 Emerald					-	-	Yes	-
10 Sapphire					0.8	30.4	Yes	No
Speech Pathology								
1 Centuri	3.5	85	39%	55%	-	-	Yes	No
2 Cyperus	5.3	72	52%	63%	-	-	Yes	No
3 Eagle	4	145	57%	71%	0.5	20	Yes	No
4 Electra	10.9	98	35%	48%	N/A	N/A	Yes	No
5 Gemma	4.9	64	37%	60%	1.0	37.5	Yes	-
6 Polaris	3.1	177	53%	64%	0.6	-	Yes	-
7 Regulus	-	-	-	-	-	-	Yes	-
8 Rigel	4.6	126	42%	53%	0.75	as referred	Yes	-
9 Emerald					-	-	Yes	-
10 Sapphire					0.5	19	Yes	-
Dietetics								
1 Centuri	1.3	71	33%	46%	-	-	Yes	Yes, on call phone service
2 Cyperus	3.1	51	37%	44%	-	-	Yes	Yes
3 Eagle	1.3	51	20%	25%	0.05	2	Yes	Yes, phone services for all hosp
4 Electra	5.8	72	25%	35%	N/A	N/A	Yes	Yes, on call or phone service
5 Gemma	2.6	14	8%	13%	0.2	7	Yes	-
6 Polaris	3	175	52%	63%	0.3	-	Yes	Yes, on call phone service
7 Regulus	-	-	-	-	-	-	Yes	Yes, Sat/Sun am. On call pm
8 Rigel	3.6	92	31%	38%	0.1	as referred	Yes	No
9 Emerald					-	-	No	Yes, on call
10 Sapphire					0.42	16	Yes	No
Therapy Assistants								
1 Centuri					N/A	N/A	Yes	N/A
2 Cyperus					-	-	-	-
3 Eagle					-	3.5	Yes	No
4 Electra					N/A	N/A	Yes	-
5 Gemma					1	37.5	Yes	-
6 Polaris					N/A	-	-	-
7 Regulus					-	-	-	-
8 Rigel					N/A	-	Yes	-
9 Emerald					-	-	No	-
10 Sapphire					-	-	-	No
Other AHP								
1 Centuri					-	-	N/A	N/A
2 Cyperus (Psychology)					-	-	Yes	No
3 Eagle					-	-	-	-
4 Electra					N/A	N/A	Yes	-
5 Gemma (Orthotists)					As req'd	As req'd	Yes	-
6 Polaris:								
Neuropsychology					0.6	-	5 days/wk	-
Clinical Psychology					0.1	-	3 days/wk	-
7 Regulus					-	-	-	-
8 Rigel					-	-	-	-
9 Emerald					-	-	No	-
10 Sapphire					-	-	-	-

Likelihood of seeing each allied health professional discipline on admission

Physiotherapy:

The percentage of admissions for DRG 37/38 seen by physiotherapy during hospitalisation ranged from 56% to 73% (average 65%). Of patients who received an occasion of care from any allied health discipline, 77% to 100% (average 86%) saw a physiotherapist. The average number of hours spent with each client ranged from 2.3 to 7.9 (average across sites of 4.9 hours). Data from all sites was included. One site included physiotherapy data only. Exclusion of this sites' data reduced the average percentage of patients who received an occasion of care from 86% to 84%.

Occupational Therapy:

The percentage of admissions for DRG 37/38 seen by occupational therapy during hospitalisation ranged from 30% to 65% (average 45%). Of patients who received an occasion of care from any allied health discipline, 37% to 79% (average 59%) saw a occupational therapist. The average number of hours spent with each client ranged from 1.5 to 14.4 (average across sites of 4.6 hours).

Social Work:

The percentage of admissions for DRG 37/38 seen by social work during hospitalisation ranged from
12% to 47% (average 33%). Of patients who received an occasion of care from any allied health discipline, 19% to 58% (average 43%) saw a social worker. The average number of hours spent with each client ranged from 2.5 to 7.8 (average across sites of 3.8 hours).

Speech Pathology:

The percentage of admissions for DRG 37/38 seen by a speech pathology during hospitalisation ranged from 35% to 57% (average 45%). Of patients who received an occasion of care from any allied health discipline, 48% to 71% (average 59%) saw a speech pathologist. The average number of hours spent with each client ranged from 3.1 to 10.9 (average across sites of 5.2 hours). With exclusion of Electra – Average number of hours spent with client – 3.6 hours

Nutrition and Dietetics:

The percentage of admissions for DRG 37/38 seen by a dietitian during hospitalisation ranged from
8% to 52% (average 29%). Of patients who received an occasion of care from any allied health discipline, 13% to 63% (average 38%) saw a dietitian. The average number of hours spent with each client ranged from 1.3 to 5.8 (average across sites of 3.0 hours).

At the time of this data collection period, Electra utilised a different method of capturing time which is reflected in the statistics ie packages of time for an AHP service at Electra vs real time utilised at all other sites. If this sites data is excluded and figures reworked, no difference were seen in the average hours per patient for physiotherapy. However, a reduction in hours were seen for physiotherapy, occupational therapy, social work, speech pathology and dietetics from 4.9hrs to 4.6 hrs 4.6 hrs to 3.00 hrs, 3.8 hrs to 3.1hrs, 5.2hrs to 4.3 hrs, 3.0hrs to 2.2 hrs respectively.

Degree of variability between seeing AHP depending on the professional discipline and site

Table 8 reveals the percentage of admissions seen by any AHP, which AHP were most likely to see a client and variations occurring across sites.

Physiotherapy then **speech pathology** showed the least variation between sites of the percentage of admissions seen by the AHP (difference of 17% and 22% respectively; 56%-73% and 35%-57%). **Dietetics** then **social work/occupational therapy** showed the greatest variation (difference of 44% and 35%, then 8-52% and 12%-47%/ 30-65% respectively).

Of patients seen by any allied health discipline, **physiotherapy** was the most likely to be provided (77-100%), followed by **occupational therapy** and **speech pathology** (37-79%, 48-71%). **Social work** and **dietetics** were least likely to have involvement (19-58%, 13-63%).

Of admissions receiving an AHP's care, **physiotherapy** then **speech pathology** again showed the least variation between sites (difference of 23% each; 77-100% and 48-71% respectively). The greatest variation occurred with **dietetic**s (difference of 50%; 13-63%). **Occupational therapy** then **social work** showed the next greatest variation (difference of 42% and 39%; 37-79% and 19-58% respectively.

The degree of variability in weekly service provided by allied health disciplines
A 5 day service was available for most allied health disciplines at most sites. The exception was Emerald who reported no 5 day service for physiotherapy or dietetics, however a service was available 5 days for occupational therapy, social work and speech pathology.

The provision of a 7 day oncall service tended to be dependant on discipline. An oncall weekend service was provided by physiotherapy at all sites and provided by dietetics at the majority of sites (excluding Rigel, Sapphire, Gemma). Occupational therapy, speech pathology and social work (excluding Cyperus) did not to provide weekend services.

The degree of variability in hours provided by allied health disciplines
The level of variation between the minimum and maximum average hours provided by each discipline was investigated.

If Electra is included**, occupational therapy** showed the greatest variation in the number of hours spent per client by a factor of 9.6. **Dietetics** was the next variable by a factor of 4.5. **Speech pathology, physiotherapy and social work** each varied by a factor of approximately 3.

With Electra excluded, less extreme in variation is noted. **Physiotherapy** showed the greatest variation in the number of hours spent per client by a factor of 3.4. **Occupational therapy** was the next most variable with a factor of 3.1. **Dietetics, social work, and speech pathology** each varied by a factor of approximately 2.

Table 8a
1/7/1999-30/6/2000
Designated Allied Health Staffing levels for this group of *DRG B70 (Stroke)*

Department *(*Acute Episodes: AHP Episodes)* *1 Centauri (286 : 211)* *2 Cyperus (182 : 149)* *3 Eagle (306 : 246)* *4 Electra (397 : 310)* *5 Gemma (261: 167)* *6 Polaris (498 : 410)* *7 Regulus (269 : 180)* *8 Rigel (411 : 347)* *9 Storm (516 : 443)*	***** Av Hrs/ Episode &*** ****** No. of Episodes***	******* % Adm Seeing that AHP*** ********% Seen by that Discipline***
Physiotherapy	** ***	**** *****
1 Centauri	*4.5 193*	*67% 91%*
2 Cyperus	*3.7 98*	*54% 66%*
3 Eagle	*3.4 212*	*70% 86%*
4 Electra	*3.7 269*	*64% 87%*
5 Gemma	*5.7 152*	*27% 92%*
6 Polaris	*2.4 322*	*65% 79%*
7 Regulus	*5.2 167*	*62% 93%*
8 Rigel	*4.1 289*	*70% 83%*
9 Storm	*8.3 396*	*78% 89%*
Occupational Therapy		
1 Centauri	*2.0 112*	*39% 53%*
2 Cyperus	*3.3 102*	*56% 68%*
3 Eagle	*2.9 183*	*60% 74%*
4 Electra	*5.1 175*	*44% 56%*
5 Gemma	*4.5 133*	*51% 80%*
6 Polaris	*1.7 318*	*63% 76%*
7 Regulus	- -	- -
8 Rigel	*3.2 132*	*32% 38%*
9 Storm	*5.8 376*	*73% 85%*
Social Work	*1.9 99*	*35% 47%*
1 Centauri	*4.3 93*	*51% 62%*
2 Cyperus	*1.9 198*	*65% 80%*
3 Eagle	*4.2 111*	*28% 36%*
4 Electra	*2.9 43*	*16% 26%*
5 Gemma	*3.5 155*	*31% 38%*
6 Polaris	- -	- -
7 Regulus	*4.9 152*	*37% 44%*
8 Rigel	*3.8 268*	*52% 60%*
9 Storm		

Speech Pathology	*3.2*	*129*	*45%*	*61%*
1 Centauri	*4.3*	*72*	*40%*	*48%*
2 Cyperus	*3.4*	*165*	*54%*	*67%*
3 Eagle	*7.5*	*163*	*41%*	*53%*
4 Electra	*5.0*	*88*	*34%*	*53%*
5 Gemma	*3.5*	*249*	*50%*	*61%*
6 Polaris	-	-	-	-
7 Regulus	*4.0*	*189*	*46%*	*54%*
8 Rigel	*4.1*	*263*	*51%*	*60%*
9 Storm				
Dietetics				
1 Centauri	*2.1*	*110*	*38%*	*52%*
2 Cyperus	*2.8*	*70*	*38%*	*47%*
3 Eagle	*1.3*	*47*	*15%*	*19%*
4 Electra	*2.7*	*85*	*21%*	*27%*
5 Gemma	*3.9*	*15*	*5%*	*9%*
6 Polaris	*3*	*213*	*43%*	*52%*
7 Regulus	*2.6*	*85*	*32%*	*47%*
8 Rigel	*2.8*	*132*	*32%*	*38%*
9 Storm	*2.3*	*224*	*43%*	*51%*

Table 9
Average Hours/AHP Episode Total & By Professional Group with Average Length of Stay (ALOS) and Complexity for Allied Health and Non Allied Health for DRG 37/38 (CVA with & without complications)

Site, Average encounters /day	Avg AH Hrs/ (IP) Total	Physio (Hrs)	OT (Hrs)	SW (Hrs)	D/N (Hrs)	Speech (Hrs)	ALOS for AH (Days)	ALOS for Non-AH (Days)	Complex-ity AH	Complex-ity Non-AH
1 Centauri 1.27	7.87	4	1.5	2.6	1.3	3.5	10.91	5.47	4.43	3.66
2 Cyperus 1.23	12.79	4.3	4.7	3.3	3.1	5.3	14.49	3.64	3.66	2.33
3 Eagle* 1.09	10.48	4	3.2	2.5	1.3	4	10.7	2.38	4.06	2.23
4 Electra # 1.91	22.72	6.7	14.4	7.8	5.8	10.9	11.56	3.04	3.50	2.49
5 Gemma 1.25	12.87	7.9	3.6	2.3	2.6	4.9	13.88	2.00	4.46	2.38
6 Polaris* 1.08	8.61	2.3	1.6	3.2	3	3.1	10.74	1.71	3.14	1.79
7 Regulus 1.33	5.07	5.1					15.63	3.91	3.91	2.84
8 Rigel 1.50	11.74	4.5	3.1	5.2	3.6	4.6	12.72	2.39	3.86	2.72
Average across sites (excluding Electra)		4.9 (4.6)	4.6 (3.0)	3.8 (3.1)	3.0 (2..2)	5.2 (4.3)	Avg 12.21	Avg 3.05	Avg 3.79	Avg 2.59
Range of Hours on Average (excluding Electra)		2.3-7.9 (2.3-7.9)	1.5-14.4 (1.5-4.7)	2.5-7.8 (2.5-5.2)	1.3-5.8 (1.5-3.6)	3.1-10.9 (3.1-5.3)				
Min/Max Variation Factor of 77% (excluding Electra)		3.4 (3.4)	9.6 (3.1)	3.5 (2.1)	4.5 (2.4)	3.1 (1.7)				

** Health Round Table – NAHBC sites with acute stroke units (Ref 1)*
 # Electra –different method of capturing time exists at this site and is reflected in the statistics ie Packages of time for an AHP service at Electra vs real time utilised at all other sites

Characteristics of Allied Health Stroke Management
The complexity and average length of stay was greater for patients receiving allied health interventions. However, there was a 46% increase in the average complexity designated to those receiving allied health care (3.79 vs 2.59). These clients were also associated with a 4 fold increase in length of stay which appears consistent with increased clinical complexity.

A 77% difference existed between the minimum and maximum allied health visits per day (range 1.08-1.91). Sites with acute stroke units recorded the lowest ALOS for allied health (10.7 and 10.74 days). Interestingly, sites with acute stroke units also recorded the lowest average visits per day (1.08, 1.09) and the average hours spent per inpatient were on the lower side of responses (8.61 and 10.48 hours).

This may support the development of dedicated stroke units as they resulted in lower ALOS, fewer hours spent per patient and fewer average visits per patient. It may be proposed that certain efficiencies and expertise develop within these units. Perhaps objectives are more clearly stated, networking is enhanced and a clear end point or discharge plan is identified.

Sites with designated stroke units also recorded the lowest ALOS for those not receiving allied health intervention. Although postulation, it may be that patients not receiving allied health interventions are less complex cases and consequently are not being treated by the acute stroke unit.

It is noted that 1 site without a dedicated stroke unit (Centauri) had amongst the lowest length of stay and the highest complexity, with similar figures to the 2 sites with dedicated units.

Health round table data (1,2) also illustrates that NAHBC sites with acute stroke units had the greatest percentage of patients seen in the first half of the stay (85% vs 63-78%). The reduced ALOS can not be contributed to age as the patient profile was not younger (65.8 and 72.3 years vs range 65.8-74.5 years). Lower numbers of patients were discharged home (36% and 42%). The average length of stay was also low (table above) although the previous years results were average or above average. The relative stay index for 1998-1999 was amongst the lowest. Percent emergency was less than average and amongst the lowest.

Table 9a
1/7/1999-30/6/2000
Average Hours/AHP Episode Total & By Professional Group with Average Length of Stay (ALOS) and Complexity for Allied Health and Non Allied Health for DRG B70 (Stroke)

Site, Average encounters /day	*Avg AH Hrs/ (IP) Total*	*Physio (Hrs)*	*OT (Hrs)*	*SW (Hrs)*	*D/N (Hrs)*	*Speech (Hrs)*	*ALOS for AH (Days)*	*ALOS for Non-AH (Days)*	*Complex -ity AH*	*Complex -ity Non-AH*
1 Centauri 1.27	*9.14*	*4.5*	*2.0*	*1.9*	*2.1*	*3.2*	*12.20*	*2.51*	*4.57*	*3.11*
2 Cyperus 1.24	*11.30*	*3.7*	*3.3*	*4.3*	*2.8*	*4.3*	*13.62*	*3.95*	*2.90*	*2.16*
3 Eagle 1.05	*9.14*	*3.4*	*2.9*	*1.9*	*1.3*	*3.4*	*9.51*	*2.46*	*4.15*	*3.26*
4 Electra 1.07	*12.29*	*3.7*	*1.5*	*4.2*	*2.7*	*7.5*	*8.73*	*2.97*	*3.00*	*2.08*
5 Gemma 1.18	*12.57*	*5.7*	*4.5*	*2.9*	*3.9*	*5.0*	*12.08*	*2.38*	*4.80*	*3.15*
6 Polaris 1.10	*8.22*	*2.4*	*1.7*	*3.5*	*3.0*	*3.5*	*11.19*	*2.20*	*3.76*	*2.13*
7 Regulus 1.28	*6.08*	*5.2*			*2.6*		*14.21*	*4.27*	*4.34*	*2.77*
8 Rigel 1.24	*10.10*	*4.1*	*3.2*	*4.9*	*2.8*	*4.0*	*11.37*	*3.38*	*4.13*	*2.80*
9 Storm 1.09	*18.22*	*8.3*	*5.8*	*3.8*	*2.3*	*4.1*	*13.24*	*3.55*	*3.92*	*2.26*
Average across sites		*4.6*	*3.6*	*3.4*	*2.6*	*4.3*	*Avg 11.79*	*Avg 3.07*	*Avg 3.95*	*Avg 2.63*
Range of Hours on Average		*2.4-8.3*	*1.7-5.8*	*1.9-4.9*	*1.3-3.9*	*3.2-7.5*				
Min/Max Variation Factor of 21%		*3.5*	*3.4*	*2.6*	*3.0*	*2.3*				

Table 10
Acute stroke management and comparison of additional parameters

	% Seen First ½ of Stay (Ref 1)	**Average Age (in years)**	**% Discharged Home**	**Relative Stay Index % '98-99**	**Relative Stay Index % '97-98**	**% Emerg -ency**
1 Centauri	78%	73.1	39%	92	92	96%
2 Cyperus	74%	68.3	43%	129	116	91%
3 Eagle*	85%	65.8	36%	91	100	86%
4 Electra	81%	68.7	42%	94	97	79%
5 Gemma	79%	69.3	50%	91	106	81%
6 Polaris*	85%	72.3	42%	93	109	86%
7 Regulus	63%	74.5	44%	118	90	89%
8 Rigel	74%	72.8	45%	106	98	96%
Average	78%	70.6 yrs	42.6%	100	100	88%

**Health Round Table – NAHBC sites with acute stroke units (Ref 2)*
"Relative Stay Index" – Compares the length of stay of acute patients at 1 hospital with the group average of all hospitals

Table 10a
1/7/1999-30/6/2000
Acute stroke management DRG B70 (Stroke) and comparison of additional parameters

	% Seen First ½ of Stay	*Average Age (in years)*	*% Discharged Home*	*Relative Stay Index % '99-00*	*Relative Stay Index % '98-99*	*Relative Stay Index % '97-98*	*% Emerg -ency*
1 Centauri	*78%*	*70.9*	*35%*	*82*	*92*	*92*	*96%*
2 Cyperus	*80%*	*66.9*	*42%*	*120*	*129*	*116*	*91%*
3 Eagle	*86%*	*67.8*	*45%*	*77*	*91*	*100*	*86%*
4 Electra	*76%*	*67.8*	*45%*	*81*	*94*	*97*	*79%*
5 Gemma	*77%*	*68.3*	*50%*	*88*	*91*	*106*	*81%*
6 Polaris	*89%*	*71.9*	*39%*	*80*	*93*	*109*	*86%*
7 Regulus	*72%*	*73.8*	*39%*	*91*	*118*	*90*	*89%*
8 Rigel	*79%*	*74.0*	*38%*	*80*	*106*	*98*	*96%*
9 Storm	*82%*	*68.5*	*45%*	*102*			
Average	*80%*	*70.0 yrs*	*42%*	*88*	*100*	*100*	*88%*

3.2.4 Referral methods utilised

A variety of referral techniques are employed. Several sites have blanket referral, although not for all professions. There is need to be cognizant that the **term "blanket referral" may have different interpretations** between professional groups. For some professions there is an implicit expectation that all clients will be seen. For others it enables the staff member to see a client if a need is identified, without requesting a specific doctors referral.

At **Eagle**, physiotherapy, occupational therapy and social work interpret the blanket referral as an implied obligation to see all patients. Speech pathology and dietetics interpret blanket referrals as the right to see any patient who may require their services without requesting a specific referral, however patients would not be seen automatically by either discipline. In reality there is the need to be alerted that their intervention may be required which can create the perception that a doctors referral is required.

At **Rigel**, blanket referrals provided the opportunity to choose to see a patient without a specific referral.

At **Polaris,** speech pathology, physiotherapy and occupational therapy interpret the blanket referral as a requirement to see all patients. Social work and dietetics interpret the blanket referral as the right to see a patient if required for their care without requesting a referral.

At **Electra** -physiotherapy and occupational therapy screen and assess clients as appropriate. Speech pathology worked with referrals only. Social work saw patients with referred or screened patients.

Blanket referrals existed most frequently at Eagle, Electra, Polaris, Rigel and Emerald. Only Eagle, and Emerald extended a blanket referrals to each of the 5 allied health professions identified. Polaris extended blanket referrals to 4 allied health professions. Although the

professional groups differed at each site they extended across the 5 categories (physiotherapy, occupational therapy and speech pathology at each site, dietetics at Polaris and social work at Eagle). Sapphire extended blanket referrals to 3 professional groups (physiotherapy, social work, speech). Electra and Rigel identified blanket referrals for physiotherapy only.

For sites without blanket referral, medical and other allied health referrals were equally employed.
For physiotherapy, this occurred at Centauri, Cyperus, Electra, Gemma and Regulus. For occupational therapy, it occurred at Centauri, Cyperus, Electra, Gemma, Regulus and Rigel. For social work, this occurred at Centauri, Cyperus, Electra, Gemma, Polaris and Rigel. For speech pathology, this occurred at Centauri, Cyperus, Electra, Gemma, Regulus and Rigel. For dietetics, it occurred at Centauri, Cyperus, Electra, Gemma, Regulus, Rigel and Sapphire.

Nursing was the most frequent "other" referral source (Centauri, Cyperus, Electra, Regulus, Rigel). Family and chaplain referrals were noted by Electra. Eagle identified nutrition screening as a source of referrals. Self referral and team meetings were also stated (Cyperus).

Table 11
Question 2.4 Referral Method

Profession	Blanket	By Doctor	Other AHP's	Other (state)
Physiotherapy	3 Eagle 4 Electra 6 Polaris 8 Rigel 9 Emerald 10 Sapphire	1 Centauri 2 Cyperus 4 Electra 5 Gemma 7 Regulus	1 Centauri 2 Cyperus 4 Electra 5 Gemma 7 Regulus	1 Centauri, nursing 2 Cyperus, nursing/team meeting 4 Electra, nursing 7 Regulus, nursing
Occupational Therapy	3 Eagle 6 Polaris 9 Emerald	1 Centauri 2 Cyperus 4 Electra 5 Gemma 7 Regulus 8 Rigel	1 Centauri 2 Cyperus 4 Electra 5 Gemma 7 Regulus 8 Rigel	1 Centauri, nursing 2 Cyperus, nursing/team meeting 4 Electra, nurse/family 7 Regulus, nursing 8 Rigel, nursing
Social Work	3 Eagle 9 Emerald 10 Sapphire	1 Centauri 2 Cyperus 4 Electra 5 Gemma 6 Polaris 7 Regulus 8 Rigel	1 Centauri 2 Cyperus 4 Electra 5 Gemma 6 Polaris 7 Regulus 8 Rigel	1 Centauri, nursing 2 Cyperus, nursing/ team meeting/ self referral 4 Electra nurs/fam/ chaplin 6 Polaris, nursing 7 Regulus, nursing 8 Rigel, nursing
Speech Pathology	3 Eagle 6 Polaris 9 Emerald 10 Sapphire	1 Centauri 2 Cyperus 3 Eagle-Helps ID 4 Electra 5 Gemma 7 Regulus 8 Rigel	1 Centauri 2 Cyperus 3 Eagle-Helps ID 4 Electra 5 Gemma 7 Regulus 8 Rigel	1 Centauri, nursing 2 Cyperus* 4 Electra, nursing 7 Regulus, nursing 8 Rigel, nursing
Dietetics	3 Eagle 6 Polaris 9 Emerald	1 Centauri 2 Cyperus 3 Eagle-Helps ID 4 Electra 5 Gemma 7 Regulus 8 Rigel	1 Centauri 2 Cyperus 3 Eagle-Helps ID 4 Electra 5 Gemma 7 Regulus 8 Rigel	1 Centauri, nursing 2 Cyperus, nurse, team mt'g 3 Eagle, routine nutrition screening 4 Electra, nursing 7 Regulus, nursing, speech 8 Rigel, nursing

		10 Sapphire	10 Sapphire	10 Sapphire
Other designated AHP's				
Orthotist		5 Gemma	5 Gemma	
Neuropsychologists		2 Cyperus 5 Gemma 6 Polaris	2 Cyperus 6 Polaris	2 Cyperus*
Clinical psychology		2 Cyperus 6 Polaris	2 Cyperus 6 Polaris	2 Cyperus* 6 Polaris, nursing

***** At Cyperus, speech pathology and psychology/neuropsychology require medical confirmation of referral for all referrals from non medical staff

3.2.5 Use of clinical pathways or some similar type of care maps

Clinical pathways were utilised by 3 sites, Eagle, Polaris and Sapphire. Two other sites utilise care plans. Gemma utilises a Care management plan.

No care maps were employed in 5 hospitals Centauri, Cyperus, Rigel, Emerald, Electra although Electra stated clinical pathways were to be introduced this year after a non successful previous trial and Regulus has a Stroke Care Plan.

Table 9 showed the sites with clinical pathways (**Eagle, Polaris**) did have the lowest ALOS (10.70 and 10.74 days, from a range of 10.70-15.63 days). However **Gemma and Regulus,** who had introduced care plans were amongst the highest ALOS.

Table 12
Question 2.5 Are clinical pathways or some similar type of care map used in the units where these patients would be admitted?

Yes – Clinical pathways	(3) - Eagle, Polaris, Sapphire
Yes – Some other names –please state	(2) - Gemma: Care Management
No –	(5) - Centauri, Cyperus, Electra, Rigel, Emerald

Additional comments received:
4 Electra - Clinical pathways will be introduced this year. There was a trial of a pathway which was not successful.
5 Regulus: Stroke Care Plan but not a clinical pathway

3.2.6 Whether multidisciplinary clinical team meetings are held?

All units held multidisciplinary meetings. For 1 site (Cyperus) frequency and staff attending meetings depended on the ward involved.

Table 13
Question 2.6 Are multidisciplinary clinical team meetings held?

Yes	-	10
No	-	0

Additional comments received:
2 Cyperus – Dependant on ward/admitting officer. Nursing and [significant] allied health meetings and/or multidisciplinary meetings, with medical officer involvement held on the majority of wards. Multidisciplinary meetings held consistently on neurosciences and acute rehabilitation wards.

3.2.7 Frequency & purpose of clinical meetings

Weekly meetings were held at 7 sites (Centauri, Eagle, Gemma, Regulus, Rigel, Emerald, Sapphire) . Twice weekly meetings were held at 2 sites (Electra and Polaris). Regulus held a weekly allied health meeting and a weekly rehabilitation meeting. At 1 site meetings varied depending on the ward/admitting officer (Cyperus).

The purpose of the meetings were reasonably consistent and included:
Review of treatment and management and patient care plans (4 sites: Emerald, Centauri, Sapphire, Electra), screening or suitability for rehabilitation or other units eg community (7 sites: Centauri, Regulus, Electra, Eagle, Gemma, Polaris, Regulus), discharge planning including social issues (6 sites: Centauri, Eagle, Gemma, Polaris, Regulus, Rigel), progress and referral to other professionals (4 sites: Centauri, Eagle, Polaris, Regulus).

Table 14
Question 2.7 Frequency & purpose of these clinical meetings: -
Please state: -

Site	Purpose of clinical meetings	Frequency
1 Centauri	Weekly for both neurology and general medical units except 1 general medical unit meets daily. Meet to discuss patients, discharge plans, rehabilitation potential, progress and refer to other professionals as appropriate.	Weekly for both neurology and general medical units except 1 general medical unit meets daily
2 Cyperus	as above ie dependant on ward/admitting officer. Nursing and [significant] allied health meetings and/or multidisciplinary meetings, with medical officer involvement held on the majority of wards. Multidisciplinary meetings held consistently on neurosciences and acute rehabilitation wards.	Multidisciplinary meetings are held consistently on neurosciences and acute rehab wards on a weekly basis
3 Eagle	Once a week – Multidisciplinary – Allied Health reporting and discharge planning , referral to rehab, diagnosis/medical therapy.	Once a week
4 Electra	2 x a week. To ensure all patients are being treated appropriately, to note their progressions and refer them onto other units ie elderly rehab/capital rehab/community.	Twice per week
5 Gemma	Weekly to discuss team management & D/C plan process. To screen patients for rehab ward	Weekly
6 Polaris	Twice weekly – purpose, holistic care, appropriate referrals, medical tests required and discharge planning	Twice weekly
7 Regulus	Weekly allied health meeting – for discharge planning, referred to rehabilitation. Weekly rehab consultant & allied health discuss patients on rehab list & make new referrals	Weekly
8 Rigel	1 x week to discuss social issues and discharge plans	Weekly

	for patients.	
9 Emerald	Weekly meetings are held with allied health, neurology, registrar, neurosurgical registrar and rehab consultant for case review and management.	Weekly
10 Sapphire	A multidisciplinary meeting is held once a week to discuss patient care plans	Weekly

3.2.8 Are outcome measures used with this DRG (P) Group?

Generally there are a range of tools employed.

The **clinical team measures** were used by 3 sites (Gemma, Polaris, Sapphire). Measures included length of stay and swallowing impairment (2 sites), mortality rates, discharge outcomes and variances from clinical pathways (1 site each).

The Royal Brisbane Hospital Outcome Measurement for Swallowing was used by 3 **speech pathology** departments. One site utilised Enderby Therapy Outcomes Measure and Westmead/Parramatta Hospital Outcome Measures for language assessment.

Assessment tools were used by **physiotherapy** at 7 sites (Centauri, Eagle, Electra, Gemma, Regulus, Rigel , Emerald). The Motor Assessment Scale was used at 4 sites (Eagle, Emerald, Regulus, Rigel). Unspecified gait and balance tools were used at 4 site (Centauri, Eagle, Gemma & Regulus). The Berg balance test was used at 2 sites (Electra, Emerald). The Elderly Balance test was used at 2 sites (Eagle & Electra) .

No tools were identified as being utilised by **social work** at any site.

The FBBC Nutrition Screening Tool and SGA Nutritional Assessment was used by **dietitians** at 1 site (Eagle) while another stated achievement of optimal nutritional status (Electra).

Occupational therapy indicted the use of tools at 4 sites (Centauri, Electra, Eagle, Gemma). Eagle and Centauri specified the MBI (Modified Barthel Index). Eagle, Gemma and Electra utilised the MMSE (Mini Mental Status Examination) while Centauri stated that medical staff utilise the MMSE. AMPS (Assessment of Motor and Process Skills) was utilised at 1 site (Centauri). Cognisant (Neuro Behavioural Cognitive Status Examination), Rivermead Perceptual Assessment Battery, Rivermead Behavioural Memory Test were utilised at 1 site (Electra).

Table 15
Question 2.8 Are outcome measures used with this DRG (P) Group?
Please list and state if a "Clinical Team Measure" or "Discipline specific" and which discipline?

Site	Response
1 Centauri	Occupational Therapy - MBI, AMPS Physiotherapy – Tools for gait, sitting, standing, balance Medical staff – MMSE
2 Cyperus	Nutrition - Screening tools reflecting nutrient & fluid requirements &/or reflection of self care requirements OT Acute – AMPS, ROM measurements, Functional assessment of self care and feeding noted in medical file Physiotherapy - Proven measures (eg: FIM, Barthel) for very acute clients are not available.

	Pre and post-treatment functional status is documented in the file, discharge and transfer summaries' Social Work – No discipline specific outcome measure being used at time of this study (under development). Speech Pathology– Clinical assessments/outcomes:'Local' dysphagia assessment but content would be consistent with other hospitals. Components of this utilised for initial assessment, reviews and discharge; 'local' communication screening test (content would be consistent across agencies); Boston, WAB, Frenchay Published outcome measures utilised on an audit basis across DRG – including Enderby TOM & RBHOM.
3 Eagle	Physiotherapy – Motor Assessment Scale, Elderly mobility scale, balance assessment Occupational Therapy – MBI, MMSE. Dietetics - FBBC Nutrition Screening Tool and SGA Nutritional Assessment. Speech – RBHOMS. For language – Enderby therapy outcomes measure. Westmead/ Parramatta hospital outcomes measure
4 Electra	No clinical team measures. Social work - N/A. Dietetics - Maintenance , achievement of optimal nutritional status. Speech - RBHOMS. Occupational Therapy – Cognisant (Neuro behavioural cognitive status examination) Rivermead Perceptual Assessment Battery, MMSE, Rivermead Behavioural Memory Test Physiotherapy – Berg Balance Test, Elderly Mobility Scale
5 Gemma	Clinical team Measures for acute: LOS Physiotherapy – balance assessments Occupational therapy – Cognitive and perceptual screens eg MMSE Speech – RBHOMS.
6 Polaris	Clinical team measure- length of stay, mortality rates, discharge outcomes
7 Regulus	Physiotherapy specific – Mobility Scale for Acute Stroke, Modified Motor Assessment scale, sitting balance, standing balance, gait (time and quality of task considered).
8 Rigel	Physio-Neurological clinical indicators using the Motor Assessment Scale (MAS)
9 Emerald	Speech therapy trial of Brisbane Dysphagia Outcome Measure (RBHOMS) Physiotherapy – MAS and Berg (balance test)
10 Sapphire	Clinical team measure length of stay, variances from clinical pathways, swallowing impairment, progression through thickened fluids to normal oral intake.

3.2.9 Does the medical or clinical unit have a database to record this data?

Six sites did not use a data base to record this data (Centauri, Cyperus, Electra, Regulus, Rigel, and Emerald). Three sites (Eagle, Polaris, and Sapphire) did record outcome measures. One site (Gemma) was in the process of developing a database.

Table 16
Question 2.9 Does the Medical or Clinical Unit have a database to record this data?

Yes	(4)	-	Eagle, Gemma – developing, Polaris, Sapphire
No	(6)	-	Centauri, Cyperus, Electra, Regulus, Rigel, Emerald

3.2.10 Any research projects being conducted within the clinical unit at present, which may have an impact on the course of treatment or length of treatment of this group of patients?

Four sites (Gemma, Emerald, Sapphire, Polaris) were undertaking research projects which would impact on the treatment of these clients. Drug trials were conducted at 2 sites (Sapphire, Polaris). Other research were being conducted at 1 site each: evidence based practice for management of hemiplegic and education packages (Gemma), imaging trials (Polaris), sleep apnoea (Sapphire), oral intake survey (Emerald) and a stroke study (Sapphire).

Table 17
Question 2.10 Any research projects conducted within the clinical unit at present, which may have impact on the course or length of treatment of this group of patients? Please list: -

Site	Response
1 Centauri	No
2 Cyperus	Unaware of current research as across a number of wards/ clinical unit
3 Eagle	Not at present
4 Electra	No
5 Gemma	EBP project for management of Hemiplegic UL (upper limb) – QA project OT – with Australian Brain Foundation circulating Education packages post stroke.
6 Polaris	Acute drug trials. Imaging trials (ie PET). Trials may include bed rest, hourly observations and additional scans
7 Regulus	No
8 Rigel	No response
9 Emerald	Survey of oral intake & associated difficulties - a multidisciplinary nutrition project
10 Sapphire	Mini projects, drug trials, sleep apnoea and stroke study

3.3. Rehabilitation

3.3.1 How decisions are made regarding need for ongoing patient rehabilitation

Decisions were made at team meetings at all sites. However, it was seldom used at Rigel and used in conjunction with AHP charted recommendations at Centauri. No site indicated they did not use this method.

The consultants were responsible for the majority of decisions at 1 site (Rigel). Six sites (Cyperus, Gemma, Regulus, Rigel, Emerald, Sapphire) indicated referral depended on availability of rehabilitation beds. This was not the case for the remaining 4 sites. Allied Health medical chart recommendations were used by 9 sites and not used by 1 site (Electra). All methods for decision making were used by 5 sites (Cyperus, Regulus, Rigel, Emerald, Sapphire).

Table 18
Question 3.1 How are decisions made regarding the need for ongoing inpatient rehabilitation: -

Site	At the Team meetings	By the Consultants only	Depending on Availability of Rehab beds	From AHP recommendations in medical chart	All of the above
1 Centauri	Yes	No	No	Yes	
2 Cyperus	Yes	Yes	Yes	Yes	Yes
3 Eagle	Yes	No	No	Yes	
4 Electra	Yes	No	No	No	
5 Gemma	Yes	No	Yes	Yes	
6 Polaris	Yes	No	No	Yes	

7 Regulus	Yes	Yes	Yes	Yes	Yes
8 Rigel	Yes (v. seldom)	Yes (majority)	Yes	Yes	
9 Emerald	Yes	Yes	Yes	Yes	Yes
10 Sapphire	Yes	Yes	Yes	Yes	Yes

3.3.2 Inpatient rehabilitation facilities for patient transfer

Seven sites (Cyperus, Eagle, Electra, Gemma, Rigel, Emerald, Sapphire) had rehabilitation facilities on the campus. All except Emerald and Rigel also had access to rehabilitation on another campus. Centauri, Polaris and Regulus did not have access to rehabilitation on campus but were able to access another campus.

Table 19
Question 3.2 Are there inpatient rehabilitation facilities for these patients to be transferred to: -

Site	On your campus	On another campus
1 Centauri	No	Yes
2 Cyperus	Yes (acute rehab)	No
3 Eagle	Yes	Yes
4 Electra	Yes	Yes
5 Gemma	Yes	Yes
6 Polaris	No	Yes
7 Regulus	No	Yes
8 Rigel	Yes	Yes
9 Emerald	Yes	No
10 Sapphire	Yes	Yes

3.3.3 Is there a waiting list or booking system for Rehab beds

All sites had a waiting list for Rehabilitation beds. At Cyperus, the booking system was a medical decision.

Table 20
Question 3. 3 Is there a waiting list or booking system for Rehab beds

Yes	(9)	-	Centauri, Cyperus (- as determined by medical decision), Eagle, Electra, Gemma, Polaris, Regulus, Rigel, Emerald, Sapphire
No	(0)	-	

3.3.4 Are patients able to be prioritised on the waiting list?

A priority system was in place at 8 sites. Regulus was not able to prioritise although it was stated that ongoing medical issues may alter waiting list order.

For 1 hospital all rehabilitation was done off campus (Centauri). It was the rehabilitation liaison nurse from the off-campus site who organised all patient transfers and decided patients priorities. Criterion for decision making, reprioritising depends on patients current medical status and

function, hence those with greater potential, better function or more stable medical status are transferred first.

Table 21
Question 3.4 Are patients able to be prioritised on the waiting list?

Yes	(10)	-	Centauri, Cyperus, Eagle, Electra, Gemma, Polaris, Rigel, Emerald, Sapphire
No	(1)	-	Regulus

Additional comments received:
1 Centauri – as all rehab is done off campus the rehab liaison nurse from the off-campus site organises all patient transfers and hence it is her decision if patients are prioritised. Unaware if there is criteria for this

7 Regulus – once accepted on waiting list are taken in order of waiting list - ongoing medical issues may alter waiting list order.

3.3.5 Are patients generally able to be transferred when required?

The majority of respondents (9) were not able to transfer patients as required. One site (Eagle) could transfer when required, although Regulus commented on occasional waiting lists.

Table 22
Question 3.5 Are patients generally able to be transferred when required?

Yes	(1)	-	Eagle,
No	(9)	-	Centauri, Cyperus, Electra, Gemma, Polaris, Regulus, Rigel, Emerald, Sapphire

3.3.6 What impacts on waiting times for transfer to rehabilitation units?

All sites stated bed availability as an impact on waiting times. Other factors included medical status, stability, complications (5 sites: Gemma, Electra, Sapphire, Eagle, Polaris) other medical issues, co-morbities and determinations, awaiting procedures or specific diagnosis, level of nursing dependence (4 sites: Cyperus, Polaris, Eagle, Electra), type and level of rehabilitation required (2 sites: Rigel, Centauri), seasonal factors (2 sites: Centauri, Sapphire).

Other impacts on the waiting time included delays between assessment, referral and consultation from rehabilitation facility (Electra), casemix in rehabilitation ward (Electra, Gemma), lack of alternative facilities (Cyperus) and the off site transfer of the rehabilitation unit (Centauri).

Table 23
Question 3.6 What impacts on waiting times for transfer to Rehab units? Please list: -

Site:	Response:
1 Centauri	Bed availability Type of rehab req'd, fast or slow stream Rehab unit being transferred to (all off campus) Season/time of year – usually longer waits in winter
2 Cyperus	Availability of beds within acute within acute rehab wards Determination by medical officers Lack of alternative facilities
3 Eagle	Bed availability, Other medical assessments, Co-morbities, Level of nursing dependence Pt readiness for rehab
4 Electra	Discharge home Bed availability Medical complications Time delay between assessment, referral and consultation from rehab facility Awaiting specific diagnosis
5 Gemma	Bed availability on rehab ward Pts medical status at suggested time of transfer Current casemix of patients on rehab ward
6 Polaris	Bed availability Medical stability Waiting for procedures (eg TOE)
7 Regulus	Bed availability Medical stability
8 Rigel	Bed availability, Severity of patient deficits
9 Emerald	Bed availability
10 Sapphire	Availability of beds in rehab units Seasonal factors Presence of compounding medical issues

3.3.7 Average waiting time

Waiting time was around 7 days for 6 sites with 3-7 days stated for 2 sites (Eagle, Gemma), 5-7 days for 1 site (Centauri), 1 week (Polaris and Regulus) and 7-10 days (Emerald).

For 3 facilities (Electra, Rigel, Sapphire) waiting time ranged from days to weeks. Cyperus was unable to provide average stating it greatly varied. One site with 2 facilities averaged approximately 1-2 days for 1 facility but 1-3 weeks for the other.

Table 24
Question 3.7 What is the average waiting time?

Site	Response
1 Centauri	Can range from a day to a couple of weeks dependant on above. Probably 5-7 days
2 Cyperus	Unable to provide average – greatly varies
3 Eagle	3-7 days
4 Electra	One facility – capital rehab approx 1-2 days Another (elderly) approx 1-3 weeks

5 Gemma	3-7 days
6 Polaris	7 days
7 Regulus	Approx 1 week but can vary
8 Rigel	1 day to weeks – no specific /average time
9 Emerald	Not officially recorded but approx 7-10 days
10 Sapphire	4 days to 6 weeks

3.3.8 Specified criteria for admission or transfer to the rehabilitation units

No criteria or informal criteria was used by majority of sites (Cyperus, Eagle, Gemma, Polaris, Regulus, Rigel, Sapphire). Generally, the informal assessment was based on perceived cognitive status, functional skills and endurance, potential for recovery, level of support service required, quality of life and family support, continence, age, medical stability.

Formal criteria were used at three site (Centauri, Electra, Emerald). Emerald indicated criteria were used only for head injury, spinal rehab units and area health boundaries. Centauri and Electra utilised criteria such as medically stable, ability to participate (eg cognitive ability, sitting and balance, continence) geographical area and age or family support.

Table 25
Question 3.8 Are there any specified criteria for admission or transfer to the Rehabilitation Units you send patients to? Please list: -

Site	Response
1 Centauri	Sitting, Balance, Continence, Ability to participate in rehab program (medically + endurance). Cognitive ability to learn and recall what has been taught (rehab facility will sometimes consider complex cases if family providing care in longer term/post rehab)
2 Cyperus	Informal and based on assessed capacity to : Improve functional skills to increase level of competence Improve quality of life Reduce level of support services required Enable early discharge from acute ward (need to be medically stable)
3 Eagle	Nothing formal – criteria based on Drs, Therapists recommendations
4 Electra	Conscious, Capital rehab: medically stable, ability to participate, may not require so much evidence of rehab pot, age, geographical area SFE – rehab potential, cognition, ability to participate, age, geographical area
5 Gemma	No formal documented criteria General criteria discussed in team meeting, include patients, cognitive ability, progress to date and ability to endure 30-60 minute individual AHP therapy sessions
6 Polaris	Depends on Rehab facility, age, medical stability, potential for recovery, slow stream vs fast stream
7 Regulus	No specific. Often depends on home situation , cognitive status, continence
8 Rigel	Non specified or documented. Usually dependent on consultants disgression (sic)
9 Emerald	Yes for head injury and spinal rehab units are diagnosis dependant Area health boundaries
10 Sapphire	Yes – dependant on patients potential to improve, overall needs and pace of rehabilitation

3.3.9 Interim care facilities for those patients deemed not appropriate for rehabilitation

Only 1 site (Polaris) had interim care facilities or beds available for patients not appropriate for rehabilitation, with the wait being 60-80days.

The wait for transfer to interim or residential care varied between days to weeks for 3 sites. Gemma and Centauri averaged 3-4 weeks although could be many weeks at Regulus and up to an 8 week wait at Centauri. Electra reported a 1-3 week wait. Rigel reported a wait of days to weeks.

For those transferred to interim care or nursing home bed most (5) remained in the medical or acute wards while awaiting placement (Eagle, Gemma, Regulus, Rigel, Sapphire). One site (Cyperus) used respite care. There were no response from 3 sites (Centauri, Polaris, Emerald).

Table 26
Question 3.9 Are there interim care facilities or beds available for those patients deemed not appropriate for rehabilitation?

Yes	(1)	-	6 Polaris
No	(9)	-	1 Centauri, 2 Cyperus, 3 Eagle, 4 Electra, 5 Gemma, 7 Regulus, 8 Rigel, 9 Emerald, 10 Sapphire

Table 27
Question 3.9 Continued - Approximately how long is the wait for an interim care or nursing home bed?

Site	Response
1 Centauri	Very variable depending on bed availability from 1-8 weeks. Average 3-4 weeks
2 Cyperus	No response
3 Eagle	No response
4 Electra	1-3 weeks transferred to residential care
5 Gemma	3-4 weeks
6 Polaris	Approximately 60-80 days
7 Regulus	Waiting time fluctuates - often many weeks.
8 Rigel	Days to weeks
9 Emerald	No response
10 Sapphire	No response

Table 28
Question 3.9 Continued - If not, what will happen to these patients otherwise?

Site	Response
1 Centauri	Patients remain at Centauri while waiting placement
2 Cyperus	Currently forced to use respite care services as alternative option. This is not appropriate, and becoming increasingly difficult to access
3 Eagle	transfer to a medical unit – 7-10 days stay only
4 Electra	Patients are assessed for level of care required and placed in residential care with the possibility of a review by the rehab team.

5 Gemma	Remain on medical ward until discharge
6 Polaris	No response
7 Regulus	Continued to be seen by Physiotherapy on low priority basis only ie stay in acute ward
8 Rigel	Remain in the medical ward awaiting suitable placement
9 Emerald	No response
10 Sapphire	Patients remain on acute beds

3.4. Post Acute Phase

3.4.1 Whether there were ambulatory rehabilitation facilities for patients to be referred to, if inpatient rehabilitation was not required and length of wait.

Ambulatory rehabilitation facilities were available on campus at 6 sites (Cyperus, Eagle, Electra, Rigel, Emerald, Sapphire) and available on another campus at all except Emerald. Cyperus indicated specific disciplines were at community health centre. Centauri can refer onto day therapy centres in the local community for HACC eligible clients. A rehabilitation in the home program is run by the local rehabilitation hospital. Patients can be referred directly to this service from Centauri without having to go to the local rehabilitation hospital. There is outpatient input available from occupational therapy, speech pathology and physiotherapy at the local rehabilitation hospital but are very limited.

The waiting lists for these services was discipline dependent at 4 sites (Cyperus, Electra, Polaris, Emerald) and with prioritisation indicated at 2 sites (Cyperus, Rigel).

The average waiting time fluctuated from between a few days to a week at 2 sites (Centauri, Regulus), from ½ to 2-3 weeks at 3 sites (Eagle, Gemma, Polaris) and up to 3-4 weeks at 1 site (Sapphire).

Table 29
Question 4.1 Are there Ambulatory rehabilitation facilities for these patients to be referred to, if inpatient rehabilitation is not required: -

	On your campus	**On another campus**
1 Centauri	No	Yes has day therapy centre for over 65's, Local rehab hospital (0.2 FTE – OT only). Rehab in the home program
2 Cyperus	Yes	Yes (for specific disciplines at community health)
3 Eagle	Yes	Yes
4 Electra	Yes	Yes
5 Gemma	No	Yes
6 Polaris	No	Yes
7 Regulus	No	Yes
8 Rigel	Yes	Yes
9 Emerald	Yes	
10 Sapphire	Yes	Yes

Table 30
Question 4.1 continued. Are there waiting list or times for these services? If Yes, how long?

Site	**Response**
1 Centauri	Usually days to a week
2 Cyperus	Yes Varies across disciplines dependant on prioritisation. Commences at 1 week.
3 Eagle	Yes - 1-3 weeks

4 Electra	Yes – depends on the service and disciplines within services have varying waiting lists
5 Gemma	(Approximately)1/2-2 wks
6 Polaris	Yes depends on disciplines required. Approx 1-2 weeks
7 Regulus	Yes - Few days to 1 week
8 Rigel	Yes – fluctuates depending on staffing. May be prioritising according to need/urgency
9 Emerald	Discipline specific
10 Sapphire	Yes – 3-4 weeks

3.5 Any Other Comments

Additional comments were elicited. A service variation dependant on the ward and experience of the staff was raised. Timely linkages with other services or programs was emphasised. The provision of assistance to regional areas and difficulty accurately estimating staff time involvement was noted.

Table 31
Any additional comments

Site	Response
1 Centauri	Care can be different depending on whether patient admitted to neurology unit or general medical unit and if on "home" ward or being treated on a "outlier" "nonhome ward" - differences in medical and nursing expertise, knowledge and experience, especially nursing staff re care of stroke pt and management of mobility and transfers.
2 Cyperus	Hospital provides significant level of services to regional areas of NSW. The comments relate to facilities within the local area only Many clients with DRG (with CC) require timely linkages with other services/ programs (eg : Diabetes). Waiting lists etc within other programs impact on care planning for these clients.
3 Eagle	No further comments
4 Electra	Electra has 2 sites where there are medical wards and rehab wards. Rehab services are being reviewed. In discussion with other AH professional it was difficult to indicate how many hours per week each clinician would spend with stroke patients, as the service is provided on an "as needed' basis.
5 Gemma	No further comments
6 Polaris	No further comments
7 Regulus	No further comments
8 Rigel	No further comments
9 Emerald	No further comments
10 Sapphire	No further comments

Appendix 1.- Health Round Table

DataOctober - 1998 to June 1999 Allied Health Data. **Linked IPA Summary for F037 Cerebrovascular disorders except TIA**

Department	Indicator	Hospital								
		Centauri	Cyperus	Eagle	Electra	Gemma	Polaris	Regulus	Rigel	All
All	Acute Episodes	217	138	255	284	171	337	200	298	238
	Episodes with Allied Health	155	115	204	203	106	277	144	240	181
	Allied Health Encounters	2,342	2,325	3,024	4,310	1,847	3,819	1,351	5,605	3,078
	Contact Days	1,847	1,886	2,764	2,251	1,480	3,531	1,018	3,736	2,314
	Total Inpatient Hours	1,221	1,471	2,138	4,612	1,364	2,384	730	2,818	16,738
	Cond Encounters per Day	1.27	1.23	1.09	1.91	1.25	1.08	1.33	1.50	1.33
	Hours per Inpatient	7.87	12.79	10.48	22.72	12.87	8.61	5.07	11.74	11.59
	AH treated in 1st half of stay	78%	74%	85%	81%	79%	85%	63%	74%	78%
	ALOS for Non-AH	5.47	3.64	2.38	3.04	2.00	1.71	3.91	2.39	3.05
	ALOS for AH	10.91	14.49	10.70	11.56	13.88	10.74	15.63	12.72	12.21
	Complexity for Non-AH	3.66	2.33	2.23	2.49	2.38	1.79	2.84	2.72	2.59
	Complexity for AH	4.43	3.66	4.06	3.50	4.46	3.14	3.91	3.86	3.79
Physiotherapy	Episodes with Physio	138	89	172	158	96	246	144	201	1,244
	Total Inpatient Hours	549	386	694	1,062	757	574	730	903	5,655
	Hours per Inpatient	4.0	4.3	4.0	6.7	7.9	2.3	5.1	4.5	4.5
Social Work	Episodes with Soc Work	66	62	115	55	20	114	0	140	572
	Total Inpatient Hours	169	202	283	427	45	369	0	730	2,226
	Hours per Inpatient	2.6	3.3	2.5	7.8	2.3	3.2		5.2	3.9
Occ. Therapy	Episodes with Occ Therapy	72	73	155	114	58	219	0	88	779
	Total Inpatient Hours	109	344	492	1,641	209	358	0	272	3,424
	Hours per Inpatient	1.5	4.7	3.2	14.4	3.6	1.6		3.1	4.4
Nutrition	Episodes with Nutrition	71	51	51	72	14	175	0	92	526
	Total Inpatient Hours	93	156	67	417	37	526	0	330	1,624
	Hours per Inpatient	1.3	3.1	1.3	5.8	2.6	3.0		3.6	3.1
Speech	Episodes with Speech	85	72	145	98	64	177	0	126	767
	Total Inpatient Hours	293	383	583	1,065	315	556	0	585	3,780
	Hours per Inpatient	3.5	5.3	4.0	10.9	4.9	3.1		4.6	4.9

Appendix 2

Health Round Table Data – October 1998 to June 1999 F037 Cerebrovascular disorders except TIA Hospital Comparisons by DRG Family

Hospital	Centauri	Cyperus	Eagle	Electra	Gemma	Polaris	Regulus	Rigel	Chapter
Overall Totals for 1998/99									
Separations	**217**	**138**	**255**	**284**	**171**	**337**	**200**	**298**	**1,900**
Percent of Last Full Yr	***70%***	***81%***	***73%***	***79%***	***77%***	***73%***	***65%***	***82%***	***75%***
Seps/Patient Ratio	1.03	1.06	1.07	1.09	1.13	1.03	1.04	1.05	1.06
Average Age	73.1	68.3	65.8	68.7	69.3	72.3	74.5	72.8	70.7
Percent Emegency	96%	91%	86%	79%	81%	86%	89%	96%	88%
Same Day Emergency Cases	3	2	8	7	6	20	2	20	68
% Transferred In	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Operational Performance Indicators									
% Discharged Home	39%	43%	36%	42%	50%	42%	44%	45%	42%
Complications of Care %	1.8%	4.4%	2.0%	1.8%	1.2%	2.4%	3.5%	3.0%	2.4%
Emergency Readmits	***3%***	***6%***	***4%***	***2%***	***7%***	***5%***	***6%***	***5%***	***5%***
Same Day Case Ratio	***3%***	***4%***	***6%***	***5%***	***14%***	***6%***	***2%***	***8%***	***6%***
SD Ratio Last Yr	3%	2%	6%	4%	7%	7%	3%	5%	5%
Multi-Day Elect Surg Rate	-	-	-	-	-	-	-	-	-
Percent DOSA	-	-	-	-	-	-	-	-	-
Comparisons of Average Length of Stay									
Aus Standard ALOS	**9.4**	**12.9**	**9.4**	**9.2**	**9.5**	**9.3**	**12.4**	**10.8**	**10.1**
HRT ALOS inc SD	9.4	12.8	9.3	9.1	9.4	9.2	12.3	10.7	10.1
Change vs Last Year	***-2%***	***+3%***	***-16%***	***-9%***	***-14%***	***-16%***	***+21%***	***+3%***	***-5%***
HRT ALOS ex SD	9.6	13.4	9.9	9.6	10.9	9.8	12.5	11.6	10.7
Change vs Last Year	***-3%***	***+5%***	***-16%***	***-9%***	***-7%***	***-17%***	***+19%***	***+6%***	***-4%***
Outlier Cases > Trim Pt	**4%**	**10%**	**5%**	**6%**	**4%**	**4%**	**6%**	**7%**	**5%**
Outlier % Last Yr	4%	10%	6%	6%	6%	6%	4%	6%	6%
HRT ALOS ex Outliers	8.5	9.9	8.4	6.7	9.2	8.3	10.7	9.3	8.7
RSI 98/99	***92%***	***129%***	***91%***	***94%***	***91%***	***93%***	***118%***	***106%***	***100%***
RSI 97/98	***92%***	***116%***	***100%***	***97%***	***106%***	***109%***	***90%***	***98%***	***100%***
Case Day Gap Relative to Chapter						*(Summary of Individual ANDRGs)*			
Inlier Days > 75%ile	264	198	234	159	204	443	383	343	2,229
Outlier Days > Trim Point	107	218	164	432	99	223	196	201	1,640
Case Day Gap	**372**	**415**	**398**	**591**	**304**	**666**	**579**	**544**	**3,869**
% of Used Case Days	**18%**	**24%**	**17%**	**23%**	**19%**	**22%**	**23%**	**17%**	**20%**

Appendix 3

National Allied Health Benchmarking Consortium

DRG 37& 38 Project Questionnaire

1.Admission Process

1.1 Are patients with DRG37/38 admitted to: -

- An Acute Stroke Unit ☐
- To a Neuroscience's Unit ☐
- To any available bed in a Medical Unit ☐
- To any available bed in a surgical unit ☐
- Other please describe_____

1.2 If you have an Acute Stroke Unit

- Are there admission criteria Yes No

Please outline with dot points below.

_____

_____

_____

_____

1.3 How many beds are designated to this unit_____

2.Care Management

2.1 Which other Health Specialists would see the patient during their admission. (✔)

	Always	Sometimes	Never
Neurologist			
Neurosurgeon			
Geriatrician			
Rehabilitation Consultant			
General Physician			

2.2 How do these specialists become involved with or are referred these patients?

Comment_____

_____

2.3 **Designated Allied Health staffing levels for this DRG group** –

Profession	**FTE's**	**Hours/week**	**5day service**	**7day service**
Physiotherapy			Yes/no	Yes/no
Occupational Therapy			Yes/no	Yes/no
Social Work			Yes/no	Yes/no
Speech Pathology			Yes/no	Yes/no
Dietetics			Yes/no	Yes/no
Therapy Assistants			Yes/no	Yes/no
Other designated AHP's(list)			Yes/no	Yes/no

2.4 Referral Method (✔)

Profession	**Blanket**	**By Doctor**	**Other AHP's**	**Other(state)**
Physiotherapy				
Occupational Therapy				
Social Work				
Speech Pathology				
Dietetics				
Therapy Assistants				
Other designated AHP's(list)				

2.5 Are clinical pathways or some similar type of care map used in the units where these patients would be admitted?

Yes – clinical pathways
Yes – some other names –please state_____
No.

2.6 Are multidisciplinary clinical team meetings held?

Yes No

2.7 Frequency & Purpose of these clinical meetings: -
Please state: -

_____

2.8 Are outcome measures used with this DRG (P) Group?
Please list and state if a "Clinical Team Measure" or "Discipline Specific" and which discipline?

- _____
- _____
- _____
- _____
- _____
- _____

2.9 Does the Medical or Clinical Unit have a database to record this data?

Yes No.

2.10 Is there any research projects being conducted within the clinical unit at present, which may have an impact on the course of treatment or length of treatment of this group of patients?
Please list: -

_____
_____

3.Rehabilitation

3.1 How are decisions made regarding the need for ongoing inpatient rehabilitation: -

- At the team meetings Yes No
- By the consultants only Yes No

- Depending on availability of rehabilitation beds Yes No
- From AHP recommendations in the medical chart Yes No
- All of the above Yes

3.2 Are there inpatient rehabilitation facilities for these patients to be transferred to: -

On your campus? Yes No
On another campus Yes No

3. 3 Is there a waiting list or booking system for Rehab beds

Yes No.

3.4 Are patients able to be prioritised on the waiting list?

Yes No.

3.5 Are patients generally able to be transferred when required?

Yes No

3.6 What impacts on waiting times for transfer to Rehab units?
Please list: -

- _____
- _____
- _____
- _____

3.7 What is the average waiting time?

_____

3.8 Are there any specified criteria for admission or transfer to the Rehabilitation Units you send patients to?
Please list: -

_____
_____

3.9 Are there interim care facilities or beds available for those patients deemed not appropriate for rehabilitation?

Yes No

Approximately how long is the wait for an interim care or nursing home bed?

_____

If not, what will happen to these patients otherwise?

4.Post Acute Phase

4.1 Are there Ambulatory rehabilitation facilities for these patients to be referred to, if inpatient rehabilitation is not required: -

On your campus Yes No
On another campus Yes No

Are there waiting list or times for these services?

Yes how long? (Approximately)
No.

Any other comments:

Appendix 4
Best Practice Literature

The current best practice literature was elucidated. Best practice literature represents a distillation of the best studies that have undergone critical appraisal. The critically appraised and summarised research of the "Cochrane Collaboration" and the distilled evidence from the "Best Evidence" databases were searched. Bibliographic databases of "Medline" and "CINAHL" were conducted. Outcomes investigated have included mortality rates, dependency /requirement for institutional care, functionality, length of stay and resource use.

A 1992 review (Sandercosk and Willems) concluded that no effective treatment existed for ischaemic stroke. More recent papers have provided other conclusions. A meta-analysis of stroke units and mortality identified that patients treated by specialised stroke units had a **lower mortality** at 4 and 12 months than patients given medical care in medical and neurological wards (Langhorne et al, 1993). The units were multidisciplinary reinforcing the role of AHP staff.

Functional outcome varied but there was a trend towards improved function as well as improved survival with designated stroke units (Langhorne et al 1993). In stroke units, a higher proportion of patients treated received therapy compared with medical and neurology wards. Allied health therapy was also received sooner (Langhorne, 1993). Another finding shows a 23% reduction in the odds of death after 12 months if treated in a specialised stroke unit (Cochrane Database 1995). Jorgensen et al (1999) found mortality at all times was significantly decreased in patients treated on the stroke unit.

The success of interventions was complicated by varied selection criteria, uncertainty about the aspects of multidisciplinary teams that led to reduced mortality and whether the aim was to add life to years or years to life (Langhorne et al 1993). Meta-analysis did not resolve which patients might benefit from treatment in a stroke unit and what components are most essential to the units success.

Stroke Units Trialists Collaboration (1997) found the **length of stay was reduced** by 8% **and no increase in the use of resources** was apparent. The beneficial effects were independent of patients age, sex, stroke severity or organisation of the stroke unit. The systematic review highlighted stroke units as multidisciplinary. Other characteristics included stroke education/training programmes and specialisation of staff. The benefits were not clearly due to the structure staff mix or amount of medical, nursing or therapy input available. Features of stroke units usually absent from conventional care settings included organisation (co-ordinated multidisciplinary teams, nursing integration with multidisciplinary care, involvement of carers in rehabilitation), specialisation of health staff and education (programmes for staff, patients and carers). Ascertaining the specific differences of value in dedicated stroke units is difficult.

Prencipe et al (1998) showed the 10 year follow-up for risk of death was 1.7 times higher than for the general population. Mortality was predicted by age, hypercholesterolaemia, previous myocardial infarction, non valvular atrial fibrillation, and minor disability at discharge. Further major stroke was predicted by recurrent minor stroke, previous myocardial infarction, hypertension, nonlacunar stroke at baseline. If the priority is to prevent premature death rather than stroke, the best strategy may be for allied health to contribute to control of CVD risk factors such as hypercholesterolaemia.

After a first ever stroke the risk of dying remains elevated, but was particularly high for the first 30 days (Dennis et al. 1993). Patients who received rehabilitation from a multidisciplinary stroke unit had **lower rates of death or dependency**. (Ronning and Guldvog 1998, p779-84; Stroke Units Trialists' Collaboration, 1997). Those with moderate or severe stroke had greater benefits (Ronning and Guldvog, 1998, p779-84). **Outcomes were better for early interventions** after a stroke and for **younger patients** (Ottenbacher and Jannell, 1993).

Ronning and Guldvog (1998, p58-62) showed **survival rates** at 1 year and 18 months were higher in designated stroke units when compared with general medical wards (70.6% vs 64.6% and 65.1% vs 58.0% respectively. The 10 day fatality after cerebral haemorrhage was 24.5% vs 51.6% in favour of the stroke unit. The long term survival was mostly explained by the **lower fatality in the first 10 days.** It was hypothesised that early mobilisation may have reduced the occurrence of deep vein thrombosis and pulmonary embolism and were especially successful for treatment of patients with haemorrhage.

One program found that early discharge to **community care** was as effective as conventional care for stroke (Rudd et al. 1997). The community care group was also more satisfied with their hospital admission. Performance of activities assessed with the Barthel index showed home **physiotherapy** used fewer resources and were more effective than day hospital (Young and Forster, 1992). Gait was not effectively improved if physiotherapy offered more than 1 year after a stroke and improvements were not maintained 3 months later (Wade et al, 1992). Clinical **depression** after a stroke was associated with decreased improvement in functional status and increased risk of mortality (Morris et al, 1992; Everson et al 1998). Psychosocial interventions after CHD improved mortality recurrence of CHD and psychological distress. (Linden et al, 1996). Such results may be applicable to other situations.

Treatment within stroke units also **reduced the relative risk of death within 5 years** by 40% independent of other factors such as age, sex, stroke severity and co-morbidity, and increased 5 year survival by a factor of 1.8 (Jorgensen et al, 1999). It was again identified that the differences in mortality were achieved during acute treatment and rehabilitation then merely sustained during follow-up. Stroke patients who received organised inpatient care in a stroke unit were more likely to be alive, independent and living at home after 1 year (Stegmayr et al 1999, Stroke Units Trialists' Collaboration, 1997).

Indredavik et al (1999) studied the aspects of stroke units most responsible for the better outcomes. Features of stroke units included teamwork, staff education, functional training and integrated nursing and physiotherapy although the effects of these characteristics were not possible to measure. There final analysis identified the shorter time to start **mobilisation** followed by the stabilisation of diastolic **blood pressure** were most significantly associated with discharge home within 6 weeks.

The shorter length of stay in stroke units could be due to quicker functional recovery or better organisation and co-ordination between patient, caregivers and professionals. Kalra (1994) compared stroke patients managed in stroke rehabilitation units with that of similar patients managed in general wards. In stroke units, Barthel scores rose rapidly after 2 weeks reaching a plateau at 6 weeks. General wards reached a plateau after 12 weeks despite similar therapy input. Discharge occurred at 20 weeks from general wards compared with 6 weeks from stroke units. **Functional recovery was greater** and **more rapid** in the stroke units. The stroke unit also expedited discharge, **shortening length of stay.**

Appendix 5
Validated and Standardised Assessment Tools

The body of evidence indicates better clinical outcomes post acute stroke are achieved with co-ordinated and multidisciplinary planning. The post stroke rehabilitation paper from the US Public Health Services Agency for Health Care Policy and Research (Gresham et al, 1995) recognises however that there is paucity of good scientific evidence and a heavy reliance on expert opinion. The challenge is to distinguish actual benefits of rehabilitation from spontaneous neurological recovery.

Tools

The NAHBC has recognised the need for tools to assess the progress of patients. Assessment practices vary widely and there are no tools universally applied. There can be some reluctance of clinicians to adopt standardised instruments. Only a few measures have been adequately validated.

Tools and guidelines would help reduce the variations in practice and allow comparisons to be made. Validated standardised tools assist with deciding who would most likely benefit from rehabilitation, the optimal type and timing of rehabilitation, the effectiveness of particular treatments or combinations of treatments.

Tools need to be valid (measure what intended), reliable (with 2 people achieving similar results), sensitive (detect clinically important changes) and sensible (reasonable and easy to use).

AHCPR's post stroke rehabilitation report (Gresham et al 1995) recommended instruments in wide use that had been evaluated with respect to the above criteria.

Overall measures:

- Glasgow coma scale - systematic way to monitor changes in level of consciousness
- Stroke deficit scales - includes measures of mentation, motor function and language. The best validated were National Institutes of Health Stroke Scale and the Canadian Neurological scale. They were brief, reliable and could be administered by a range of staff. Both are insensitive to detecting changes.

Global Disability measure:

- Rankin scale - a measure of overall independence post stroke.

Balance and Co-ordination

- Romberg test

Measures of Activities of Daily Living:

- Barthel
- Functional Independence Measure (FIM)

May have limitations as not sensitive to change in people with high levels of functional disability, may fail to detect improvements in specific activities and combining scores may be misleading as summise different areas.

Mental Assessment

- Mini Mental Status Examination (MMSE).
- Neurobehavioural Cognition Status Examination (NCSE)

MMSE is valid, reliable, brief and widely used across different populations however is heavily language dependant. NCSE is valid and samples a broad range of mental functions but has not been tested for reliability in stroke.

Motor Function and Balance

- Berg - reliable, valid and sensitive to change

- Rivermead mobility - simple reliable and used in stroke patients.
- Timed functional movements - could be considered

Other promising instruments that have not been evaluated in strke populations include
Tinetti Mobility Skills, Reuben Physical Performance and Duke Mobility Skills .

Speech and Language

Instruments are in wide use and can provide baseline information on speech and language. Consequently they can measure progress, but do not necessarily reflect measurement of functional abilities as does

- Communicative Abilities of Daily Living (Holland, 1990)
- Functional Communication Profile (FCP) (Sarno, 1969) – a rehabilitation orientated rating scale.

Depression

Awaiting attachment 10

Activities of Daily Living

Awaiting attachment 11

Family Assessment

- Family Assessment Device (FAD) - valid, reliable. 60 items assessing family problem solving and and functioning to identify families requiring further assistance
- DSM-111R Global Assessment of Functioning (GAF) Scale - useful to assess families social functioning.

Quality of Life

- SF-36 - is brief and can be administered by phone
- Sickness Impact Profile (SIP) - long takes 30 minutes

To monitor a wide range of health dimensions after return to the community residence. Neither has well documented sensitivity in stroke patients

Nutritional Assessment

No nutritional assessment tools were included by Gresham et al (1995). Possible choices include

- FBBC (Ferguson et at 1999) Validated Australian screen for malnutrition in the acute setting.

Stages of Assessment

The following stages may be useful occasions for assessments to occur (Gresham et al, 1995):

- Clinical evaluation at time of admission (Neurological and medical status and responses to treatment) On the basis of screening, the patient may be referred to an interdisciplinary rehabilitation program or individual rehabilitation services in an ambulatory setting, or not to recommend rehabilitation.

- Assessment performed at time of admission to rehabilitation program at assess appropiateness of referral, formulate treatment goals, develop a rehabilitation plan and provide a baseline for monitoring progress

- Periodic assessment to document progress, adjust treatment as required and plan for discharge or transfer

- After discharge, assessment is required to moniter adaptation to the community residence and maintenance or gains made during rehabilitation

Rosenberg and Popelka (2000) comment that timliness and intensity of rehabilitation services can maximise hospital outcome on discharge and followup A decision tree regarding selection of setting for rehabilitation program is outlined in the paper. Recommended threshold criteria for admission to a comprehensive rehabilitation program included.

- Medical stability
- Presence of a functional deficit
- Ability to learn
- Enough physical endurance to sit supported for at least 1 hour
- And ability to participate actively to some extent in rehabilitation activities.

Outcome Measures

Potential measures of the success of stroke rehabilitation include:

- Survival
- Normalised health patterns (such as nutrition, continence and sleep)
- Freedom from physical pain and emotional distress
- Cognitive and communicative abilities
- Freedom from impairments of motor control, joints, sensation, speech and language, and other areas
- Independence in mobility and activities of daily living
- Independence in complex daily functions
- Sucessful family function and adaptation
- Quality of life

Appendix 6
References

The Cochrane Database of Systematic Reviews. A systematic review of specialist multidisciplinary team (stroke unit) care for stroke inpatients. 1995.

Dennis MS, Bun JP, Sandercock PA et al. Long term survival after first ever stroke: The Oxfordshire Community Stroke Project. Stroke. 1993 Jun; 24: 796-800

Everson SA, Roberts RE, Goldberg DE, Kaplan GA. Depressive symptoms and increased risk of stroke mortality over a 29 year period. Arch Intern Med 198 May 25;158:1133-8.

Ferguson M, Capra S, Bauer J and Banks M (1999) development of a valid and reliable malnutrition screening tool for acute hospital patients. Nutrition. 1999.15(6); 458-64.

Gresham GE, Duncan PW, Stason WB et al. Post stroke rehabilitation. Clinical Practice Guideline, No 16, Rockville, MD:U.S. Department of Health and Human Services. Public Health Service, Agency for Health Care Policy and Research. AHCPR Publication N. 95-0662. May 1995.

Indredavik B, Bakke F, Slordahl SA, Rokseth R, Haheim LL. Treatment in a combined acute and rehabilitation stroke unit: which apects are the most important? Stroke. 1999; 30:917-923.

Jorgensen SH, Kammersgaard LP, Nakayama H, Raaschou HO, Larsen K, Hubbie P, Olsen T. Treatment and rehabilitation of a stroke unit improves 5 year survival. Stroke. 1999; 30:930-933.

Kalra L. The influence of stroke unit rehabilitation on functional recovery from stroke. Stroke. 1994; 25:821-825.

Langhorne P, Williams, BO, Gilchrist W, Howie K. Do stroke units save lives? Lancet. 1993 Aug 14; 342:395-8.

Linden W, Stossel C, Maurice J. Psychosocial interventions for patients with coronary artery disease. A meta-analysis. Arch Intern Med. 1996 Apr 8; 156: 745-52.

Morris PL, Raphael B, Robinson RG. Clinical depression is associated with impaired recovery from stroke. Med J Aust. 1992 Aug 17;157: 239-42.

Ottenbacher KJ, Jannell S. The results of clinincal trials in stroke rehabilitation research. Arch Neurol. 1993 Jan;50:37-44.

Prencipe M, Culasso F, Rasura M, Anzini A, Beccia M, Cao M, Giubilei M, Fieschi C. Long term prognosis after a minor stroke. 10 year mortality and major stroke recurrence rates in a hospital based cohort. Stroke 1998 Jan 29: 126-32.

Ronning OM, Guldvog B. Stroke unit vs general medical wards, 1: Twelve and eighteen-month survival. Stoke. 1998 Apr; 29: 58-62.

Ronning OM, Guldvog B. Outcome of subacute stroke rehabilitation. A randomised controlled trial. Stoke. 1998 Apr; 29: 779-84.

Rosenberg CH and Popelka GM. Post-stroke rehabilitation. A review of the guidelines for patient management. Geriatrics 2000 September 55;9:75-81.

Rudd AG, Wolfe CD, Tilling K, Beech R. Randomised controlled trial to evaluate early discharge scheme for patients with stroke. BMJ. 1997 Oct 25;315:1039-44.

Sandercock P and Willems H. Medical treatment of acute ischaemic stroke. Lancet. 1992;33:537-9.

Sarno MT. Functional Communication Profile (FCP). New york University Medical Center Monograph Department. New York. New York University; 1969.

Stegmayr B, Asplund K, Hulter-Asberg K, Norrving B, Peltonen M, Terent A, Wester P. Stoke Units in their natural habitat. Stroke 1999; 30:709-714.

Stroke Unit Trialists' Collaboration. Collaborative systematic review of the randomised trials of organised inpatient (stroke unit) care after stroke. BMJ 1997 Apr 19;314:1151-9.

Wade DT, Collen FM, Robb GF, Warlow CP Physiotherapy intervention late after stroke and mobility. BMJ. 1992 Mar 7; 304:609-13.

Young JB, Forster A. The Bradford community stroke trial: results at six months. BMJ. 1992 Apr25;304:1085-9.