

Introduction

The Queen Elizabeth National Spinal Injuries Unit is responsible for the management of all patients in Scotland who have a traumatic injury to the spinal cord. This involves the acute management of the injury, rehabilitation to maximise function and life long follow up to prevent the complications of paraplegia.

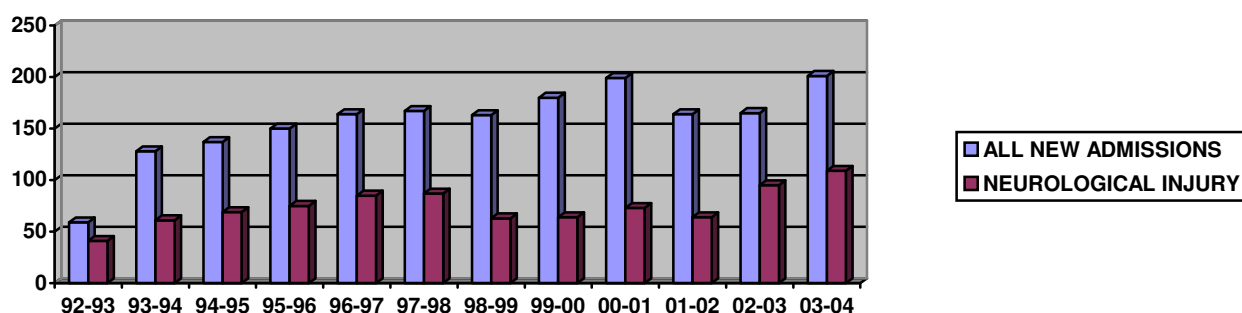
In addition, the Unit provides support to all hospitals in Scotland who admit fractures of the spinal column. This support varies from simply advice to local consultations. Complex fractures requiring surgery or specialised rehabilitation are admitted as necessary.

The number of patients with a neurological deficit varies from year to year. For the second year running a record number of patients were admitted

In addition to managing the acute phase of injury, the unit is also responsible for the life long care of anyone who has sustained a neurological injury. If there is a neurological deficit then they are at risk of developing certain medical and surgical complications. With appropriate medical management life expectancy is near normal and the quality of life enhanced.

In the past year the unit has continued to develop services and respond to the needs of patients and the referring hospitals. The ultimate aim being a seamless pathway of care from the time of the accident to eventual return to a home environment.

The core activity of the unit remains those patients whose spinal fracture is complicated by a neurological injury. They often require acute surgical intervention combined with a period of SITU or HDU care before a prolonged period of rehabilitation. Rehabilitation consists of education, physiotherapy, occupational therapy, and multi-disciplinary care to maximise the full potential remaining following injury. Inpatient stays are long, averaging one year for tetraplegics and six months for paraplegics. The increased numbers of patients with neurological injury had a significant impact on the workload of the unit



Over the course of the year a total of two hundred and one patients were admitted to the unit. There were one hundred and nine patients who had sustained a complete or incomplete neurological injury. The number of patients with no neurological deficit decreased slightly due to improvements in managing patients in their local hospital wherever possible.

2.0 Activity

The annual report and its associated appendices contain a comprehensive analysis of the Spinal Injury Unit activity and the individual reports of each department or associated body.

2.1.1 New In-Patient Activity

The number of new admissions increased in 03/04 after stabilising the previous two years. An increasing number of referred patients were treated by outreach medical services or as outpatients due to limitations on beds. There was a significant increase in the number of patients with a neurological injury.

	1997/ 1998	1998/ 1989	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	TOTAL 1992- 2004
NEW ADMISSIONS	167	163	180	199	164	165	201	1877

Appendix DA1

In excess of 250 patients were referred to the unit during 2003-2004. Orthopaedic consultants managed over fifty patients without neurological deficit in the referral hospital following advice. The Units consultant medical staff or Liaison nursing staff managed a number in the referral hospital. An increasing number of elderly patients with cervical injuries involved halo fixation in the referral hospital with outpatient follow up in the unit. A number of patients were managed in the Neuro-surgical and Orthopaedic wards of the Southern General Hospital because of concomitant injuries. In a few cases the referrals were inappropriate for admission but could be treated as outpatients. We continue to receive referrals for advice via the Internet.

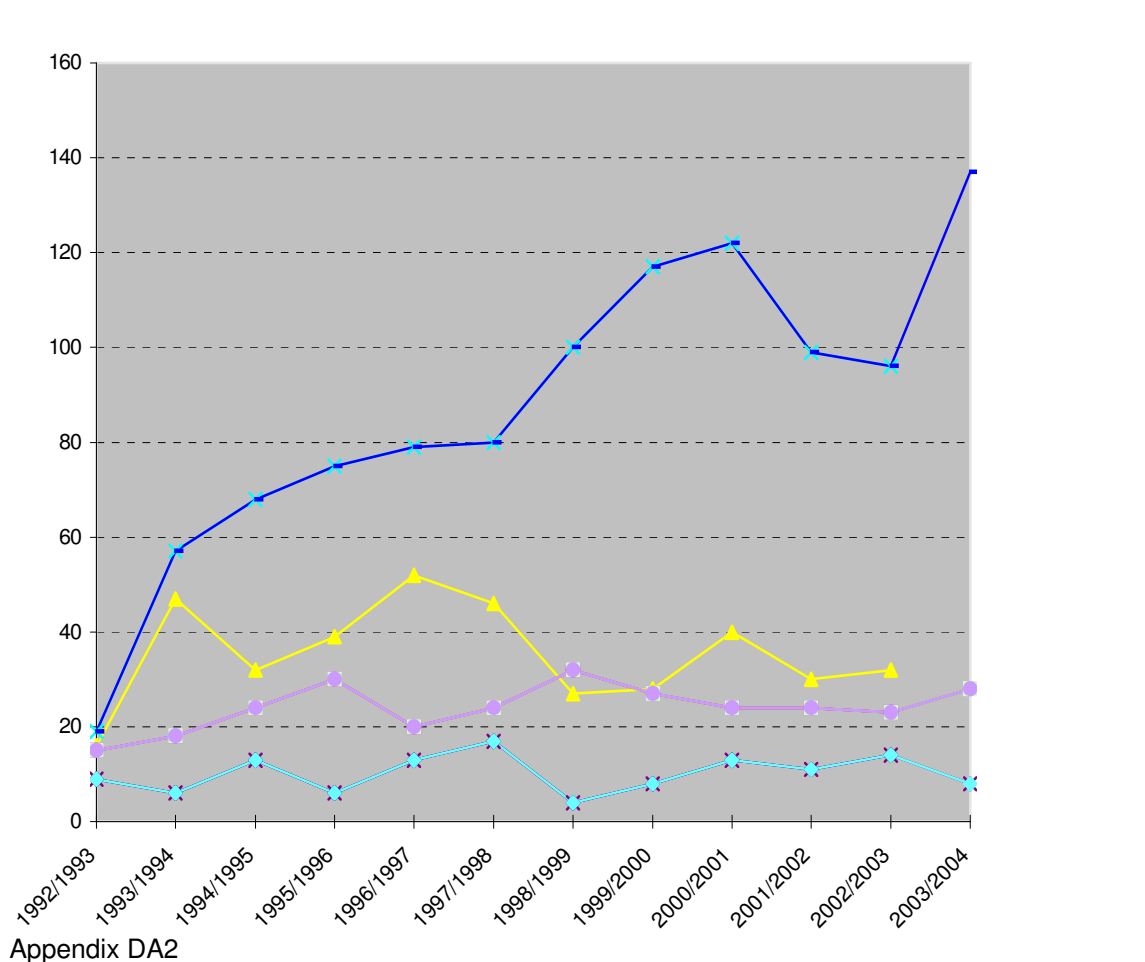
2.1.2. New Admissions: Case mix Complexity

The severity of a Spinal Cord Injury is dependent on the anatomical level of and the extent of neurological damage. This has considerable bearing on the type and extent of rehabilitation each patient requires. This case mix complexity has been classified as follows.

	ANATOMY	NEUROLOGY
GROUP I	Cervical Injury 1 - 4	High Tetraplegia
GROUP II	Cervical Injury 5 - 8	Low Tetraplegia
GROUP III	Thoracic, Lumbar and Sacral Injury	Paraplegia
GROUP IV	All levels of Injury with	Incomplete or no Paralysis

Group I patients have the most severe neurological injuries and the numbers are expected to vary considerably each year. Groups II and III are the next most dependant and require significant periods of rehabilitation and long term follow-up. Group IV includes all patients with spinal fractures and incomplete or no paralysis. This last group has increased consistently since the Unit opened. In general this group can be managed conservatively or by surgical stabilisation. Conservative management requires prolonged bed rest and an increased risk of deformity or chronic mechanical back pain. The increased demand for surgical stabilisation and the increased awareness of the Unit has resulted in an increased referral pattern. Quality of care issues regarding stabilisation surgery, early mobilisation and specialised rehabilitation along with the continued development of a clinical network and the measurement of outcome indicators is likely to lead to a continued increase in the referral of Group IV patients.

2.1.3 New Admissions by Case-Mix Complexity



GROUP	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	Total 1992/2004
I	17	4	8	13	11	14	8	122
II	24	32	27	24	24	23	28	289
III	46	27	28	40	30	32	28	417
IV	80	100	117	122	99	96	137	1049
Total	167	163	180	199	164	165	201	1877

There was a fall in the number of highly dependant Group I patients. All patients with this level of injury were male. The number of patients referred with a spinal fracture and incomplete or no neurology increased significantly.

The variation in complexity in Group IV is better demonstrated by ASIA grades. The throughput remains higher than any other spinal injury unit in the UK.

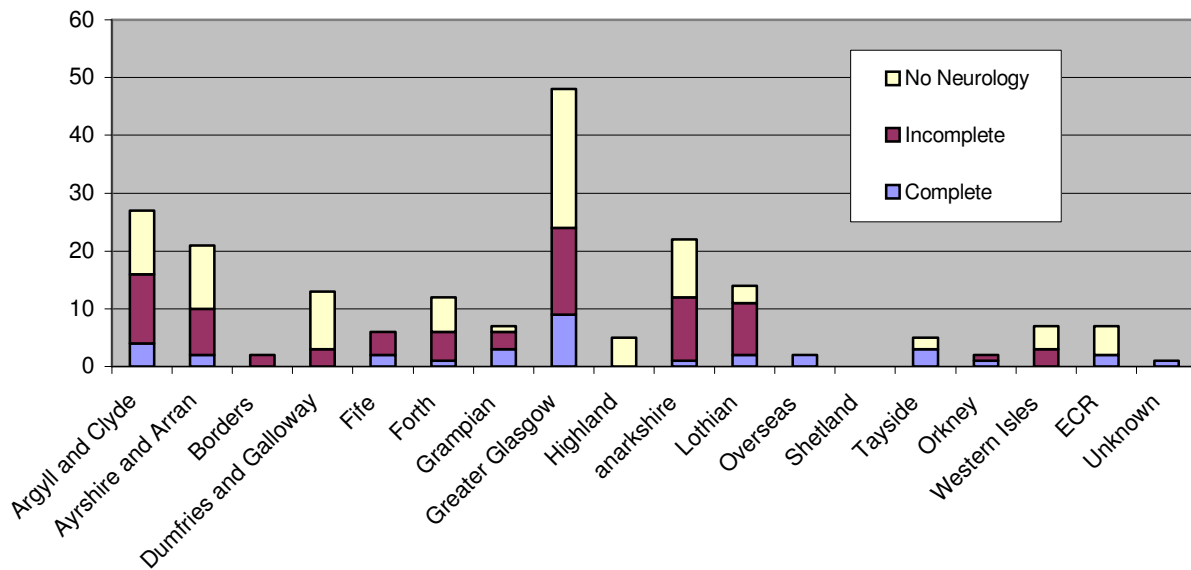
2.1.4 New Admissions by ASIA Impairment Level & Health Board

2003/2004	A	B	C	D	E	Total
Argyll & Clyde	4	2	7	3	11	27
Ayrshire & Arran	2	2	2	4	11	21
Borders	0	0	1	1	0	2
Dumfries & Galloway	0	1	1	1	10	13
Fife	2	0	1	3	0	6
Forth Valley	1	0	2	3	6	12
Grampian	3	0	0	3	1	7
Greater Glasgow	9	3	1	11	24	48
Highland	0	0	0	0	5	5
Lanarkshire	1	2	3	6	10	22
Lothian	2	3	4	2	3	14
Overseas	2	0	0	0	0	2
Shetland	0	0	0	0	0	0
Tayside	3	0	0	0	2	5
Orkney	1	0	1	0	0	2
Western Isles	0	0	2	1	4	5
ECR	2	0	0	0	5	9
Unknown	1	0	0	0	0	1
TOTAL	33	13	25	38	92	201

ASIA Impairment Scale

A	Complete: No motor or sensory function
B	Incomplete: Sensory but not motor function is preserved below the neurological level and includes S4-5
C	Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a motor grade less than three
D	Incomplete: Motor function is preserved below the neurological level, and at least half of the key muscles below the neurological level have a grade more than three
E	Normal: Motor and sensory function is normal

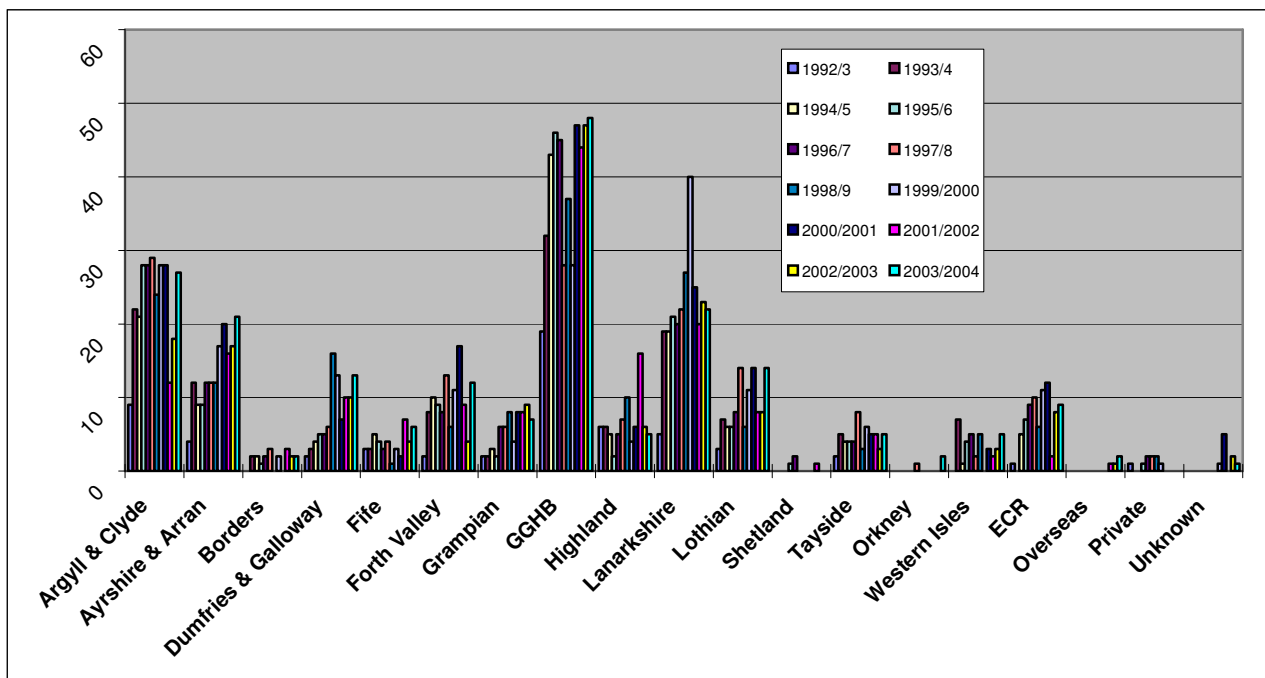
2.1.41 Admissions by neurological Deficit and Health Board



GGHB is responsible for the largest number of complete and incomplete spinal cord injuries. The number of non-neurological injuries is higher than predicted. There are an increasing number of referrals especially cervical injuries due to local pressures. A programme of educational and instructional meetings are planned to reduce this pressure. The management of non-neurological cervical spine injuries is being reviewed.

2.1.5 New Admissions by Health Board Of Residence

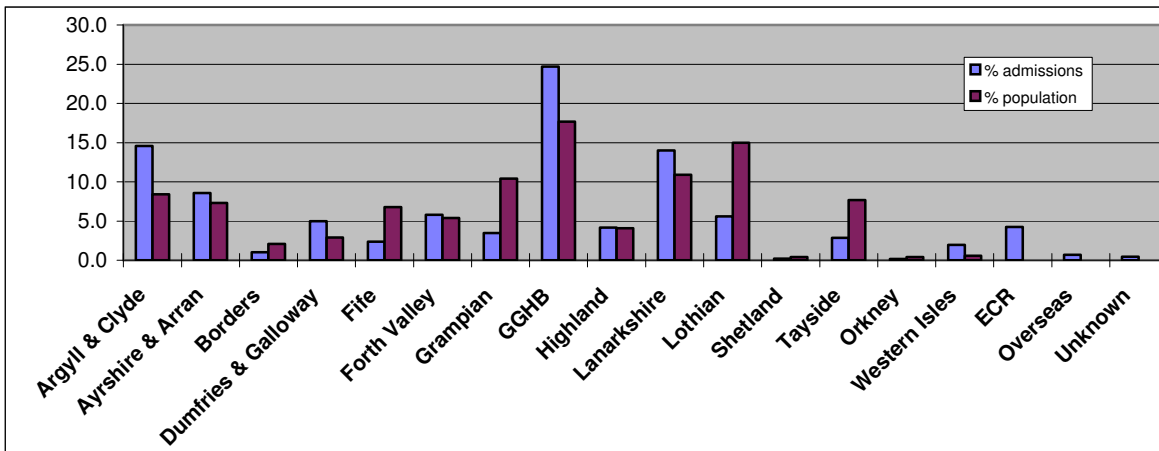
Appendix DA3



The Unit accepts patients from throughout Scotland. An increased referral pattern from some health boards reflects leisure-related accidents. Patients domiciled in Scotland but who are injured abroad are repatriated when clinically indicated and recorded under their own health board.

2.1.6 Admissions by Health Board compared with Population Size

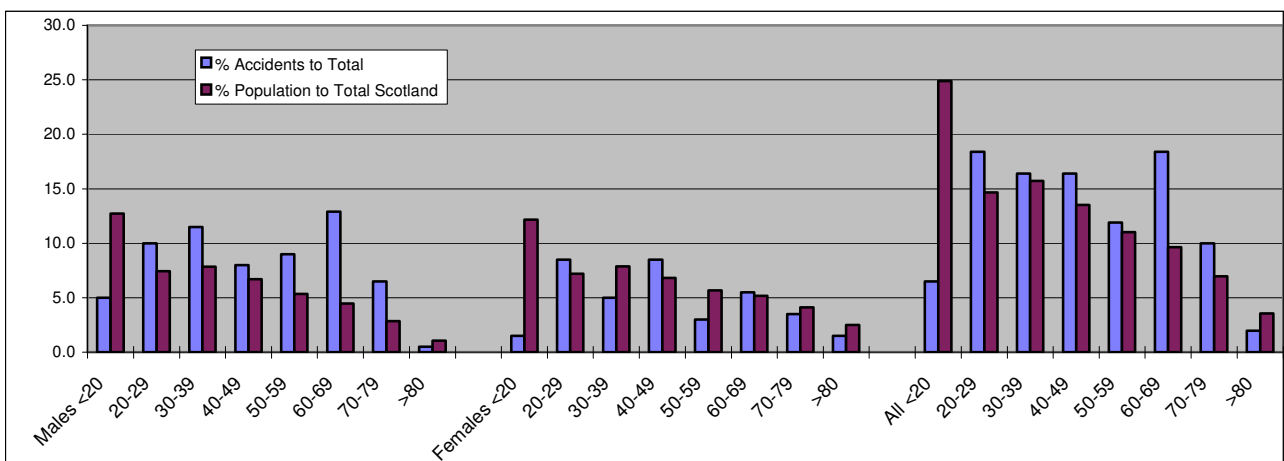
Appendix DA4



There continues to be a preponderance of referrals from the adjacent Health Authorities of Greater Glasgow Health Board, Argyll & Clyde, Lanarkshire and Ayrshire and Arran. This reflects an increased incidence of neurological injury from these regions and patients with fractures requiring surgical fixation. There is an increasing demand for care of non-neurological injured patients. Neurological injured patients remain the priority.

There has been positive encouragement for consultant medical staff in Lothian, Tayside and Grampian to develop services for those patients with no neurological injury. Support is always available from the unit in the management of these patients. This has significant benefits for both patients and relatives.

2.1.7 New Admissions by Age Group



The age distribution is as expected. There is a preponderance of males disproportionate to the population. The number of injuries in those under twenty remains low. The increase in age-related degenerative spinal fractures continues. The management of an increasing number of elderly patients with cervical injuries managed, as outpatients, are not reflected in these figures.

2.1.8 Length of Stay for Traumatic Injury by Level of Spinal Cord Lesion

Case mix	No. of patients	Mean L.O.S. (days)	Range of L.O.S.
I	6	395	197 - 915
II	24	162	8 - 419
III	30	132	8 - 370
IV	127	20	0 - 135
All	187	69	0 - 915

Throughout the last ten years there has been significant effort spent on reducing the length of stay within the unit. Improvements in surgical intervention and rehabilitation strategies have resulted in better patient outcomes and earlier discharge. The wide variation of length of stay within each classification is indicative of the variation in the rehabilitation needs within each group.

The low median length of stay of Group IV is indicative of the efficient management of such patients by appropriate surgical stabilisation or use of halo jackets or thoraco-lumbar spinal supports.

The total number recorded in this section is lower than the total number of admissions because not all patients are discharged within the calendar year.

2.2 In-patient Procedures

The acute management and rehabilitation of the spinal injured patient can involve a significant number of in-patient surgical procedures. This section outlines the major surgical procedures carried out during the year.

2.2.1 Surgical Stabilisation

Surgical stabilisation of spinal fractures is carried out to prevent further neurological damage, aid early rehabilitation and to promote good long-term function. Rarely late surgery is indicated to reduce pain and deformity or to deal with neurological complications. Failure of orthotic management is a further indication for surgery. A team approach to decision making is used to optimise patient outcome.

There has been continued Orthopaedic and Neuro-surgical development of internal fixation devices. A pro-active approach to cervical and thoraco-lumbar surgery is followed to permit early rehabilitation, a reduced length of stay and better functional outcome. It is probable that there is a higher rate of intervention than in other UK units. To date no comparable data is available.

Over the year the orthopaedic and neuro-surgical teams carried out twenty-eight thoraco-lumbar fixations and nine cervical fixations.

2.2.2 Spinal Injury Specific Surgery

A wide range of procedures involving orthopaedics, plastic surgery, urology, general surgery, ENT and neurosurgery are required for acute and long-term patients. The spinal

unit staff and appropriate specialists from the Southern General Hospital provide this service. Over twenty-seven spinal injury theatre lists were carried out over the course of the year involving thirty-six individual procedures and seven surgical specialities. Additional upper limb and orthopaedic trauma cases were performed in the orthopaedic theatre. Day Case procedures carried out within the unit are recorded in a later section.

2.2.3 Implanted Pain Control

Over the year three new pumps were implanted to control pain and spasticity. Chronic pain is a significant problem for patients with a spinal cord injury. An increasingly sophisticated approach is taken to its management. One approach is the surgical implantation of reservoirs of analgesic drugs.

In January 2004 a dedicated intrathecal pump clinic was set up. The two clinic staff are fully trained in routine pump refills and have access to senior medical staff at all times. Patients attend with varying frequency to have pumps refilled and have the pump reprogrammed. Between 5 and 22 patients attend each clinic.

At present thirty-one pumps are implanted and operational. Twenty-two patients attend the QENSIU for refills and 9 patients attend local hospitals.

Pumps Active 03-04	
Isomed	13
Synchromed	13
Archimedes	5

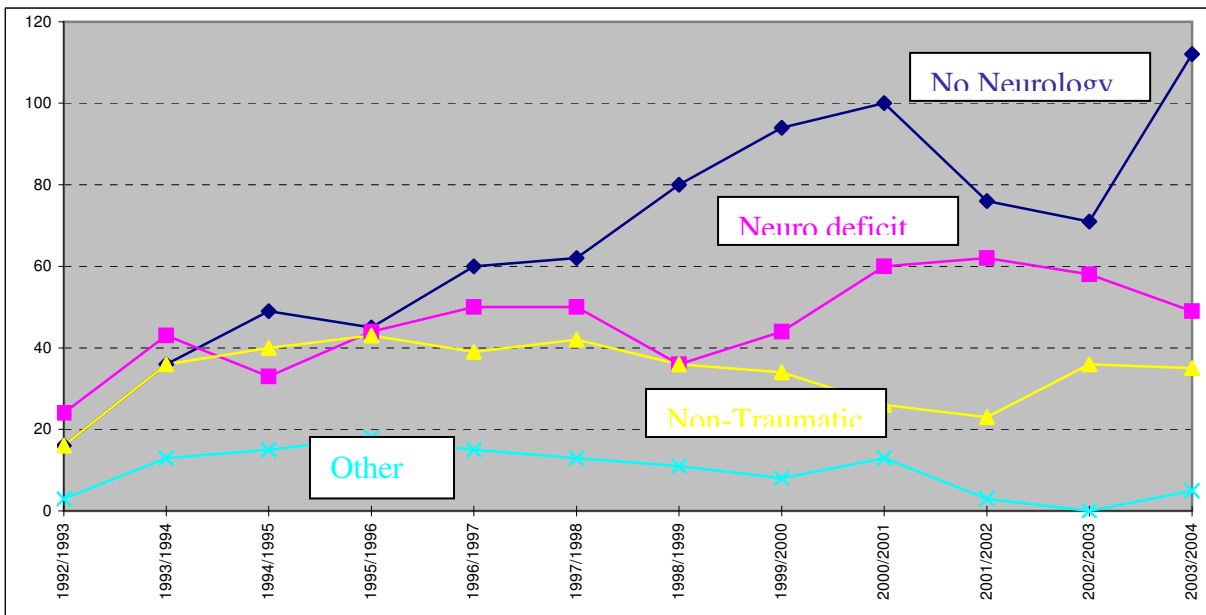
2.3 Admissions and Discharges by Degree of Injury

The degree of injury is dependent on the type and effect of the injury. A non-traumatic spinal cord injury may be more serious in terms of outcome and dependency than a traumatic lesion with a major neurological deficit. The spectrum of activity in the unit is shown by the appropriate ICD9 codes.

The ICD9 codes are as follows

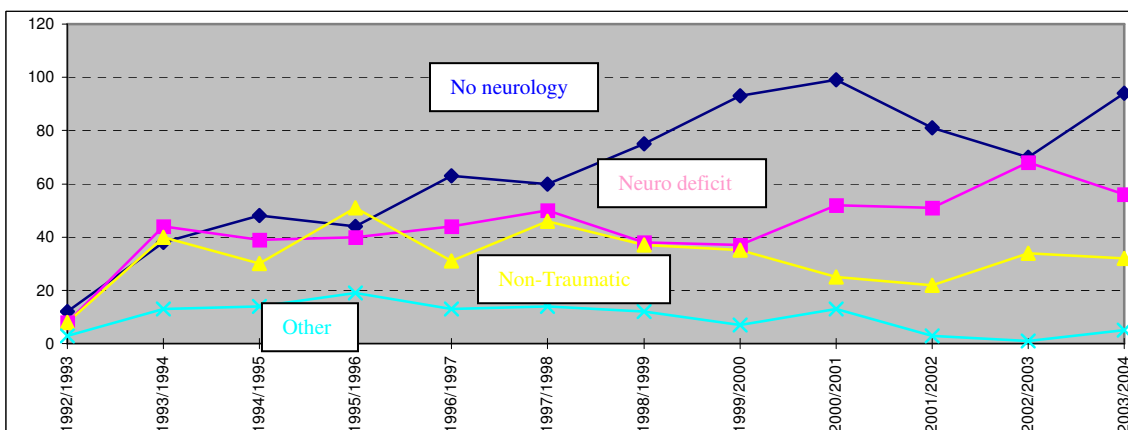
- 805 Fracture of vertebral column without mention of spinal cord injury
- 806 Fracture of vertebral column with mention of spinal column injury
- 952 Spinal Cord Lesion without evidence of spinal bony injury
- OTHER Other Spinal Cord Related Conditions

2.3.1 Admissions by Degree of Injury



Appendix DA5

2.3.2 Discharges by Degree of Injury



Appendix DA6

The institution of admission guidelines and the improved surgical services throughout Scotland initially resulted in a fall in the number of non-neurological patients admitted. There has been increasing pressure over the year from orthopaedic services to take non-neurological injured patients. Nationally there are pressures on orthopaedic resources due to waiting list pressures. Transfer to the unit for some non-neurological patients can be beneficial if they have a complex fracture requiring internal fixation or specialised orthosis. Educational resources are being developed to help services dealing with non-neurological spinal fractures.

2.3.3 Admissions and Discharges for Non Traumatic Spinal Cord Injury (ICD 9 Code 952)

2003/2004	Admissions	Discharges
Central Cord Lesion	24	23
Infection	2	2
Vascular	1	2
Tumour	0	1
Intra medullary Cyst	0	0
Non-specific Lumbar Lesions	3	3
Penetrating Wounds	3	1
Other	2	0
Total	35	32

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NOTE: Non-traumatic spinal cord injury is misleading as it includes Central Cord Syndrome that is traumatic in origin but does not involve significant bony damage. Central Cord Syndrome often results in major paralysis. It usually occurs in the elderly population who have osteoarthritic changes in the cervical spine and results in a severe disability with a predominantly upper limb paralysis with high dependency. It is anticipated that this type of injury will continue to increase in line with demographic changes.

2.3.4 In-patient Bed Days

2002/2003	Edenhall (HDU)	RCU	Philipshill (Rehab)	TOTAL
Beds	12	4	32	48
Actual -TOBD				16334
Available				
Bed Occupancy %				92.6%
ALOS				62.2

The unit operates an acute admission system to Edenhall Ward based on clinical priority. Philipshill Ward admits from Edenhall Ward and an elective waiting list or planned transfer. It continues to be impossible to obtain complete occupancy figures for the unit from the HIS/PAS systems

There has been a continued reduction in the overall length of stay for the majority of patients during the year. This has been achieved by reduction in the delay between actual and intended date of discharge.

2.3.5 Delay Between Actual and Intended Date of Discharge

	No. of patients discharged	No. of Patients Delayed	Mean delay (days)	Range of Delay (days)	NO DELAY
1999/2000	172	21	122	22 - 410	87%
2000/2001	189	27	68	1 - 877	85%
2001/2002	157	11	19	1 - 107	92%
2002/2003	173	8	46	2 - 212	95%
2003/2004	187	7	52	1 - 188	96%

The vast majority of patients were discharged on their intended date (96%).

The figures show progress in reducing the number of patients with delayed discharge. There was a decrease in the number of patients (7) who had an identifiable delay between the actual and intended date of discharge but not in the mean delay.

There continued to be a small group of patients who had significantly delayed discharge due to difficulties with housing or finding appropriate long-term nursing care. There is an identified need for some type of step-down unit to allow continued progress in rehabilitation at a lower level of supervision than is available within the unit. Support is growing for the provision of long-term care for some highly dependant or ventilator dependant patients. The biggest area of concern is GGHB were there are difficulties with long term care and ventilator support. The Discharge co-ordinator and increased support from social services has helped reduce unnecessary hospital stay.

2.3.6 Re-admissions to the unit

The majority of patients discharged from the unit never require re-admission. They attend annually or bi-annually as out patients for lifelong follow up. In some ways readmission at any time must be regarded as a failure. Some re-admissions are inevitable and cannot be prevented by greater education or increased care in the community.

There were seventy-two readmissions to the unit. This is a significant shortfall on the contract estimate of 200.

Case-mix complexity and individual patient circumstances are out with the control of the unit. A continued emphasis on discharge at the appropriate level of rehabilitation and education should ensure that the number of re-admissions remains at a satisfactorily low level.

2.4 Out patient Activity

The out patient activity of the unit is focused on the post discharge management of acute injuries and the long term follow up including the management of complications. Dedicated clinics in Orthopaedics, Neurosurgery, Urology, Rehabilitation and Pain Management supplement the nurse led annual review clinics for those patients with a

substantial neurological deficit. Early discharge of fully treated patients with no expectation of future disability to the General Practitioner is encouraged.

New patients are referred to the out patient clinic for consultant opinions regarding chronic neurological dysfunction secondary to spinal cord injury, pain, deformity, and bladder or bowel disturbance.

Out reach clinics are held in Raigmore Hospital (Inverness), Edenhall Hospital Edinburgh, Foresterhill Hospital (Aberdeen), Dumfries and Galloway Royal Infirmary, The Borders Hospital and Arbroath.

2.4.1 Summary of Out-patient activity

	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Return	2407	2401	2017	2074	2229	2228	2412
New	36	73	104	139	90	88	93

The number of return and new outpatients has risen. There was further development of follow-up protocols enabling the Liaison Nursing Service to increase its role in out patient management.

The number of new outpatients has now stabilised to a manageable level. The majority of these patients are tertiary referrals involving complex medical investigation and assessment.

2.4.2 New Out-Patient Activity by Health Board

	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004
Argyll & Clyde	32	32	25	19	22
Ayrshire & Arran	6	4	7	5	8
Borders	0	1	0	0	0
Dumfries & Galloway	2	2	2	1	10
Fife	4	1	0	1	2
Forth Valley	10	15	3	4	7
Grampian	0	0	4	1	2
Greater Glasgow	31	45	29	32	22
Highland	0	0	1		1
Lanarkshire	13	29	16	20	15
Lothian	2	6	2	3	3
Shetland	0	0	0	0	0
Tayside	3	1	1	0	1
Orkney	0	0	0	0	0
Western Isles	1	2	0	1	0
ECR	0	1	0	0	0
Total	104	139	90	88	93

2.4.3 Out -Patient Activity by Centre

	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	CHANGE PREVIOUS YEAR	TOTAL 1992- 2004
New QENSIU	73	103	139	90	88	93	+ 6%	653
Return QENSIU	2083	1740	1729	1934	1880	2090	+11%	15353
Edinburgh Edenhall	279	224	255	171	189	189	0%	1732
Raigmore Inverness	39	41	51	55	47	28	- 40%	344
Aberdeen	0	13	46	51	65	55	- 15%	230
Dumfries	0	0	18	18	24	19	- 21%	79
Borders	0	0	0	0	23	14	- 39%	37
Arbroath	0	0	0	0	0	17		17
	2474	2121	2238	2319	2316	2505	+8%	18445

The development of the outreach service has significantly improved the service to patients throughout Scotland. As well as medical and nursing staff, Physiotherapy and Occupational Therapy staff are available at the clinics. Spinal Injury Scotland are often represented to give support and resource information where needed. The number of senior medical staff available limits further expansion of the service.

Frequency	Location
Weekly	QENSIU NEW
	QENSIU RETURN
	Edinburgh
Three Monthly	Aberdeen
	Inverness
Six Monthly	Dumfries
	Borders
	Arbroath

2.4.4 Outpatient Activity by Specialty at QENSIU

	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	
DBA Orthopaedics	98	150	123	97	114	136	
RAJ Neurosurgery	82	109	86	133	126	108	
GC Urology	159	277	370	356	287	267	
Skin Care	224	199	200	145	115	187	
Pain / Acupuncture	120	92	96	57	191	295	
Neuroprosthetics [Fraser/Hems]	0	0	3	42	22	29	
Sexual Dysfunction	53	22	27	45	41	47	
Spinal Injury Annual Review	TOTAL	1007	989	953	1059	984	1021
	MEDICAL		564		639	603	681
	NURSING		425		420	381	343
Total		1767	1843	1868	1934	1880	2090

There has been a further increase in the number of patients seen at the Consultant Specialist Clinics. A number of patients previously seen at the Neurosurgical Clinic are now followed up at the Halo Clinic as day cases. Urodynamics and halo fixation are now designated as day case procedures. The numbers attending specialised clinics are stable. There is an increasing demand for pain management and this has been supported by the appointment of two pain specialists to the unit.

Spinal Injury Annual Review clinics are a large component of the commitment to life long care. These are nurse led with only sixty-six percent of patients require medical input. The Hand Out-Patient service continues to be developed. This is a specialised service, which is extremely time-consuming despite the small number of patients attending.

Measurement of activity at clinic level indicates that there is an underreporting of activity by 9%. This is accounted by the system failing to capture referrals from the wards, informal “drop in” consultations and some follow up appointments. The introduction of a HIS system within the trust should help identifying all activity.

2.5 Day Case Activity

Day case activity continues to offer an important service for minor surgical procedures, medical interventions and nursing care. The new developments in spinal fracture management, pain control and sexual dysfunction are expected to maintain this activity. The introduction of pain control sessions in 2002 has increased activity. The level of Day Case activity exceeds the contracted activity but will be self limited due to the finite population of spinal injured patients.

2.5.1 Day Case Attendances by Reason For Admission

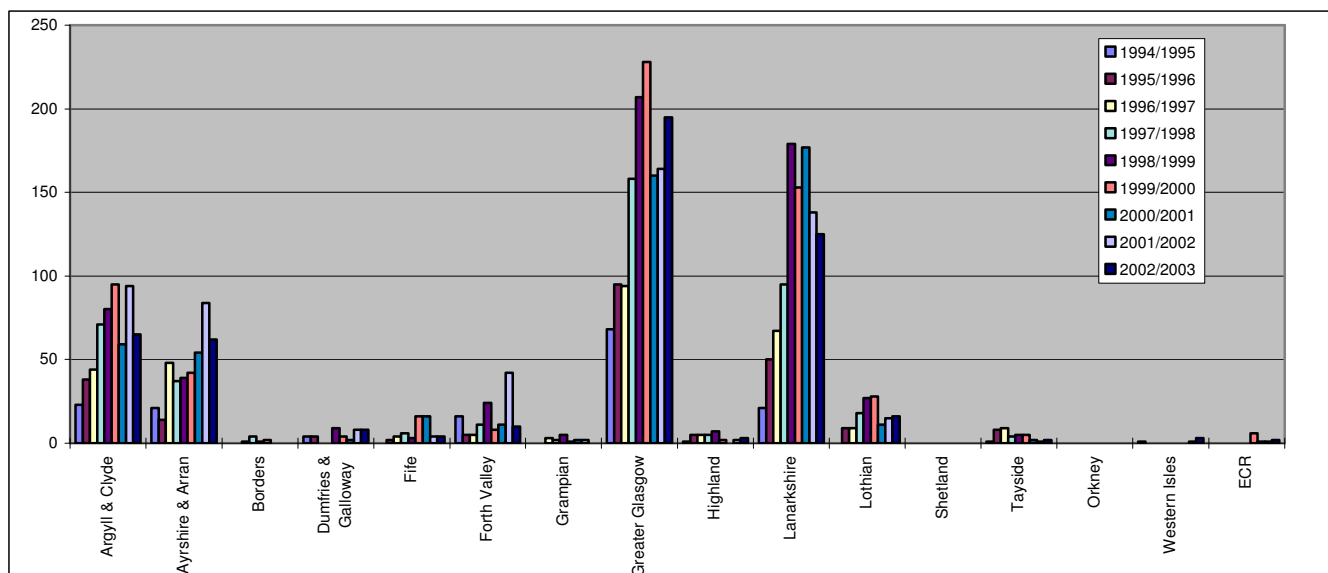
	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Urology –urodynamics	44	42	15	31	21	21
Halo Fixation	133	169	234	346	242	226
Skin	6	8	7	5	5	20
Orthopaedic/Neurosurgery	60	7	1	0	1	0
Pain/Acupuncture	294	350	231	160	203	292
Sexual Dysfunction	21	14	11	12	21	33
Other	0	0	0	2	2	5
Total	558	590	499	556	495	597

Halo fixation has increasingly become the treatment of choice for a number of cervical injuries. Improved protocols with a reduced number of follow-up appointments have resulted in a reduction in the rate of rise for this type of activity. The two consultant anaesthetist sessions in pain control has improved patient access to this type of support. There is an increased demand for Botox therapy for spasticity. All day case procedures involve a formal intervention carried out by medical or specially trained nursing staff.

Overall there continues to be a 12% under reporting of activity. This is due to the systems currently in place to formally monitor activity.

2.5.2 Day Case Attendances by Health Board

As a national service Day Case activity is limited by geographical constraints. Many patients who could be managed as a day-case require in-patient stay due to difficulties in travelling. If indicated some procedures are arranged to be done in the patients locality.



Appendix DA8

3. 0 Waiting Times

3.1 Waiting Times Outpatient Clinics

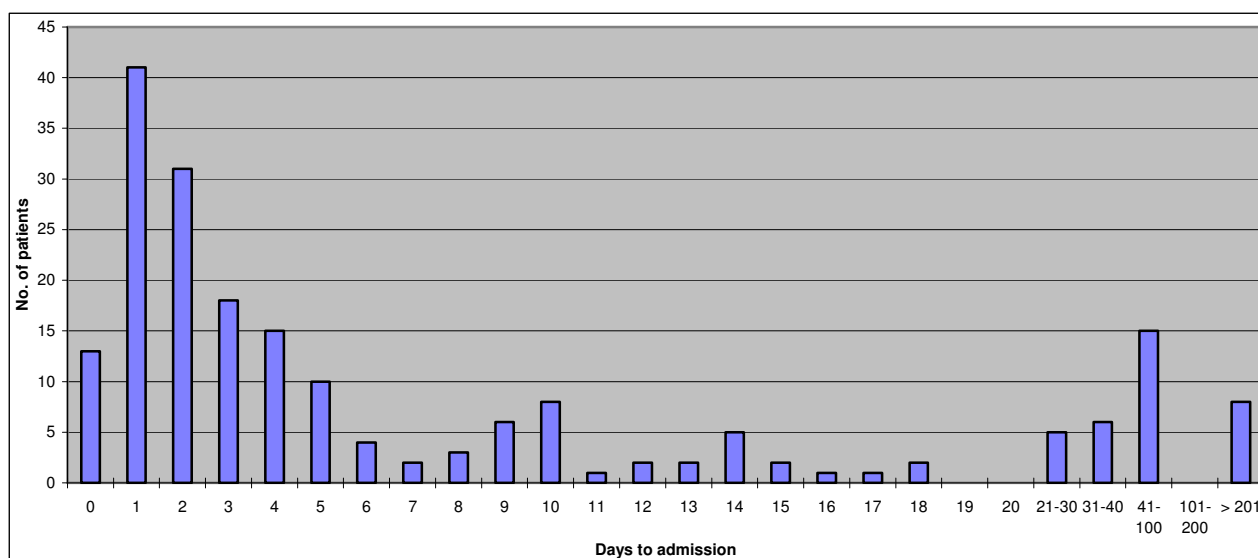
There is an open door policy to the Nurse Led Spinal Injury Clinics. Medical advice is always available and is required in sixty per cent of patients. Patient satisfaction remains high with this team approach. The maximum waiting time for elective outpatient appointments is four weeks.

3. 2 Waiting Times Acute Admissions

Acute referrals are admitted as soon as appropriate on clinical grounds. It is unit policy to admit all patients with neurological injury within twenty-four hours as long as there are no concomitant medical problems. Patients requiring specialised Neurosurgical or orthopaedic care are managed in the appropriate ITU or ward prior to transfer.

3.3 Time from Injury to Admission

Early admission to the Spinal Injury Unit provides immediate support to the patient and family. In 2003-04 twenty seven per cent of patients were admitted within twenty-four hours. Forty two per cent were admitted within forty-eight hours and fifty eight per cent within four days. These figures match or improve previous years. It was expected that these figures would have deteriorated due to the absolute increase in the number of admissions and the number of vacancies in nursing staff. The maintenance of such good figures could not have occurred but for a tremendous effort from all staff.



The pattern of early admission is not being achieved in other Spinal Injury Units in the United Kingdom due to similar if not worse difficulties. Early admission continues to be a priority as it is seen as an advantage to the patient and relatives.

Co-operation between the staff in the Unit and the referral hospital ensures immediate admission if clinically indicated. Telephone advice is always available for those patients who are not immediately transferred. Direct admission to orthopaedic or neurosurgical wards for surgical stabilisation may increase the time to admission but is appropriate to minimise transfers of potentially unstable patients.

Approximately twenty-percent of patients have associated orthopaedic injuries. Co-operation between Surgical Intensive Therapy (SGH), the referring hospital and other specialised units is often required. (Plastic Surgery, Burns Unit, Maxilla-Facial, Renal etc.)

Most patients admitted after five days have conditions that do not require immediate treatment or have additional co-morbidities that require medical intervention in the referring hospital prior to transfer. A few new patients have undergone rehabilitation in another centre and are admitted to the unit for reassessment or treatment of complications.

	No. of Patients	Mean Time (Days)	Range of Time
2000-2001	199	163.3	0 - 12575
2001-2002	164	103	0 - 12012
2002-2003	165	62	0 - 4948
2003-2004	201	83	0 - 6596

This analysis includes all patients admitted. The mean time has been reduced. Some patients have an acute injury on top of a pre-existing injury, which explains the prolonged delay.

Four patients were admitted after 200 days. These patients had been initially cared for in other centres or had developed a secondary complication due to a further insult at a previous fracture.

4. Quality of Care Issues:

4.1 Charter Mark

The Charter Mark was renewed in June 2000. The Spinal Injuries Unit will re-apply for Charter Mark in summer of 2004.

4.2.1 National Service Division Visit

Staff from NSD regularly visit or are in touch with the Unit throughout the year. Continued close co-operation has ensured that standards are maintained and there is an early response to increased or changing clinical needs.

The Annual and six-monthly report acts as a focus to continually evolve the service.

4.2.2 Formal Complaints

A formal complaint/suggestion system is in place. This has proved invaluable in monitoring quality and modifying the service.

The major concern for relatives and carers remains the ambulance service and car parking.

The dedicated ambulance service was withdrawn by S.A.S due to operational reasons. The replacement system has proved less flexible to the demands of the service. At times patients have suffered unacceptable delays or cancellations. Considerable effort was spent in explaining the situation to any patient affected.

Parking in the vicinity of the unit for disabled and non-disabled remains a concern. A number of disabled parking bays were lost in the redevelopment of the Institute of Neurology. These concerns have been raised with the trust but there are limited opportunities at present to increase the available parking. It is foreseen that a system of fees for parking will be introduced within GGHB over the coming year. It is not known how this will affect the unit.

Following completion of rehabilitation patients are discharged home or back to the referral hospital. In one case the carers indicated that they would have preferred that their relative remained within the unit after rehabilitation. This was not possible.

In another case a complaint was received from a social worker about the difficulties experienced around a patient's discharge and provision of disabled access to their house. The unit felt it was working in the patient's interest.

4.2.3 Relatives & Patients Meetings

Regular contacts are maintained with relatives and carers throughout a patient's stay. Carers are actively involved with the discharge process. All staff are encouraged to attend patient social activities and events. Formal discussion groups with patients and relatives are organised. The medical staff encourages an open dialogue with patients and relatives regarding treatment and progress. Consent issues are in constant review and the implications of the Incapacity Act in the management of the acutely injured are being implemented.

4.2.4 Benchmarking

There have been continued attempts to develop benchmarking with other UK units. Figures are now being made available from other units and are being analysed. There has been national support for each spinal unit to produce annual reports on the Scottish model. The unit staff has visited spinal units in the UK and Switzerland to assess best practice. Management teams from other units have been to Glasgow seeking advice regarding activity and developments.

4.3 Education

The unit has an important role in education. This extends to prevention of the initial accident, management of the early stages and the avoidance of subsequent complications in the early or late stage of rehabilitation.

The second meeting on "The First Forty Eight Hours" was held in May 2003. The meeting attracted over one hundred and forty health professionals. The faculty includes the Scottish Ambulance Service, Strathclyde Fire Service, Paramedical Staff, Consultant Surgeons, Nursing, and Spinal Injury Unit Staff.

The Director gave Post-Graduate Medical lectures at Edinburgh, Aberdeen, Dundee, and Glasgow. The Consultant medical staff lectured in Edinburgh, Glasgow University, Fort William and Grangemouth.

Medical students attend for clinical practice in 2nd, 4th and 5th year. Third years can attend for the spinal injury special study module.

The Senior Nurse Manager has lectured at Ayr, Paisley and Caledonian Universities. Bell College has made a formal application to the Senior Nurse Manager for placements of their students within the unit.

Meetings were organised with GPs and District Nurses by the Liaison Nursing staff. The Education Sister co-ordinated Study Days for nurses from Aberdeen, Dublin, Paisley and Caledonian Universities.

Out-reach study days for carers and patients were organised at Aberdeen in 2003 and Inverness in 2004. If possible further educational days will be organised for Dumfries and the Borders

The Out-Patient Sister provided training and education for University students and District Nurses at Paisley and Caledonian Universities.

Glasgow University Medical students continue to attend the unit as part of the Year Three study module and on placement.

The Unit has been fortunate in receiving a number of UK and overseas visitors at Medical and Paramedical level.

4.4 Hospital Acquired Infection

Hospital acquired infection continues to be a problem within the Unit mirroring the experience throughout the hospital population.

The problem of MRSA continues to be monitored within the Unit and every effort is made to try and reduce the periods in isolation. Periods in isolation significantly affect the rehabilitation timetable and every attempt is made to reduce this to a minimum.

4.41 Hospital Acquired Infection

	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Total patients req. isolation	31	45	52	67	70	N/A
Salmonella						6
Clostridium Difficile	1	1	1	1	6	0
MRSA	25	42	48	64	64	33
Streptococcus pyogenes	5	1	0	1	0	2
Scabies	0	1	0	0	0	0
TB			1	1	0	0
Varicella Zoster			1	0	0	1
Patient days in isolation	1 – 82 days	-				N/A
Ave. days in isolation	-	55.8	53.75	52.6	52.6	N/A

There was a significant reduction on the number of cases of MRSA within the unit in the year. Checks prior to admission and constant vigilance within the unit has contributed to this fall. The major problem during the year was an outbreak of salmonella affecting Philipshill Ward. The situation was monitored by the infection control team and a special task-force. Considering the high risk of cross contamination and the nature of bowel regimes the infection was restricted by the high standards of nursing and medical practice. A report was prepared by the senior nurse manager for the infection control team. All recommendations of the task force have been carried out.

Unfortunately the trust database is incomplete for patient isolation days.

4.5 Pressure Sore Prevention

Spinal injured patients are the most susceptible population to the development of pressure sore due to the absence of sensation and movement. The Unit continues to be at the forefront of pressure sore management with the introduction of protocols and training programmes for patients, carers and nursing staff.

4.6 Pressure Sore Prevalence

Continued education and constant vigilance is required to reduce the number of pressure sores. Monitoring of sacral splits is now included.

	No. of patients	No. of acquired sores	No. of admitted sores	Total number of sores	Point prevalence
1999/2000	38	3	3	6	16%
2000/2001	42	2	4	6	15%
2001/2002	48	4	8	12	25%
2002/2003	42	1	5	6	14%
2003/2004	45	1	9	10	22%

The number of sores identified remains low. There was an increase in the number of sores present on transfer. There is a continued programme to reduce and monitor sores. A Videometer is being purchased to evaluate treatment.

4.7 Bed & Mattress Hire

Therapy Bed Contract .

The number of therapy beds per month has reduced from 8 to 4.24. There has been an increase in the use of mattresses per month from 3 to 5.8. The overall effect is a reduction in the cost of bed and mattress hire.

4.8 Ventilated Bed Days

The number of ventilated bed days will be dependent on the case mix presenting to the unit. Improvements in ventilation protocols continue to be developed by the respiratory care team to reduce the total time on a ventilator.

4.81 Ventilated Bed Days Appendix DA20

		No. Patients	Ave. Ventilated Days	Total Ventilated Days
2003/2004	Edenhall	17	25	427
	RCU	3	160	481

The relocation of RCU to a centralised position in Philipshill Ward has proved effective during staff shortages and has given long-term patients better support and integration. Overall this has given greater flexibility in managing admissions to Edenhall and all ventilated patients in the unit. We continue to develop aggressive policies in weaning patients who require temporary ventilation as part of their initial management. There is

concern about the provision of long term care to ventilator dependant patients who are unable to progress to domiciliary ventilation and need long term nursing care support

4.9 Respiratory Care: Ventilation Needs of Low Tetraplegic Patients

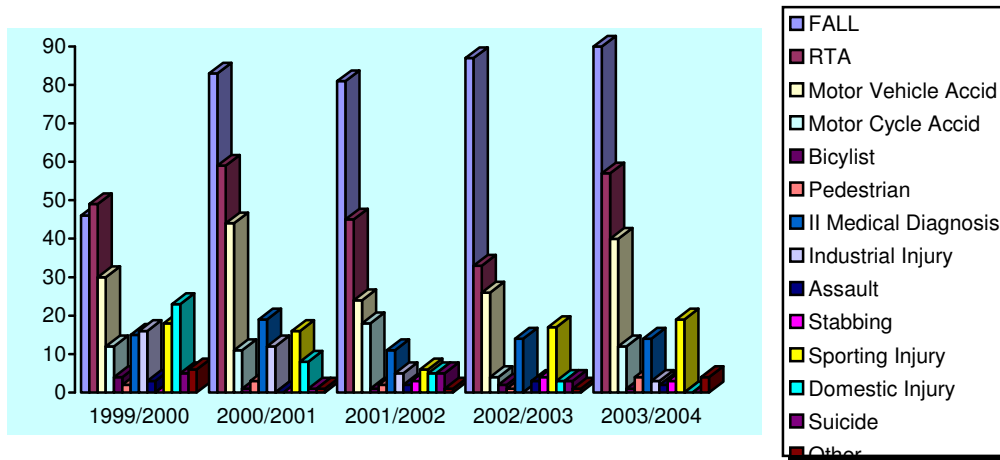
Protocols have been developed for the maintenance and weaning of low tetraplegic ventilator dependent patients. Changes in protocols have resulted in a reduction in the number of ventilated days. Continued developments are expected in this area over the next five years

5.0 Mechanism of Injury

	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Fall	62	52	46	83	81	87	90
RTA	52	47	48	59	45	33	57
Motor vehicle	42	38	30	44	24	26	40
Motorcyclist	3	2	12	11	18	4	12
Bicyclist	4	4	4	1	1	2	1
Pedestrian	3	3	2	3	2	1	4
Secondary to Medical Diagnosis	22	16	15	19	11	14	21
Industrial Injury	8	10	16	12	5		3
Assault	8	0	3	0	2	3	2
Penetrating Injuries		2	0	0	3	4	3
Sporting Injury	6	11	18	16	6	17	19
Domestic Injury	4	15	23	8	5	3	0
Suicide		3	5	1	5	3	2
Other	6	7	6	1	1	1	4
Total	168	163	180	199	164	165	201

Road Traffic accidents involving cars increased significantly and motorcycle accidents have returned to their previous high figures. Industrial injuries returned after last years absence. Of major concern was the number of sporting accidents affecting young people. The number of para-suicides is under-reported. Penetrating injuries includes stabbings and gunshot wounds.

5.1 Mechanism of injury by year



Overall the pattern mirrors social trend within the population. Alcohol continues to be implicated in the aetiology of many spinal injuries. The causes of injury are important as a guide to the development and promotion of prevention programmes. Falls from a height remain the most common cause in Scotland. In most units throughout the world Road Traffic Accidents are the commonest.

6.0 Financial Report 12 Months ending 31.03.04

	Budget	Actual	Variance
<u>Dedicated Staff Costs</u>			
Medical	£583,226	£678,345	(£95,119)
Nursing	£2,142,933	£2,133,576	£9,357
Paramedical	£359,391	£364,100	(£4,709)
Administrative	£98,706	£119,548	(£20,842)
Total Staff	£3,184,256	£3,295,569	(£111,313)
<u>Supplies Costs</u>			
Medical	£14,600	£4,219	£10,381
Nursing	£21,886	£10,691	£11,195
Paramedical	£12,824	£16,808	(£3,983)
Administrative	£53,701	£93,951	(£40,250)
Pharmacy	£519,515	£544,898	(£25,383)
Direct Supplies	£622,526	£670,567	(£48,040)
<u>Allocated Costs</u>			
Medical Records	£16,099	£16,099	£0
Building Costs	£159,367	£159,367	£0
Domesic Services	£62,933	£62,933	£0
Catering	£179,965	£179,965	£0
Laundry	£43,059	£43,059	£0
Neuroradiology	£58,516	£58,516	£0
Radiology	£19,321	£19,321	£0
Laboratories	£60,724	£60,724	£0
Other Diagnostic Services	£5,520	£5,520	£0
Anaesthetics	£30,914	£30,914	£0
Equipment	£12,145	£12,145	£0
Portering	£38,643	£38,643	£0
Phones	£24,290	£24,290	£0
Surgical Appliances	£51,892	£90,863	(£38,971)
Scottish Ambulance Service	£7,729	£7,729	£0
General Services	£27,602	£27,602	£0
Allocated Costs	£798,720	£837,690	(£38,971)
Total Supplies	£1,421,246	£1,508,257	(£87,011)
<u>Overhead Costs</u>			
Fixed costs :-			
Rates	£74,592	£74,592	£0
Capital Charge	£620,027	£620,027	£0
Trust Overheads	£134,438	£134,438	£0
Total Overheads	£829,057	£829,057	£0
Total Expenditure	£5,434,559	£5,632,883	(£198,324)
Post Graduate Dean Funding	£95,035	£95,035	£0
Total Expenditure net of Post Graduate Dean Funding	£5,339,524	£5,537,848	(£198,324)

7.0 Service Developments and Future Plans

7.1 Respiratory Care Unit

The incorporation of RCU into the nursing management structure of Philipshill ward has improved nurse retention and improved training in respiratory care.

7.11 Phrenic Nerve Stimulators

Patients with high-level neurological injuries have loss of diaphragmatic function resulting in impaired respiratory status. Options for treatment include permanent ventilation, assisted ventilation or pulsed stimulation of the phrenic nerve, which supplies the diaphragm.

A phrenic nerve stimulator supported by Highland Health Board was implanted in a fifteen-year-old patient in June 2003 in conjunction with the Cardio-thoracic department at the Western Infirmary. The assessment and postoperative training of carers was successfully carried out in the unit. Following discharge, the patient and carers were reviewed at home in Shetland by medical and nursing staff.

7.12 Non-invasive ventilation and assisted ventilation

Avoidance of ventilation in acute cases or in respiratory decompensation is beneficial, Methods of assistive non-invasive ventilation are being developed with the neuro-anaesthetists to reduce rehabilitation times.

Functional Electrical Stimulation of the abdominal muscles has been used to assist breathing and coughing in tetraplegics as part of a research programme. A clinical trial protocol is being developed.

7.13 Night Time Ventilatory Support

A number of high tetraplegics require night time ventilatory support. This is likely to increase in the next five years with a greater number of these patients surviving to old age. Protocols are being developed to support patients at home or in nursing care.

7.2 General Clinical Services

7.2.1 Outreach Clinics

Medical, Nursing, Occupational Therapy and Physiotherapy staff attends outreach clinics as required. Volunteers from SIS also attend to see and advise patients and carers. The increasing demand places a strain on the core service in the Unit. Additional clinics were held in Aberdeen and Inverness during the year.

Senior Medical Staff are required to be present at outreach clinics. No further expansion is possible within the current staffing structure. Teaching sessions for patients and carers are being developed to run after outreach clinics.

7.2.2 Out-Patient Department

The out-patient department has continued to develop its services during the year.

Two Consultant Anaesthetist pain clinics have been introduced this year. These are attended by patients with neuropathic pain not controlled by routine management. The clinics offer specialist drug therapy, pain interventions, acupuncture and T.E.N.S/T.S.E. The nursing staff will provide acupuncture sessions and training in the use of T.E.N.S/T.S.E therapy. Funding has recently been obtained for the purchase of T.E.N.S/T.S.E units.

A special clinic session has been started due to increased demand for the refilling of intrathecal pumps. This clinic runs each Wednesday afternoon with 2 - 6 patients. The nurse is responsible for the routine refills; any changes to medication or problems are referred to the medical staff. The possibility of routine pump refills being carried out by ward nursing staff on in-patients is being investigated. If appropriate trained staff are available this would improve the service to patients.

A clinic specialising in the nutritional aspects of paralysis is being investigated. For some time it has been recognised that optimum nutrition can reduce skin and bowel complications. It is also known that maintaining a reasonable Body Mass Index can minimise difficulties with transfers and seating problems.

7.2.3 Spinal Nurse Specialist

There is a continued demand for nurse specialist visits for patients in their home or care placement. This prevents unnecessary visits to the unit and supports patients and carers. During the year the four nurse specialists travelled over twenty thousand miles by car and carried out three hundred and four visits. This included outreach clinic, catheter changes, post discharge visits and education.

7.2.4 Assistive Technology

There is an increasing demand for technology in the management of the paralysed patient. The ultimate aim is to promote independence, assist in activities of daily living and to improve work opportunities. The additional occupational therapist has been able to plan for developments in this area. Environmental control, communication and computer skills are all being investigated. This development is fully integrated with the work done in the unit by Momentum (formerly Rehab Scotland) and SPIN.

Momentum has appointed an outreach worker to bring adaptive or assistive technology to outpatients throughout Scotland.

SPIN supported by Strathclyde University has introduced computer skill classes for inpatients.

7.2.5 Training & Development Post

The Nurse Training and Development post continues to be extremely successful. A training package for nursing auxiliaries has been developed and discussions continue with Cardonald College about the advancement of SVQ training for auxiliaries.

It is anticipated that all auxiliary nurses within the Unit will have completed the basic competency package by midyear 2004. The unit is participating fully in the conversion courses run by the trust for overseas nurses. This leads to full UK accreditation for these nurses.

7.2.6 Further Developments within Multi-Disciplinary Team

A multidisciplinary approach to education for patients, family and carers is followed in the unit. It is recognised that there is a need for continued education and an outreach service for patients discharged before the introduction of modern practice. Following the success of the educational "Road Show " in Aberdeen in April 2003 a similar event was held in Inverness in April 2004. The format gives an opportunity for patients, carers and nursing staff who are distant from Glasgow to review their care and experiences. There will be continued development of the lectures and literature for these courses in the coming year.

7.2.7 Flexible Outpatient Department Development –Discharge Co-ordinator

The Discharge Co-ordinator has worked hard with other staff to improve the discharge of patients from Philipshill Ward. All patients with a neurological injury have several goal planning meetings before a formal multi-disciplinary discharge plan is discussed. The co-ordinator has responsibility for immediate post-discharge care with on-going problems reported directly to the Liaison Sisters.

7.3 Nursing Recruitment

Nursing recruitment is recognised as a national problem. The unit has continued to attract excellent applicants from new and established nurses. The senior nurse manager and educational sister have made considerable efforts to raise the profile of the unit among the university nursing departments and in recruitment drives. Overseas nurses are being considered. Nursing staff within the Unit is pro-active in developing training objectives and orientation programmes for all students. The unit is actively involved in conversion courses and seeking support for refugee placements.

The continual education policy within the unit however makes staff attractive applicants for promoted posts outwith the service.

7.4 Medical Recruitment

The unit continues to attract high quality applicants for the three SHO positions. The posts are designed to give comprehensive training and are suitable for candidates who wish to progress to medical or surgical specialities. The Intercollegiate Board for SHO

training inspected the unit and approval for a further five years has been granted. It is hoped that that approval will also be granted for GP training.

There remains concern regarding middle grade support. At present there is historic funding for one unfilled middle grade post. Separate funding is available for rehabilitation medicine trainees from the Department of Post-Graduate Medicine. Rehabilitation trainees have to spend up to six months working in a spinal injuries unit but there is no service component.

Of national concern is the training of future consultants in spinal cord injury. European legislation was unable to recognise such a small speciality and training was combined with general rehabilitation. This has been unable to produce enough suitable candidates for the spinal injury rehabilitation posts available. The system is currently under review.

Consideration is being given to investigate the use of the middle grade salary to contribute towards a consultant in spinal cord rehabilitation or alternatively a staff grade position.

7.5 Security

Security within the unit remains a high priority due to the vulnerability of the patients. The CCTV system installed in 2002 continues to be successful in decreasing incidents and has led to police action in a number of cases. It is disappointing that the risk means that there has to be a lock down of the unit in the evenings and weekends. This does impact on rehabilitation opportunities but does contribute to the safety of all patients.

There have been no major incidents in the last year.

7.6 Implanted Electrodes for Upper Limb Function

The unit continues to provide a full tetraplegic hand service. This consists of full assessment facilities with access to soft tissue and bony surgery where appropriate.

There continues to be a desperate need to improve upper limb function in patients with tetraplegia. The programme for implantation of electrical stimulation remains suspended due to difficulties in the commercial development of the system. The unit remains committed with partners in the USA and Australia to support further development. The results of previously implanted systems have been gratifying and the potential benefits are significant.

The creation of a National Brachial Plexus Service with the support of NSD and the host trust will have synergy with the clinical work within the unit.

7.7 Capital Development and Equipment Replacement

The unit was commissioned in 1992. Despite appropriate support from NSD it is inevitable that there are now issues with refurbishment and equipment. There has been a policy of prudent replacement of essential resources from NSD or charitable sources. Despite this there is a shortfall in general refurbishment and replacement of equipment of a major nature. Major issues including development of a stepdown unit lie outwith the annual contract negotiations. Significant capital expenditure requires to be invested to maintain the highest standards.

As part of the research programme the unit obtained funding with Glasgow University for a pQCT scanner (£60,000) to measure osteoporosis. This has been placed in the Department of Nuclear Medicine for the benefit of all patients.

7.8 Integrated Care Pathways

The ICP for complete C5 cervical fractures has been piloted in the unit. There are difficulties developing the type of proscriptive ICP seen in orthopaedics. It is probable that a generic ICP will be written with individual modules for specific targets of care.

7.9 Clinical Networking and National Guidelines

Admission guidelines were issued to all hospitals in Scotland during 2002. This was of great benefit standardising the immediate management of patients and their subsequent referral. Standard referral proformas, transfer guidelines and admission proformas are now in place. An audit of 100 consecutive admissions indicates that compliance with the transfer protocols was approaching 90%. Of concern was the association between a high incidence of skin damage without the use of a vacuum mattress. Discussions with the Scottish Ambulance Service have resulted in a planned target of having all transfers complying with the protocols within two years. Consultations with the ambulance service have taken place regarding the use of cervical collars and neck immobilisation protocols. The guidelines will be reissued during 2004 along with the protocols for Brachial Plexus Injury.

The second bi-annual meeting of "Spinal Injuries – the first 48 hours" was held in May 2003. This was attended by 140 health professionals from throughout Scotland. Speakers were invited from senior trainers, the Ambulance Service, the Fire Brigade, Mountain Rescue and A & E Departments. This has helped to strengthen relationships with these groups.

7.10 Digital Radiology

Advances in digital imaging and image transfer have continued to allow improvements in patient care. The general radiology department has most images online with access from ward and office. Experiments have taken place regarding transfer of images from referring hospitals straight to the unit. At present there is no access to neuro-radiology but this may be developed in the coming year. It would be of great benefit to patients if images from the referral hospital could be viewed by staff in the unit to give advice regarding transfer and treatment. Charitable funding is being investigated for the provision of a digital viewing platform.

7.11 Clinical Governance

Multi-disciplinary clinical governance meetings are held within the unit monthly. Separate medical audit meetings are held with the department of rehabilitation. Each department has separate governance meetings. The Director, Senior Nurse Manager and the Business Manager meet weekly. Consultant clinical meetings are held twice a week.

Consultant portfolios have been introduced and appraisal started. SHO teaching and training is closely scrutinised with introductory interviews, educational contracts and regular reviews culminating in the RITA process.

A formal Critical Incident Reporting system is in place. No incidents occurred during the year.

7.12 Medical Research

An active policy of research into the management and prognosis of spinal cord injury is in progress.

The unit has developed a network of scientists and clinicians that are interested in areas pertinent to spinal cord injury. There is continued collaboration with the Universities of Glasgow, Strathclyde, Caledonian and Edinburgh.

A meeting called "Recovery and Repair" is planned for October 2004 with contributions from basic and clinical scientists.

7.12.1 Grants and Grant Applications - Cumulative Index

The following have been granted or applied for to allow work to be done in the unit. Principal researchers indicated.

Functional electrical stimulation augmented treadmill training for incomplete spinal cord injured patients Dr MH Granat
Scottish Executive £77,709 completed

A pilot study of lower limb FES cycling in paraplegia Prof K Hunt
Inspire £8,886 completed

An Open long-term study to evaluate the efficacy and safety of Tamsulosin in the treatment of neurogenic voiding dysfunction in patients with supra-sacral spinal cord lesions Mr. M.H. Fraser
Yamanouchi £10,000 completed

A randomised double-blind placebo-controlled study to evaluate the efficacy and safety of Tamsulosin against placebo in the treatment of neurogenic voiding dysfunction in patients with supra-sacral spinal cord lesions Mr. M.H. Fraser
Yamanouchi £10,000 completed

A multi-centre Phase III, Double blind placebo controlled flexible dose study to evaluate the efficacy and safety of Silfanidil in women who have female sexual dysfunction resulting from spinal cord injury. Mr D.B.Allan Dr MV Jigijinni– Report Completed
Pfizer £ 20,000

Prof K.Hunt Six month secondment 2003
Royal Academy of Engineering Secondment Scheme

Development of Systems for tetraplegic Arm Cranking using Functional Electrical Stimulation: a pilot study Prof K Hunt
EPSRC £122,403

Development of Systems for Paraplegic Cycling. Prof K Hunt Dr N Donaldson
EPSRC £244,137

Upper Limb Arm Cranking using FES Dr H. Gollee, Prof.K. Hunt
European Commission: £68,719. Completed

Control strategies for integrating motor power with leg power in paraplegic cycling
EPSRC £77,573. Completed.

Integrated Voluntary Control of Unsupported Paraplegic Standing.
EPSRC £219,402

Practical systems for balance control.
Neopraxis £38,000

Comparative Study of walking and cycling
Synergy Initiative £35,000

Equipment for Paraplegic Exercise Studies
Scottish Higher Education Funding Council £156,000

Neurocontrol Implants for the upper and lower limbs Dr M.Granat
Scottish Executive grant applied for

Electrophysiological Assessment of Central Nervous System Organisation following
Incomplete Spinal Cord Injury
B Conway, I Izzeldin D B Allan ISRT Grant

7.12.2 Projects

Non-invasive electrophysiological assessment of cortical spinal pathways in subjects with
spinal cord injury
Gillian McColl Mres student completed

Development and testing of a visual feedback system for the Freehand upper limb
Prosthesis
S. Coupaud Mres student completed

Reflex Modulation during sitting and walking
B. Conway T.Eldho

The Suitability of a ten-week circuit class to increase physical capacity
And activity levels in paraplegics
K.Cunningham MSc student completed

7.12.3 Publications

1

T. Schauer, K. J. Hunt, N.-O. Negård, M. H. Fraser, and W. Stewart, "Regelung der Trittggeschwindigkeit beim Liegedreiradfahren von Querschnittsgelähmten (Cadence control for recumbent cycling of paraplegics)," *Automatisierungstechnik*, vol. 50, no. 6, pp. 271-278, 2002. In German.

2

K. J. Hunt and A. N. McLean, "New developments in engineering for spinal cord injury rehabilitation," *Ingenia (The Royal Academy of Engineering)*, pp. 29-34, November 2002. *

3

H. Gollee, K. J. Hunt, S. Coupaud, A. N. McLean, and M. H. Fraser, "An apparatus for FES-assisted arm-cranking exercise in tetraplegia," *Neuromodulation*, 2002. Submitted for publication.

4

K.J. Hunt, A.N. McLean, S. Coupaud, and H. Gollee, "Upper-limb exercise in tetraplegia using functional electrical stimulation," *Advances Clin. Neurosci. Rehab.*, vol. 3, pp. 24-25, Nov/Dec 2003.

5

K. J. Hunt, A. J. Cathcart, C. Ferrario, B. Stone, S. Grant, S. A. Ward, and M. H. Fraser, "Workrate and cadence control for exercise testing in FES cycling," in *Proc. 8th Ann. Conf. Int. Functional Electrical Stimulation Society*, (Queensland, Australia), 2003.

6

K. J. Hunt, A. N. McLean, and M. H. Fraser, "The health benefits of cycling exercise in paraplegia using functional electrical stimulation," in *Proc. 42nd Ann. Sci. Mtg. Int. Spinal Cord Soc.*, (Beijing, China), 2003.

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S. Coupaud, H. Gollee, K. J. Hunt, S. A. Ward, A. N. McLean, and M. H. Fraser, "Development of methods for arm-cranking exercise using functional electrical stimulation (FES) in tetraplegia," in *Proc. 2nd IEEE EMBSS UKRI PG Conf. Biomed. Eng. Med. Phys.*, (Birmingham, U.K.), pp. 41-42, 2003.

8

B. Stone, C. Ferrario, K. J. Hunt, and M. H. Fraser, "An overview of functional electrical stimulation (FES) induced cycling," in *Proc. 2nd IEEE EMBSS UKRI PG Conf. Biomed. Eng. Med. Phys.*, (Birmingham, U.K.), pp. 43-44, 2003.

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K. J. Hunt, B. A. Saunders, R. Sutherland, S. Grant, A. N. McLean, and M. H. Fraser, "Mobile cycling for people with spinal cord injury using functional electrical stimulation: a case study," in *3rd Int. Congress on Restoration of (wheeled) Mobility in SCI Rehabilitation*, (Amsterdam, the Netherlands), April 2004.

10

Prasad RS, Fraser MH, Urquhart GD, McLean AN. Rupture of tuberculous spinal abscess resulting in tuberculous empyema and chylothorax. *Spinal Cord*. 2003 Jul;41(7):410-2.

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K. J. Hunt, B. Stone, N.-O. Negård, T. Schauer, M. H. Fraser, A. J. Cathcart, C. Ferrario, S. A. Ward, and S. Grant, "Control strategies for integration of electric motor assist and functional electrical stimulation in paraplegic cycling: utility for exercise testing and mobile cycling," *IEEE Trans. Neural Sys. Rehab. Eng.*, vol 12 pp.89-101, March 2004.

12

A. Oliver, D. B. Allan, "Lateral Flexion Distraction Injury of the Spine" *Injury* 2004

7.12.4 Conference Papers

1

T. Schauer, K. J. Hunt, A. Ronchi, M. H. Fraser, and W. Stewart, "Robust Control of Knee-Joint Motion," in *Proc. 6th Annual Conference of the International Functional Electrical Stimulation Society*, (Cleveland, USA), pp. 232-234, 2001.

2

T. Schauer, K. J. Hunt, M. H. Fraser, W. Stewart, and F. Previdi, "Identification of a Biomechanical System using Neural Networks," in *Proc. of the IFAC Workshop on Adaptation and Learning in Control and Signal Processing 2001*, (Como, Italy), August 2001.

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T. Schauer, K. J. Hunt, N.-O. Negård, M. H. Fraser, and W. Stewart, "Regelung der Trittggeschwindigkeit beim Liegedreiradfahren von Querschnittsgelähmten," in *Proc. Automed'01*, (Bochum, Germany), September 2001.

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H. Gollee, K. J. Hunt, S. Coupaud, A. N. McLean, and M. H. Fraser, "An apparatus for FES-assisted arm-cranking exercise in tetraplegia," in *Proc. 7th Annual Conference of the International Functional Electrical Stimulation Society*, (Ljubljana, Slovenia), 2002.

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K. J. Hunt, T. Schauer, N.-O. Negård, W. Stewart, and M. H. Fraser, "A pilot study of lower-limb FES cycling in paraplegia," in *Proc. 7th Ann. Conf. Int. Functional Electrical Stimulation Society*, (Ljubljana, Slovenia), 2002.

6

K. J. Hunt, B. Stone, N. Negård, T. Schauer, and M. H. Fraser, "FES cycling with electric motor assist," in *Proc. 1st FESnet Conference* (K. J. Hunt and M. Granat, eds.), (Glasgow, UK), pp. 7-9, September 2002. *

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S. Coupaud, H. Gollee, K. J. Hunt, A. N. McLean, and M. H. Fraser, "Physiological assessment of FES-assisted arm cranking exercise," in *Proc. 1st FESnet Conference* (K. J. Hunt and M. Granat, eds.), (Glasgow, UK), September 2002.

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H. Gollee, S. Coupaud, KJ Hunt, DB Allan, MH Fraser, AN McLean "Autonomic electrical stimulation of abdominal muscles to increase tidal volume and cough peak flow rates in tetraplegia" *43rd Annual Scientific Meeting ISCoS Athens Sept 2004*

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- 13 Gollee H, Coupaud S, Hunt KJ, Fraser MH, McLean AN. "Electrical stimulation of abdominal muscles increases tidal volume and cough peak flow rates in tetraplegia". Presented at *Scottish Thoracic Society*, Winter Meeting 2003
- 14 Joseph G, Jigajinni MV, Johnston RA, Fraser MH, McLean AN. "Delayed presentation and diagnosis of cervical; injuries in ankylosing spondylitis". Presented at *Britspine 2004* Nottingham, UK.

7.13 Pain Management

The introduction of two consultant anaesthetist has resulted in a review of pain management within the unit. This will include immediate care, postoperative issues and neuropathic pain. A multidisciplinary Pain Interest Group has been set up to coordinate changes in current systems.

Activity is now being monitored. In-patient and outpatient consultations are steadily increasing. There is an increasing demand for interventional procedures and analgesic pump implantations. A outcome assessment is planed to measure the efficacy of new treatments.

7.14 Paramedical staffing

A spinal rehabilitation unit requires a flexible approach for paramedical staff based on the needs of the patients.

Occupational therapy is receiving excellent support through Momentum in the development of assistive technology.

A clinical scientist is being appointed to support research with FES and exercise training. This will be funded from grants and charitable donations.

Various models were investigated to support the Physiotherapy service. The generic worker model and auxiliary support is seen as insufficient for the demands of the service. A physiotherapy technical instructor is seen as the best way to develop the service. It is hoped that this will be funded in the coming year.

Some consideration will need to be given as to how the unit can support recreational and sporting activities for in and out patients. A senior physiotherapist with a remit nationally to develop sporting excellence could be considered, Other options include a sports physiologist or trainer/nutritionist. At present there are excellent facilities within Glasgow for para-sports but the opportunities are less well developed elsewhere.

7.0 Summary and Conclusions

Over the last twelve years the aim of the unit has focussed on providing the best possible care for those people in Scotland who suffer a spinal cord injury. Spinal Cord Injury remains one of the most devastating injuries that can be sustained. Untreated it is invariably fatal within a short period of time. With appropriate medical and nursing care life expectancy is near normal. Spinal fractures without neurological damage can be a source of disability and deformity. Appropriate treatment minimises both and allows early return to work and family.

In 2003-04 the unit had its highest number of referrals and admissions. Despite this workload there were significant improvements in the service provided. This was totally dependant on the dedication of all the staff working in the unit.

The success of the unit remains a testament to the original design and its continued funding as a national service. The unit constantly seeks peer group review and external audit. It is inevitable that we have to look to Europe and the Americas to assess our progress and for future developments.

Prevention of primary and secondary injury remains a priority. The number of Road Traffic Accidents has fallen steadily and unusually for a spinal injuries unit falls from a height are the commonest cause in Scotland for admission. Industrial injuries are now rarely seen due to a combination of preventive measures, the lack of a heavy manufacturing base and the end of mining. Some concern must be expressed by the increase in leisure related accidents many could be prevented. In the lack of a definitive treatment regime prevention must be emphasised.

The unit is focussed on providing a national service and aims to mitigating in any way the difficulties faced by patients and relatives who have to travel for the acute treatment and long term follow up. Clinical review and education is taken around the country to minimise unnecessary travel wherever possible.

No one can be satisfied with the ultimate outcome in most traumatic paralysis. The Unit remains fully committed to leading and participating in many research initiatives in the basic sciences and applied sciences.

The Unit is heavily dependant on the staff, voluntary bodies and the wider community to deliver a service. The contribution of all is gratefully acknowledged.

An outline of the achievements and activities of the many departments in the unit is given in the Appendices.

Appropriate thanks must be given to the National Services Division and the South Glasgow University Hospitals NHS Trust for their help and support in delivering the service.

Mr. D.B. Allan FRCS
Consultant Orthopaedic Surgeon
Director, National Spinal Injuries Unit

Appendix A	Physiotherapy Report
Appendix B	Occupational Therapy Report
Appendix C	Momentum Report
Appendix D	Spinal Injuries Scotland Report
Appendix E	Social Work Report
Appendix F	Psychology Report
Appendix G	Social Work Report

Appendix H	Raw Data
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DA1	New Admissions
DA2	New Admissions by Case mix Complexity
DA3	New Admissions by Health Board of Residence
DA4	New Admissions by Health Board compared with Population Size
DA5	New Admissions by Degree of Injury
DA6	Discharges by Degree of Injury
DA7	Admissions and Discharges for Non Traumatic Spinal Cord Injury (ICD 9 Code 952) by aetiology
DA8	Day case Attendances by Health Board
DA9	New Admissions by Age Group
DA10	Age & Sex of New Patients by Category of Injury Female Patients 1999/2000
DA11	Age & Sex of New Patients by Category of Injury Male Patients 1999/2000
DA12	Age & Sex of New Patients by Category of Injury All Patients 1999/2000
DA13	Length of Stay for Traumatic Injury by level of Spinal Cord Lesion
DA14	All Discharges
DA15	Discharges by Case mix Complexity
DA16	Discharges by ASIA Impairment Level & Health Board
DA17	Discharges by ASIA impairment Level and Health Board
DA18	Delay between actual and intended date of discharge
DA19	Time to admission
DA20	Ventilated bed days

APPENDIX A PHYSIOTHERAPY

Service Aim.

The QENSIU is the only specialist spinal injuries unit in Scotland and as such serves the entire population of Scotland. As a national service it is currently funded directly by the Scottish Executive.

The unit consists of three ward areas: Edenhall the acute admitting ward with 12 high dependency beds, Respiratory Care Unit with 4 beds for domiciliary ventilator dependent patients and 2 beds for high level tetraplegic patients, and Philipshill ward with 32 beds for rehabilitation patients. Occasionally a few of these beds are used to readmit patients with post discharge complications.

The physiotherapy service to the Q.E.N.S.I.U. is provided by the Physiotherapy Department of the South Glasgow University Hospital NHS Trust.

Staffing Levels:

Jon Hasler MPhil MCSP Superintendent Lead Clinical Specialist.
Vivian Smillie MCSP and William Stewart MCSP (Senior 1)
Sandra Forrest MCSP (Senior 11)

Nine month rotating Senior 11 post:
Johanne Wilson MCSP (April 03 to Nov 03)
Melanie Fraser MCSP (Nov 03 to present)

Four month rotating Staff grade posts:
Susan King MCSP and Karen Marshall MCSP. (Feb 02 to May 03).
Kirsty Stewart MCSP and Jamie McCahill MCSP. (June 03 to Sept 03).
Lisa Hobson MCSP and Roddy Sheridan MCSP (Oct 03 to Jan 04).
Claire Griffen MCSP and Nicola Bentley MCSP (Feb 04 to May 04).

When comparing this level of staffing, for 48 beds, with the other eleven British spinal injuries units it is seen that we currently hold the worst patient to physiotherapist ratio of all the units at 6.8 patients/physiotherapist [range 4.2/physio- 6.8/physio].

Our four permanent physiotherapists provide an excellent base of experience and expertise having accumulated a combined total of 72 years spinal cord injury rehabilitation. This demonstrates stability, reliability and dedication.

Service Access.

- Weekday Service Hours: 8.30am- 4.30 Mon-Thurs and 8.30-4.15 Fri.
- Weekend Service Hours: One of the SIU physiotherapists covers any work that is needed at the weekends. Once this work is completed they leave the hospital and the emergency call-out system is reverted to.
- Emergency cover:

Mon-Fri 4.30pm-8.30am via the hospital wide on-call physiotherapy service. Weekends once the SIU physiotherapist has left the hospital, usually from midday onwards until 8.30 the following morning.

Service Activity.

Breakdown of patient groups treated.

New admissions:	00 /01.	01/02.	02/03.	03/04.
<u>Neurological Deficit</u>	<u>Total</u>	<u>Total (%)</u>	<u>Total (%)</u>	<u>Total (%)</u>
Incomplete Quadraplegia	29	28 (31)	37 (40)	25 (25.5)
Incomplete Paraplegia	14	14 (15)	19 (20)	16 (16.3)
Cauda Equina lesions	3	12 (13)	9 (10)	7 (7.2)
Complete Quadraplegia	17	14 (15)	11 (12)	14 (14.3)
Complete Paraplegia	22	15 (17)	12 (13)	21 (21.4)
Monoplegia	4	5 (6)	3 (3)	4 (4)
Incomplete Others	4	2 (2)	2 (2)	11 (11.2)
<u>Neuro deficits Total:</u>	<u>93</u>	<u>90 (100)</u>	<u>93 (100)</u>	<u>98 (100)</u>
<u>No deficit/ Intact.</u>	106	74	72	103
<u>Total:</u>	<u>199</u>	<u>164</u>	<u>165</u>	<u>201</u>

Every one of these patients was seen by the physiotherapy department, the incomplete tetraplegic patients taking the most time, through to the intact patients, who are seen as appropriate, but are usually only on the unit for approximately two weeks.

Re-admitted patients.

All patients who are readmitted receive physiotherapy input if appropriate. This would be a number of times per day, in the case of a chest infection, to twice per week to maintain the range of movement in paralysed joints while the patient is on bed rest to heal a pressure sore.

Inpatient attendance's and direct patient contact treatment units.(15 minute units)

April-March	<u>00/01.</u>	<u>01/02.</u>	<u>02/03.</u>	<u>03/04.</u>
Attendance's	11592	12760	12359	12599
Units.	27470	29272	27753	29981
<u>New patients</u>	<u>190</u>	<u>164</u>	<u>165</u>	<u>201</u>
<u>Combined indirect patient contact and non patient contact units.(15 minute units).</u>				
	00/01: 10164	01/02 : 10830	02/03: 10269	03/04: 11093

Weekend cover.

To ensure the highest level of care, the spinal injury trained physiotherapists cover all the weekend work on the spinal unit. This year the work-load has been as follows:

Year.	<u>00/01.</u>	<u>01/02.</u>	<u>02/03.</u>	<u>03/04.</u>
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Attendance	903	1006	717	765
Direct units:	1839	2039	1511	1625
Indirect units:	680	754	559	601
Ave hours/wkd:	12	13	10	11

On call after 5pm.

This service is provided by the on call physiotherapists for the whole of the Southern General Hospital, and is provided as pre arranged treatments for patients with chest complaints that will deteriorate if not treated at night, and emergency call outs from a Registrar or Consultant.

During the past 2 years the figures were:

Year:	<u>02/03.</u>	<u>03/04.</u>
Attendance	<u>63</u>	<u>96</u>
Direct units	174	303
Total hours	43.5hrs	76hrs

During this past year there has been a 75% increase in out of hours work as compared to last year.

The monthly breakdown of these figure's for 02/03 and 03/04 were as follows :

	Weeknights.		Weeknights.		Weekends. (03/04)							
	Pre- arranged.		Emergency call out.		Emergency call out.							
	Attendance(A)		Units(U)		Attendance		Units.		Day.		Night.	
	02/03	03/04	02/03	03/04	02/03	03/04	02/03	03/04	A.	U.	A.	U.
April	7	6	21	16	0	4	0	9	0	0	2	9
May	3	6	7	15	1	2	2	6	0	0	7	19
June	3	4	6	8	1	3	2	9	0	0	1	2
July	0	6	0	19	0	7	0	19	0	0	1	4
Aug	0	2	0	6	0	8	0	21	0	0	0	0
Sept	1	4	4	13	1	5	2	15	0	0	3	8
Oct	0	8	0	18	0	4	0	17	0	0	4	7
Nov	0	1	0	2	3	0	6	0	0	0	0	0
Dec	1	0	2	0	3	2	7	6	0	0	0	0
Jan	3	0	6	0	8	1	25	3	0	0	0	0
Feb	0	0	0	0	0	0	0	0	0	0	1	2
Mar	3	1	6	2	6	3	27	5	0	0	0	0
<u>Total.</u>	21	38	52	99	23	39	71	110	0	0	19	51

Out Patients.

There are four types of out patient seen by the physiotherapy department. Firstly those patients continuing their rehabilitation having had an early discharge, secondly those patients returning for further rehabilitation having made some form of recovery, or deterioration. Thirdly patients requiring pain management, predominantly with acupuncture, and finally, those patients requiring a one off assessment.

Year:	<u>00/01</u>	<u>01/02</u>	<u>02/03.</u>	<u>03/04.</u>
Attendance	209.	256	90	196
Direct units	535.	611	195	648
New patients	54.	28	31	52

There has been a 332% increase in outpatient activity (units) as compared to last year with this being the busiest year to date.

We remain understaffed to treat outpatients as thoroughly as we would like to.

Education/ Training.

For most physiotherapists learning about and gaining experience in Spinal Cord Injury rehabilitation is undertaken as a postgraduate.

However to enable students to have an experience of this specialist area all the Scottish training establishments send their students to us to gain an overview of this work.

During the year we ran 4 courses here in the unit for the physiotherapy students of the following universities:

Caledonian University. Glasgow. (BSc and MSc)

Robert Gordon University. Aberdeen

Queen Margaret University. Edinburgh.

We also gave clinical supervision placements to 10 students from these universities. We also had 4 students on elective placements from a variety of other universities. These placements varied in length from 4 weeks to 8 weeks. In all a total of 56 weeks of student supervision were given in 2003/04.

All new key workers within the unit and all new SHO's were trained in the use of the Functional Independence Measure (FIM) enabling them to understand the use of this internationally recognised outcome measure and therefore to be able to participate in the units recording of our patient's FIM scores.

SHO's received lectures on the role of physiotherapy within QENSIU and on sport/recreation for SCI individuals.

Lectures were presented to the visiting Bioengineers and Prosthetics students from The University Of Strathclyde.

Our staff also lecture to patients within the patient education programme on the following topics:

- ◆ Anatomy of the spinal column/spinal cord.
- ◆ Spasm/spasticity.
- ◆ Neurogenic pain.
- ◆ Wheelchairs.
- ◆ Sport and recreation.

Finally our commitment to training our own staff continued with regular in service training both for physiotherapy staff, the multidisciplinary team, and staff from other hospitals within Scotland.

Courses attended by staff this year have included the following:

- Service Redesign.
- Moving and Handling.
- Clinical Supervision and Mentoring.
- Clinical Risk Assessment. Personal Development Planning.

- MASCIP annual conference.
- CPR.
- Motivating Clients
- Botox. “What, when, how and where”.
- FES enables exercise after SCI. Glasgow University.
- Trigger point release and muscle tone.
- Motor control and motor relearning.
- 4th SCI Respiratory information day.

Service Clinical Governance Framework.

- Clinical effectiveness.
 - Biannually the Superintendent attends the Inter-SIU Superintendent Physiotherapists meeting where exchange of current clinical effectiveness issues is undertaken. Clinical speciality standards for the management of SCI individuals are also reviewed and a number of clinical guidelines have been written and agreed across all twelve UK units.
 - Current research/development papers are sometimes reviewed during in-service training and by attending specialist conferences.
 - Individual Case Studies have been presented as part of our in-service training programme.
 - Each patient has outcome measures using the Functional Independence Measure (FIM) set at the beginning of their rehabilitation and these are monitored especially pre discharge. Newly commenced for 2003 has been the use of gait outcomes for our incomplete injuries.
- Those physiotherapists within the Southern General Hospital who use acupuncture as a treatment modality have formed an Acupuncture interest group and are reviewing practice, standards etc.
- Audit of our success in achieving the CSP Cord Standards was undertaken with a 97% (up from 89%) documented compliance rate being achieved. The main areas of weakness were mainly due to the necessary information not having been documented (ie tel no). It has been possible to increase our compliance rate due to last year’s improvement/revision of our physiotherapy assessment sheets.
- All staff have access to the library and the internet.
- Clinical Risk Management:
 - This is also discussed between the SIU’s and resulted in some of the agreed guidelines.
 - Each individual physiotherapist assesses their abilities and those of their patients. This alters as the rehabilitation process continues. This however is not formally recorded at present.

- CPD.
- Weekly in-service training within the SIU.
- SGH Physiotherapy Department in-service training monthly.
- Courses attended by staff.

Developments in 03/04.

The Superintendent has delegated specific roles to the permanent members of staff and the 9 month rotational senior 2 in addition to their patient list responsibilities:

Senior 1: Manage the hydrotherapy pools maintenance and programme its weekly use.

Organise student supervision rota for the SIU.

Undertake clinical supervision for the permanent Senior 2.

Senior 1: Organise and provide a full teaching programme for all new rotating physiotherapy staff.

Undertake clinical supervision for the rotating Senior 2.

Permanent senior 2: Ensure team undertakes routine audits.

Undertake clinical supervision for one of the juniors.

Rotational senior 2: Programme weekly sports activities.

Undertake clinical supervision for one of the juniors.

This year the Inter Spinal Injury Unit Games returned to the Ludwic Gutmann stadium in Stoke Manderville and were held during April. The team from QENSIU performed well being placed mid-table.

For the first time ever we flew the team down to Luton, with Easyjet, and this proved very successful. The cost was met by a grant from the British Wheelchair sports association.

Patient Sport/Recreation and Community Reintegration.

This year there has been a successful reinstatement of a full programme of sporting activity as a part of our weekly rehabilitation programme.

Each Thursday afternoon a rolling programme of sport has been run by a senior and junior physiotherapist. Sports tried out have ranged from archery, table tennis, basketball through to fencing for which we organised an external coach to supervise the sessions.

As proposed last year we have started putting together links with local sports/recreational resources run by both council and private/charitable organisations. This can be seen through the following activities:

- ❖ The physiotherapy staff introduced a number of patients to disability sailing with weekly midweek sailing with a local sailing club. This was only possible due to staff voluntarily giving of their own time on Wednesday evenings through the summer.
- ❖ We invited the charity Back-Up to present quarterly talks to the patients about their outward bound and skiing activity courses. These were met with great interest by most patients.
- ❖ We have gathered the names and telephone numbers of all of Scotland's disability sports and recreation development officers to enable us to contact patients own local officer alerting them of patients needs and getting information for our patients as to what is available in their location on discharge. We hope this will involve the discharged patient in activity out-with their home that will also contribute to both their future physical and emotional rehabilitation/reintegration.

- ❖ We have taken patients to the Braehead curling rink on about six occasions where they have received expert coaching from no other than one of the current wheelchair curling world champion team members.
- ❖ One of our physiotherapists voluntarily took patients to the Scotstoun sports stadium on a number of Monday evenings to introduce them to wheelchair tennis.
- ❖ We have informed patients of the charity Walking on Air who aim to introduce disabled individuals to the sport of gliding.

We would have liked to enable our patients to undertake more of these recreational/sporting activities through the year but have found it problematic to undertake a regular programme of “out of unit” activities due to the increased staffing implication trips out of the unit necessitate.

Research (03/04):

The following research projects/grant applications have received physiotherapy input/advice during the year:

- ISRT grant application. “Comprehensive evaluation of the physiological and functional adaptations induced by locomotor training in incomplete spinal cord injured subjects. University of Strathclyde.
- Mr I.M.Izzeldin’s PhD study: “Electrophysiological Assessment of CNS organisation following Incomplete SCI. University of Strathclyde.
- Paraplegic FES-walking combined with body weight support and treadmill: feasibility study.

Publications (joint authorship):

Journal Papers:

2003.

- Neil J Postans PhD, Jon P Hasler MPhil, Malcolm H Granat PhD, Douglas J Maxwell BSc. Functional Electrical Stimulation Augmented Partial Weight Bearing Support Treadmill Training for Acute Incomplete Spinal Cord Injured Patients – A pilot Study. Archives of Physical Medicine and Rehabilitation (Submitted 2003).

Future Research.

- ◆ In light of the success of the joint Physiotherapy Department/Bioengineering Department project further funding is being sought to extend the research project “FES Augmented Partial Bodyweight Support Treadmill Gait Training with Incomplete SCI Patients”. We wish to extend it over a longer period. All future funding would be for staffing as all the equipment is already in place.
- ◆ Advisory input into Glasgow Universities pilot project looking into the cardiovascular and muscle power outcomes with incomplete paraplegic subjects walking on a treadmill.

Areas for Development(2003/04):

Rehabilitation teams within spinal cord injury units have long believed that a sport, recreation and community re-entry programme is a vital part of the rehabilitation process. Assisting spinal cord injured patients to learn to deal with social and environmental barriers through excursions into the community, including sporting, recreational and social activities should be fully incorporated into our programme of rehabilitation. As in other SIU's this should be a part of the rehabilitation therapy team role.

The unit has access to suitable transport allowing access to the wider community but has found it problematic to undertake a regular programme due to the increased staffing implication trips out of the unit necessitate.

For the patients pathway through rehabilitation to be successfully completed efforts should be made to continue the process in their own local community. There is therefore a role for the team to be contacting local sports/recreational resources both council/privately run to try and involve the discharged patient in activity out with their home that will also contribute to both their future physical and emotional rehabilitation/reintegration.

In the year ahead we will make a concerted effort to reinstate a full programme of sporting activity within the physiotherapy departments activities.

Moving research into clinical practice.

❖ Partial Body Weight Treadmill Gait Training.

As reported last year this was a highly successful area of research during 2002/3. For each patient session, of approx 1 hour, to be successfully and safely undertaken it required dedicated input from at least 2 physiotherapy team members.

With the increasing number of incomplete SCI individuals coming through the unit each year, a 14% increase in 2002/03, it would require a staffing increase to enable us to integrate this into the rehabilitation programme of all the incomplete SCI patients. As we did not have a staff increase last year we have been unable to integrate this treatment approach into every incomplete patients programme. This still remains an area for service development.

❖ Upper and lower limb FES cycling programmes.

Currently these 2 research projects are on going but it is proposed that if the results are favourable that this work would become integrated into the physiotherapy rehabilitation programmes of both paraplegic and tetraplegic patients.

Meanwhile more emphasis on non-FES cardiopulmonary fitness programmes could be developed along side the development of sport/recreation/reintegration programmes.

Future Staffing Requirements/Developments:

Technical grade:

The staffing required to undertake these developments could be addressed by the appointment of physiotherapy technical instructors.

The reason for seeking technical instructors over assistants is due to the need to seek individuals with HNC/SVQ qualifications in the areas of exercise/sport/recreation sciences. These individuals would then be able to work with a higher level of independence than an assistant would be able to in the areas identified as needing increased input.

The pay scale of technical grade 2 (lowest band) is £13,310 rising to £13,710 for a grade 3 (prior to AfC).

Such appointees would also be able to assist with the following activities enable current qualified staff to increase their time spent with one on one patient session, clinics, small research projects, audit etc:

- With the increasing number of incomplete patients we see, who are requiring pre-gait and gait training, there is an increasing need for the assistance of another person to be involved per treatment session. The technical instructor could be this person.
- In taking group sessions.
- Clerical administrative activities.
- Maintenance/cleaning of equipment.
- Accompanying out of hospital activities.
- Assisting in the hydrotherapy pool(in the water) thereby enabling an increase in usage.
- Undertaking maintenance stretches/exercises for long term and re-admission bed patients.

All of these activities would give the current staff more time to develop input to specific projects such as spasticity management via Botox and physiotherapy, recreational out of unit activities, collaborative and within department research projects etc.

Senior physiotherapist:

To develop the service to patients attending the Out-Reach Clinic's across Scotland including those clinics held at QENSIU.

With the increased number of regional out-reach clinics there have been an increasing number of physiotherapy related issues coming to our attention that need to be dealt with after the team return from the clinics and request our input. This inherently means the issue takes longer to deal with than it would do if the patient had actually been seen by a physiotherapist at the clinic. The fact that there is no physiotherapy input at the clinics also means that there is now less and less follow-up, within the first year of discharge, of patients than was the case when they came to the QENSIU for their 6 week/6 month follow-up appointments.

Since the introduction of the Functional Independence Measure (FIM), as the units primary outcome measure, we have never managed to follow up our patients progress/deterioration in function post discharge. This could clearly be a role for a clinic physiotherapist.

With the increasing SCI population growing older each year the number of spinal/limb degenerative wear and tear problems that patients are reporting at reviews is increasing. The out-patient Occupational Therapist has specifically identified this as an issues. She is regularly asked, by patients, to help them with such problems, but feels these are issues a physiotherapist should deal with. This certainly would improve the quality of care provided. This will continue to be a gap in the service we provide unless time/resources can be allocated to address these issues.

Such a physiotherapist would develop the role to meet the following needs:

- ❖ *Discuss/guide local physiotherapists in continued physiotherapy input for recently d/c patients.*
- ❖ *START collecting follow-up FIM scores for patients thus identifying improvements/deterioration's in function and with local resources devising possible ways of optimising function.*
- ❖ *There is little emphasis, in the current clinics, on assessing neurological changes, joint range of motion/contracture development, physical methods of managing spasticity and preventative interventions to minimise future problems. Such assessments of patients developing problems could allow appropriate interventions to be devised and discuss with local teams. This could reduce/minimise future problems. These issues could be taken on by a physiotherapist.*
- ❖ *Assessment of our growing number of incomplete patients could well assist in maximising continued recovery post discharge. It could also draw the teams attention to deterioration in function in the longer standing individuals. This is particularly true in the area of gait pattern changes. This was highlighted at the Inverness clinic in April this year where three of the*

patients were incomplete walkers all of whom had gait problems all relating to orthotic problems and two also to tone with the development of bad gait habits. Immediate discussion, by the physiotherapist, with the on site orthotist will have moved reviews closer much more quickly for the patients.

- ❖ *Liasing with local council sport/recreation officers to encourage discharged patients to continue rehabilitation/reintegration following discharge but out with the NHS.*
- ❖ *Respiratory function reviews in long standing high level tetraplegic patients to try and prevent/minimise respiratory problems.*

Respiratory Physiotherapist

As the role of Dr A McLean our Consultant, and his interest in the respiratory management of high tetraplegic patient develops, and the Domiciliary Ventilation Service continues to develop, we need to increase/review our respiratory skills. This would ensure that the breadth of physiotherapy input these patients could benefit from is achieved. This would also be true of the increasing number of short-term ventilated patients, and tracheostomy patients that the unit is now treating.

Most spinal injuries units within the UK that treat ventilated/tracheotomy patients now have a physiotherapist leading the work with this group of patients.

It is true that we have increased the number of anaesthetic sessions but more time could be spent with patients, one on one, to wean them off the ventilator or from their tracheotomy. In many other speciality areas speech and language therapists and physiotherapists work together to increase time spent with patients easing the weaning process along more quickly. This could again be addressed by current physiotherapist having more time to give the one on one time required. By allocating patient input to the technical assistants, when necessary, this time could be found.

APPENDIX B DEPARTMENT OF OCCUPATIONAL THERAPY

SERVICE AIM STATEMENT

To provide an effective Occupational Therapy service that will minimise disability, maximise independence and maintain health in the Spinal Injured of Scotland.

This is achieved through assessment, treatment and evaluation.

SERVICE FUNCTION STATEMENT

Occupational Therapy aims to

- Assist the recovery or rehabilitation of
 - Functional skills
 - Educational skills
 - Vocational skills
 - Social skills

This is to enable the individual to be maintained in the community or care environment at their maximum potential.

- Provide advice and support to carers and other agencies supporting the spinal injured.

The team of Occupational Therapists strive to:

- Achieve the maximum level of service within allocated resources
- Maintain a sound level of clinical expertise and excellence through skill sharing and education.

ASSESSMENT

- Activities of Daily Living
- Hand Function
- Seating
- Home Environment
- Work Environment
- School
- Community Skills
- Lifestyle/Leisure
- Keyworker/Needs assessment
- Driving assessment screening (informal)
- Power wheelchair control needs
- Pre and post-op assessment in tendon transfer surgery

TREATMENT

- Self-care skills
- Domestic skills
- Vocational skills
- Hand and upper limb function/remedial activity
- Orthotics
- Communication skills
- Functional mobility

- Family/carer training
- Education
- Neuro-control follow-up
- Tendon transfer post-op training
- Mouthstick training
- Environmental Control Unit training
- Assistive technology advice
- Adaptation of equipment
- Prescription/recommendation of aids and equipment

EVALUATION

- FIM scale
- Ongoing functional evaluation
- Standardised patient focused outcome measure for occupational therapy currently being piloted

SERVICE SPECIALITIES

- Seating assessment with specific attention to the special needs of the spinal injured. This includes posture control in high level tetraplegia and pressure sore prevention with the use of a pressure reading monitor. Joint sessions with bio-engineers are arranged when necessary.
- Splinting the tetraplegic hand and fabrication of splints to aid specific functions e.g. writing, shaving.
- Patient Education: Skin care/pressure sore prevention in ADL
 - Community resources
 - Cushion care
 - Recreation and leisure
- Environmental control unit and assessment for switch selection
- Mouthstick training
- Home assessment training and recommendations for alteration to home or for rehousing, depending on the needs of patients and family
- Equipment: assessment of patients needs with regard to specialist aids and equipment required to aid function
- Adaptation of equipment and aids
- Workplace and work skills assessment
- Unique information service for patient, carers and staff
- Pre and post-op assessment and treatment in tendon transfer surgery.

SERVICE ACCESS

Service hours: Monday - Friday , 8.30 - 16.30 (Fri 16.15)

System of referral: Blanket

Location: Based within the Queen Elizabeth National Spinal Injury Unit, a comprehensive Occupational Therapy Service is provided to the Spinal Injured of Scotland.

Within the unit there are 48 beds, 12 of which are designated High Dependency, 6 are within the Respiratory Care Unit and 30 are rehabilitation beds.

In keeping with the Spinal Unit's life-long care policy, the Occupational Therapy Service is extended to outpatients and home follow-up. The unit open door policy is also adhered to.

A holistic, multi-disciplinary team approach is adopted by the QENSIU

STAFFING

All staff are well motivated, cohesive and committed to high quality patient care

Advice and expertise is often called upon by other Occupational Therapists and health care workers based in both hospitals and in the community

The service is staffed by 4.75 WTE –

The Head Occupational Therapist is responsible for

- the day to day management of the National Spinal Service
- Development of the Assistive Technology Service
- staff supervision and development
- clinical caseload
- Caseload allocation
- Administration and statistical collation
- Fieldwork Educator
- Line management of the Senior 1 staff within the Rehabilitation Directorate
- The Head OT is responsible to the
- Clinical Director of the Spinal Injury Unit
- OT Manager

Senior 1 x 0.75 WTE - out-patient service - is responsible for,

- assessment and treatment to the out-patient population of spinal cord injured. This service includes follow-up, annual review of needs and function and care for those re-admitted to the unit with complications associated with SCI
- overseeing OT input to satellite clinics
- Patients contacting the service on the open door policy
- development and administration of out-patient service

Senior 1 x 0.5 WTE - (Hand Therapist) - is responsible for,

- co-ordination of all spinal unit upper limb assessment and treatment
- identification of patients who would benefit from or be suitable candidates for tendon transfer surgery
- Hand Service development
- Supervision of the Occupational Therapy Assistant

Senior 1 (in-patients) (new post) is responsible for,

- assessment, treatment and rehabilitation of newly injured patients.
- Supervision of Senior II
- Fieldwork educator
- Other duties as assigned by the Head OT

Senior 11 is responsible for,

- Assessment, treatment and rehabilitation of newly injured patients.
- Other duties as assigned by the Head OT

Occupational Therapy Assistance x 0.5 WTE is responsible for

- carrying out assigned patient treatment under the direction of a qualified member of staff
- various clerical, administration and other duties as assigned

All team members provide training for professional under-graduate and post graduate training to students from various health care professions

Subsequent to funding for development of an Assistive Technology Service a Senior I was employed mid-May following national advertising.

This was an internal candidate whose successful application left a Senior II vacancy.

Fully staffed – end August

The additional member of staff has allowed a review of the service and development as noted in the relevant chapters in this report. It has also enabled the department to deal with the increase in in-patient throughput

Analysis of skill mix confirmed the expectation that the most appropriate use of skills would result in the following division of duties.

Division of duties

Head OT

AT service development 60%

Clinical case load 20%

Dept/service duties 20%

Sen I

AT service development 25%

Clinical 55%

Dept/service duties 20%

Sen II

AT service development 15%

Clinical 75%

Other 10%

This will ensure:

- there is opportunity for staff development,
- reduced likelihood of skills/service being lost if staff move on
- No de-skilling of staff who take on sole responsibility of such a specialism

SERVICE ACTIVITY

Following guidelines from ISD the system of statistic collation changed in July 2002. The statistics are not comparable with the previous year.

STATISTICS FOR July 2002 to April 2003

	Units	New	Returns
In-patients	6421	168	2203
Out-patients	1344	289	160
Hands (In- pt)	2662		2178
Hands (Out-pt)	278	5	151

Home visits	301	17	13
Total	11006	479	4705

STATISTICS FOR April 2003 – Mar 2004

	Units	New	Returns
Inpatients	8159	201	3386
Out-patients	2016	495	192
Hands (In- pt)	3942	N/A	2952
Hands (Out-pt)	339	3	142
Home visits	784	N/A	99
Total	15240	699	6771

Each unit relates to 15 minutes of time staff spend in patient related activity.

The total sickness absence for the year was 13 days. This is equal to 1.2% sickness absence.

TEACHING AND TRAINING ACTIVITY

At the National Spinal Injury Unit all qualified staff are heavily involved in education and training of patients, relatives, carers, other health care professionals, lecturing at workshops/courses and to OT and PT students at the universities

Lectures/presentations this year:

- Organised and hosted the Interspinal unit Posture and Seating Annual Meeting
- Bio-engineering students
- Edinburgh therapy students
- Prosthetic students
- SHO – FIM training, posture and seating, role of OT with Spinal Injured, splinting
- New nursing staff – outcome potentials
- Lecture to Philippine nurses on role of OT
- Co-ordination of OT in-house in-service training sessions on various topics including Alcohol dependency service, Gleneagles mobility vehicles, “Breaking bad news”, Respiratory specialist nurse etc

Courses attended by staff:

- All staff have attended a variety of in-Trust courses on IT skills, eg PDP reviewer/reviewee course, Powerpoint, Access, Word Basic, Use of internet.
- Team building Day
- Specialist Splinting Class for Tetraplegia
- Clinical Risk assessment
- Memory course
- Evidence based practice study day
- Clinical reasoning for splinting
- Guttman Lectures
- Botox training
- Scottish seating and Wheelchair conference
- Care Aims course
- AMPS OT seminar
- Visit to Woodrow Wilson Rehabilitation Centre, Virginia, USA

CLINICAL GOVERNANCE ACTIVITY

- OT is represented at each spinal unit Clinical Governance meeting
- The OT Journal Club is now well established. It is focused on critical appraisal; topics.
- As with all OT departments all staff have annual review of their Personal/Professional Development Plan. This reviews their strengths, objectives and training needs.
- All staff have full access to the library facilities here and at GCU.
- All are encouraged to attend the OT in-service programme.
- The Occupational Therapy Department within the Trust now has regular Clinical Effectiveness Meetings at which the Spinal Unit staff play an active part
- Within the Spinal Unit there are monthly audit meetings where staff present projects they are working on. Also all staff have access to the training budget as per department policy.
- There are bi-annual Spinal Unit OT and PT Heads of Department meetings where the Heads of the UK Spinal Units meet to discuss issues related to service provision and development. Every attempt is made to attend these.
- Staff are encouraged to attend the annual MASCIP and Guttman lectures which are held in one of the spinal units, on rotation. Due to staffing levels only one member of staff can attend and this depends on costs.
- Further clinical governance activity is noted under the heading of “achievements and developments”

ACHEIVEMENTS/DEVELOPMENTS

- Project with Scottish Wheelchair and seating group is investigating the effectiveness of a Visual Analogue Scale as a clinical tool in posture and seating
- Senior IOT (out-patients) is involved in a committee which will be submitting a review title and aims to become a recognized Cochrane reviewer
- Audit report completed on the 2002 – 2003 pressure sore audit and presented to nursing and medical staff
- Contributed to organization of the patient’s refresher day in Inverness
- Represented the South Glasgow South Trust OT Dept in the Joint Futures Occupational Therapy Working Party for Equipment and Adaptations
- Supported 9 patient team to inter-spinal unit games at Stoke Mandeville

With the availability of an additional member of staff, the opportunity has been taken to develop several projects that had long been required but not addressed due to pressure of work. These projects were necessary to ensure the service had a strong base on which to continue developing and primarily to develop the skill mix, staff confidence, resources and relationships upon which to develop the IT/AT project

- OT policies and procedures manual revised and completely updated. Review due September 2004
- Involved in development of national OT guidelines for practice in Spinal Cord Injury. Currently devising audit proforma to allow review standards. This is a collaborative project with other spinal units in the UK
- Literature review of Outcome Measures for Occupational Therapy. This extensive work has resulted in identification of an Outcome measure that could potentially be used within the service. Training of the OT staff and a mini pilot has recently been initiated. It is anticipated that, if this proves effective, evidence of Occupational Therapy benefit and outcome can be established.
- Occupational Therapy Documentation standards established and audited in May 2003 with repeat audit May 2003 . The results showed a 57% compliance rate in April and 90% compliance rate in October. A significant improvement in quality. The audit will continue to be completed on a 6 monthly basis in an attempt to monitor and maintain standards
- A comprehensive training programme of training for OT Senior I and Senior II staff was undertaken to enhance in-house skills. This was a vital part of the re-deployment of duties subsequent to the development of the IT/AT post
- Organisational review of the hand therapy service. As a result some changes have been made to the documentation and service delivery. This is now underway and early indications are that the service is more efficient and patient centred
- Audit completed of
 - Patient perspective of compliance in wearing upper limb splints
 - Patient perspective on reasons for splinting
 - Nursing staffs perception on the reason for splinting
 - Nursing staff perception of effectiveness of communication re: patient splint wearing regime and how this can be improved

It is anticipated that the results of this audit will be presented to the June Spinal Unit Clinical Governance Meeting with proposals on improving communication and compliance. The audit will then be repeated to evaluate the effectiveness of the changes made. It is proposed that the results of this project will be submitted for publication.

- Systematic review “The effects of orthosis in managing increased tone in the upper limb.” This was reviewed in a systematic format. The result of the review was that there was no statistically significant evidence to prove or disprove effectiveness. The outcome of a Cochrane systematic review on the same topic is now awaited. It is anticipated that gaps in

research will be identified and we hope to use this in developing a research proposal for grant funding.

ASSISTIVE TECHNOLOGY SERVICE UPDATE

Refer to “Staffing “ chapter for details on staff deployment

With forward planning, the caseload has been divided in such a way that the majority of the Head III caseload is those with higher level injuries who will benefit from use of technology

- To enable the service development a period of intense staff training was established. This ensured the new senior staff would have a comprehensive baseline of knowledge and skills. This initial phase is now complete
- At the same time the opportunity was taken to review the hand therapy service. As a result some changes have been made to the documentation and service delivery. This is now underway and early indications are that the service is more efficient and patient centred.
- Set-up basic ECU work station/demo area. This is to be enlarged
- Initiated collation of literature related to ECU/assistive technology
- Initiated collation of literature related to ECU/assistive technology outcome measures
- Initiated collation of nationwide network of medical officers responsible for ECU provision
- Catalogued all equipment currently within the Spinal Unit
- Met with Greater Glasgow ECU service and West of Scotland wheelchair service and initiated discussions re:
 1. how best to increase efficiency of powerchair /ECU assessment, training and provision.
 2. ensuring compatibility of ECU, powerchair and electronic assistive technology installed in the home via social work dept.
- Initiated contact with Strathclyde University and proposals have been discussed re several potential research and development projects
- Attended Wales International Conference on Electronic Assistive Technology
 - Established up to date catalogue of electronic Assistive technology commonly used
 - Established network of contacts
- Visited Woodrow Wilson Rehabilitation Service, Virginia USA (self-funded). This highlighted the advanced status the QENSIU has already achieved in terms of internationally competitive levels of skill and resource.
- Initiated collation of data related to AT sources available via retail outlets. It is planned that a demonstration/training area will be established

Other on-going activity

- Introduce patients to ECU on ward
- Tracking of equipment on ward
- Training nursing staff re: use of any equipment on the ward
- Computer access technology - investigate funding & training?
- Identification of switches for use with ECU, powerchair and computers
- Positioning of switches for use from chair and bed
- Use of mobile arm supports in powerchair control and feeding etc
- Funding of MAS?
- Development of documentation system
- Development of review system for outcome measurement/patient satisfaction
- Liaison with employment and educational authorities as appropriate
- Liaison with other Spinal Units re: potential inter – unit projects

ASSISTIVE TECHNOLOGY SERVICE - FURTHER WORK PLANNED

- Enlarge work station/demo area.
- Review collated literature related to ECU/assistive technology. Identify potential research topic
- Review collated literature related to ECU/assistive technology outcome measures. Identify potential research topic
- Continue liaison with Greater Glasgow ECU service and West of Scotland wheelchair service and initiated discussions re:
 - how best to increase efficiency of powerchair /ECU assessment, training and provision.
 - ensuring compatibility of ECU, powerchair and electronic assistive technology installed in the home via social work dept.
- Progress work with Strathclyde University and develop research proposals for.
 - Virtual reality home assessment
 - Orthoses for central cord patients
 - Page turner
- Identify further funding and facilities for access to computer technology

- Resource implications/considerations
- Space
- Finance for equipment, travel
- Training of staff

OCCUPATIONAL THERAPY FUTURE PLAN 2004-2006

- **Complete project with Scottish Wheelchair and Seating Group** which is investigating the effectiveness of a Visual Analogue Scale as a clinical tool in posture and seating
- Senior I OT (out-patients) will be submitting a review title and aims to become a recognized **Cochrane reviewer**
- First **audit of national OT guidelines** for practice in Spinal Cord Injury
- **Carry out pilot of Outcome Measure** for Occupational Therapy with the aim of demonstrating Occupational Therapy benefit and outcome
 - Revise communication system re: splint wearing regime on ward based on outcome of previous audit. Re-audit to establish any benefit
- **Systematic review** “The effects of orthosis in managing increased tone in the upper limb.” The result of the review was that there was no statistically significant evidence to prove or disprove effectiveness. The outcome of a Cochrane review on the same topic is now awaited. It is anticipated that gaps in research will be identified and we hope to use this in developing a research proposal for grant funding.
- **Splinting** – a considerable amount of staff time is spent on manufacturing splints. It is proposed that a trial of pre-fabricated splints be carried out. This potentially will ease the pressure of work on the hand therapist. This has a cost implication for the appliances budget

PROPOSED DEVELOPMENTS

Out patient service

As the out-patient numbers continue to grow along with the number of out-reach clinics, the demand on the out-patient services have increased. Interventions are reactive and little time can be invested in re-evaluating the aging population in a planned way in an attempt to prevent deterioration in function and enhance quality of life. A reduced amount of time is also being spent on individuals as they attend the out-patient clinic.

Due to demand there is an inconsistency of service provision between patients that are seen here and at outreach clinics which the OT, currently cannot always attend. Conversely, when the therapist is at outreach clinics or on visits, patients are not seen at the unit's out-patient clinic at the time of attendance. They therefore do not receive the standard review. If they require the input of an OT, they either need to return to the clinic again, or a home visit may be required. This creates a backlog. Statistics over the years continue to show an increase in the number of new patients to the service. Figures have risen from approximately 25 – 30 new episodes of OT intervention per month to 41 this last year. To maintain a quality and nationally consistent service consideration should be given to the staffing level

It should also be noted that, as the therapist's expertise is increasingly acknowledged, demands for input into various projects continue to increase

The use of the specialist pressure mapping equipment is also in demand, eg. The department has been approached by Kings College re: a research project in which involvement would be advantageous to the service in marketing our expertise and providing cross service research

Hand therapy service

The hand therapist was invited by the hand surgeon to attend the monthly held clinic as there was a perceived need for OT intervention. Initially this was on consultancy basis and as it was linked with the neuro-implant work, it was felt to be a priority. However there is a now a continuing demand for a joint OT/surgeon clinic.

The need for Occupational Therapy pre and post operative assessment and treatment is directly related to surgical intervention. Demand for the service has also increased in line with the hand surgeons work in tendon transfer surgery.

As the number of incomplete injuries increase there also appears to be an increasing need for splint review and provision as the needs of the patient continue to change.

The following is a copy of the out-patient hand therapy waiting list. Since the inception of the waiting list the waiting time and patient numbers continues to grow monthly. The Outpatient hand therapy service has not been funded and is currently carried out on an ad-hoc basis. The hand therapist time spent in out-patient care is lost to the in-patient service for which the post is funded and impacts on the service.

The figures demonstrate how the waiting list is already growing

2004	Usual urgent waiting time offered to patient (weeks)	Usual routine waiting time offered to patient (weeks)	Longest waiting time offered to patient (weeks)	Number of patients waiting (weeks)
FEB	2	4	8	6
MAR	1	2	4	7
APR	2	4	6	9
MAY	4	6	8	12

The needs of the out-patient re: number of sessions and length of session can vary considerably dependent on need. In some cases eg splint review, a one hour session is adequate. For a post surgical patient, intervention can be required weekly – one hour, for three months.

Due to the demands of the service, involvement in inter-spinal research and development has not been feasible. There is much scope for research, audit and development of an evidence base for practice. However, the high level of constant clinical demand means little attention has been given to what is recognized as being a vital part of service provision and development.

Augmented funding to increase the current hand therapy service hours is required. This will allow appropriate service to the out-patient sector without draining the in-patient service.

APPENDIX C Momentum (Rehab Scotland)

Momentum



Input to the Queen Elizabeth National Spinal Injury Unit Annual Report

Period: April 2003 to March 2004

The aims of the Momentum service to the National Spinal Injuries Unit are: -

- To work with the Spinal Injury Unit therapy and nursing departments in promoting independence and inclusion for all spinal cord injury patients.
- To introduce computers and their possibilities to patients for use in leisure, communication, training, education and employment.
- To encourage and develop patient skills and initiatives, using assistive computer technology.
- To provide a technical assessment service for patients to access computers and training facilities.

Introduction

In 1993 Momentum, (formally Rehab - Scotland) started a pioneering assistive technology based rehabilitation service; it is a fully integrated function of the Unit.

This service is funded by Glasgow City Social Work Department under a Section 10 Grant to voluntary organisations.

Momentum operates a number of separately funded pan disability services throughout Scotland. (For Example: the partnership with Glasgow City Council). Where appropriate, our service at the National Spinal Injuries Unit is able to utilise those services to meet the local needs of patients after discharge.

The focus of the service provides social and occupational rehabilitation programmes through the provision of adaptive and assistive technology. The service is person centred and has a number of underlying principles; needs led, flexible and holistic which integrate with the multi-disciplinary rehabilitation approach of the unit.

While in the unit, and early in recovery, patients are able to gain an insight into their potential for employment or other constructive activities within their own community.

The organisation provides a service that delivers a menu of options delivered within a Best Value framework. The key elements include:

- 1) Starting with an initial consultation to appreciate the patient's physical capabilities. An assessment is performed in conjunction with Unit therapists. The objective is to identify

appropriate A/T suitable to meet the patient's needs and also pinpoint the right place to locate switches, should they be required.

- 2) Primary goals are exploration and A/T rehabilitation based activities. It has to be recognised that therapy and pre vocational goals are set in conjunction with the Unit multidisciplinary approach
- 3) Many patients are uninformed about the value of computers in rebuilding their lives! Part of the service includes exploratory sessions, designed to discover that using assistive technology can make access to home computing possible.
- 4) For those using speech recognition, training may be "teaching" the computer how they pronounce words and to learn the appropriate commands.
- 5) For those with a requirement for headset technology, with keyboards pictured as icons on the screen, the need is to learn the commands, and practice head movement, for selecting characters and mouse commands by dwelling on an icon, or by single switch operation.
- 6) With the support of adaptive technology. E-Mail communication and exploration of the Internet are popular items on our agenda. This is particularly important for the social inclusion for patients from the more remote areas of Scotland, enabling them to keep in touch with family, employers and relatives back home.
- 7) For people retaining employment or university courses the project works closely with employers and agencies to ensure the correct assistive technology devices a prescribed. Carers and family are also given much needed support
- 8) The tangible results for patients participating in the service are: -
 - a. More constructive use of leisure time, environmental and vocational independence i.e. Pre-vocational skills, employment support, social integration and peer involvement to prevent social exclusion.
 - b. Improved competency and confidence in using technology to reduce barriers and increase flexibility and adaptability, thereby reducing discrimination.
 - c. As a result of working with computers and assistive technology, Momentum make a significant contribution in improving patients work tolerance, volition, general endurance, self esteem and self worth of patients.

Developments during 2003 / 2004

Outreach Programme

During 2003 Momentum was awarded Section 16b funding to extend our Unit based service to cater for the needs of patients after discharge from the unit. An Outreach programme has been developed and places, on a more positive footing, a service to people in the community that previously has only been available from Momentum on an Ad Hoc basis. In remote areas of Scotland, due to travel costs, this facility has just not been available.

Mr Garry Ryan has joined us in the role of Outreach Worker. Due to space, Mr Ryan is based at our Head Office at Intercity House 80 Oswald Street, Glasgow.

The aims are:

- To further help patients achieve a higher level of independence, for example, on line shopping, leisure activities and electronic communication.
- Provide technical help and advice to patients, their family, carers and employers on the selection and use of appropriate assistive technology.
- Provide independent advice on the most suitable route to take to obtain recognised qualifications for employment and / or Further Education.

Patient Internet and E Mail Wireless Network

For many years it has been recognised that the delivery of a hospital based service, such as this, requires the capability to provide technology at the bedside. Frequently patients are computer literate with their own laptops and have a requirement to perform tasks for personal or business use.

With the help of a patient's relative running in a 10 Kilometre sponsored run and also a donation from the Abbey Bank we have been able to install a Wireless (802.11b) Network in Philipshell Ward. The installation was completed in the second week of April 2004.

Currently the access point restricts its use to Rooms 4 to 10, and the Dayroom. Future fund raising will extend access to the remaining rooms and the Therapy Areas. No time table is available at the moment to commit to its implementation.

The facility enables patients at their bedside to access the Internet and using Microsoft Messenger, they can utilise the accompanying headset and Webcam to contact friends and relatives, both visually and with audio link. Providing of course, that the recipient has the necessary compatible equipment!

The most outstanding use of this equipment to date has been a patient using it to keep in touch with relative in Venezuela.

We believe this service extension to be unique in a hospital environment and shows innovation in the use and application of standard technology.

The Laptop computers are compatible with the assistive technology devices we use for paraplegic or tetraplegic patients.

Conferences Attended 2003 / 2004

May 2003	C.A.L.L. Centre Conference	Dumfries
July 2003	Welsh Assistive Technology Conference	Cardiff
September 2002	Glasgow City Social Work Seminar on "Equal Access to Employment"	Glasgow
March 2004	C.A.L.L. Centre Conference	Edinb' rgh
March 2004	PEM Conference	York

Patient Referrals: April 2003 to March 2004

In House Service

New patients	46	
Carried over from 2002/2003 to 2004/2005	17	
Returning patients	<u>17</u>	
S/Total:		<u>80</u>

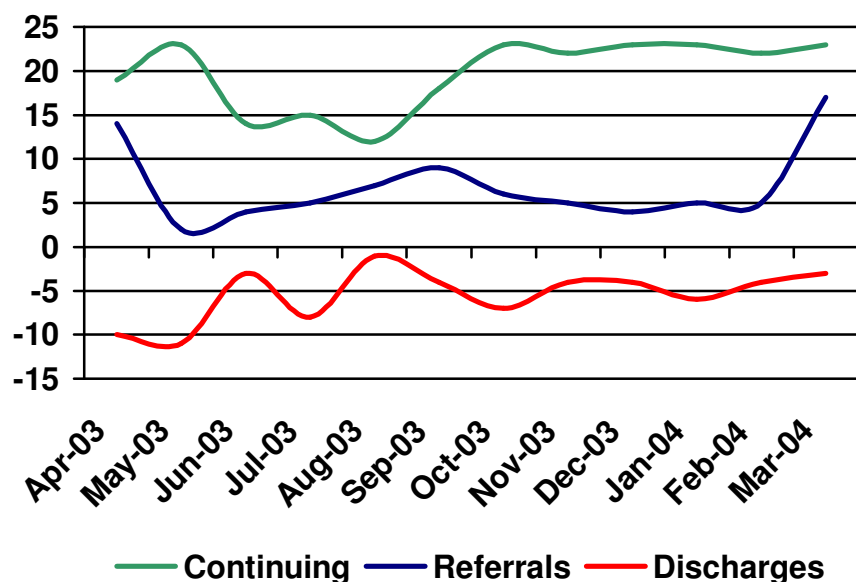
Outreach Service

New patients	16	
Carried over from 2002/2003 to 2004/2005	2	
Returning patients	<u>4</u>	
S/Total:		<u>22</u>

TOTAL: 102

Representing a 33% increase over the same period 2003/2004

Referrals and Discharges 2003 / 2004

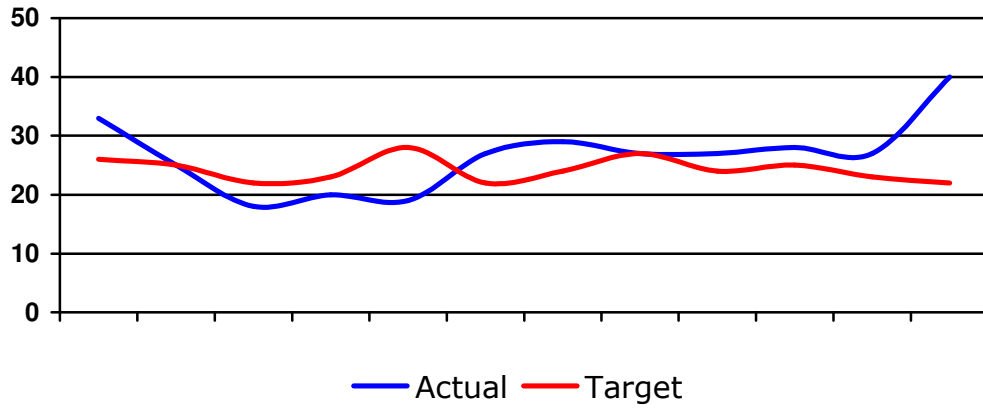


Patient Achievements 2003 / 2004

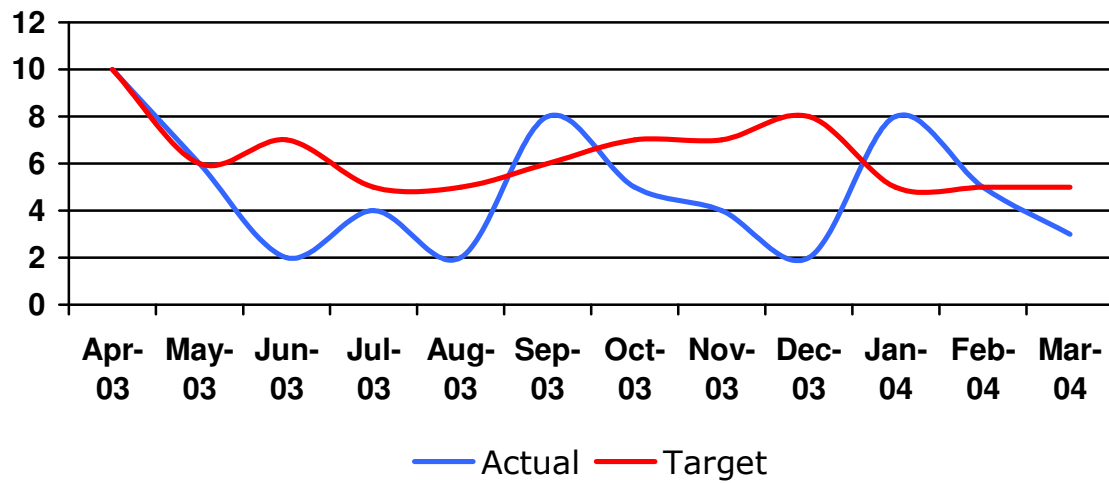
Initial Achievement	39	
Therapy / Leisure Achievement	8	
Assistive Technology Achievement	6	
Family / Carer Achievement	22	
Onwards Referral for Vocational Activities	5	
Support for Continuing Education	1	
Support for Employment	<u>3</u>	
S/Total:		<u>84</u>

Representing a 18% increase over the same period 2003/2004

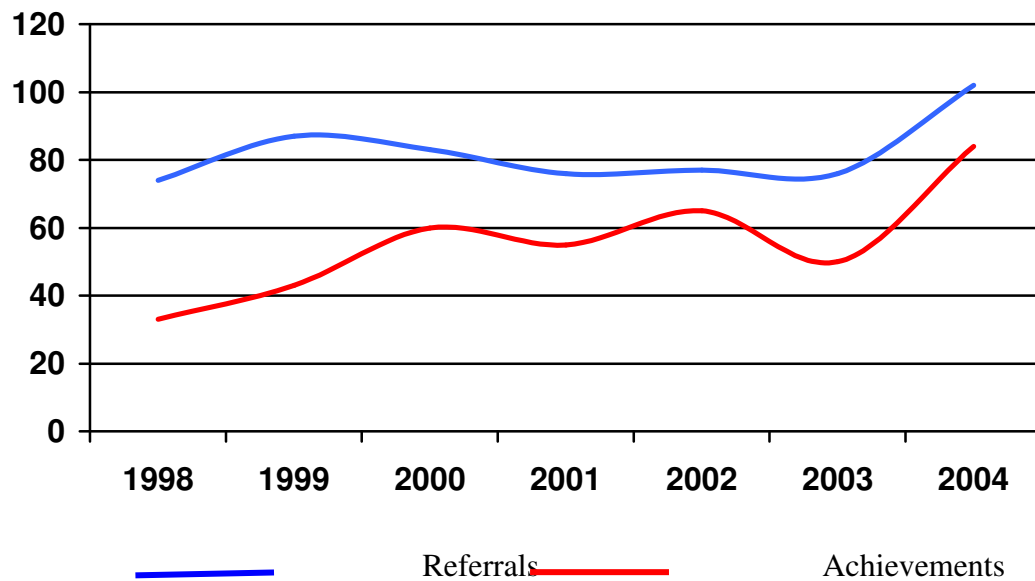
Referrals – Actual v Targets 2003 / 2004



Achievements - Actual v Targets 2003 / 2004



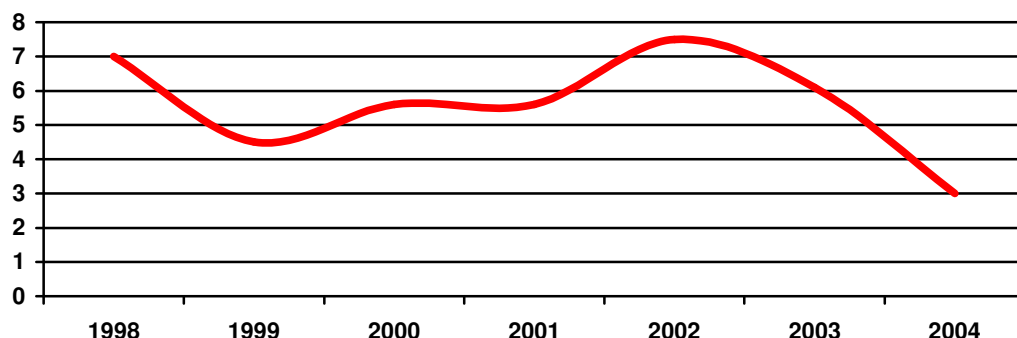
Seven year referral Trend



Trend is a slow and gradual growth over the past seven years. The drop in referrals in 2001 and 2002 was caused when the service had several high level injury, ventilator dependant patients requiring simultaneous assistive technology training. Ventilator patients require frequent training

sessions and exclude others from using the facilities. This is reflected in the rise of patients not seen during the same period and shown in the next chart.

Number of patients not seen due to limited resource



NB: The dramatic reduction in patients not seen 2003 / 2004 is due to the commencement of the Outreach Programme. It is predicted the Outreach Programme will drive this down further by the year end.

Patient Breakdown by Local Authority 2003 / 2004

Aberdeen City	7	Highland	2
Aberdeenshire	0	Inverclyde	1
Angus	1	Moray	1
Argyll & Bute	4	North Ayrshire	1
Borders	1	Midlothian	0
Clackmannanshire	0	North Lanarkshire	10
Dumfries and Galloway	4	Orkney Islands	0
Dundee City	4	Perthshire & Kinross	1
East Ayrshire	3	Renfrewshire	11
East Dunbartonshire	3	Shetland Isles	1
East Lothian	0	South Ayrshire	3
East Renfrewshire	0	South Lanarkshire	0
Edinburgh City	10	Stirling	3
Falkirk	0	West Lothian	3
Fife	3	Western Isles	1
Glasgow City	24	Other	0
		<u>TOTAL:</u>	<u>102</u>

Patient Breakdown by Health Board 2003 / 2004

Greater Glasgow	28	Forth	3
Ayrshire and Arran	7	Tayside	7
Argyll and Clyde	18	Grampian	5
Lanarkshire	10	Highland	2
Borders	1	Western	1
Lothian	12	Orkney	0
Dumfries and Galloway	4	Shetland	1
Fife	3	Other	0
		<u>TOTAL:</u>	<u>102</u>

Project Highlights: April 2003 to March 2004

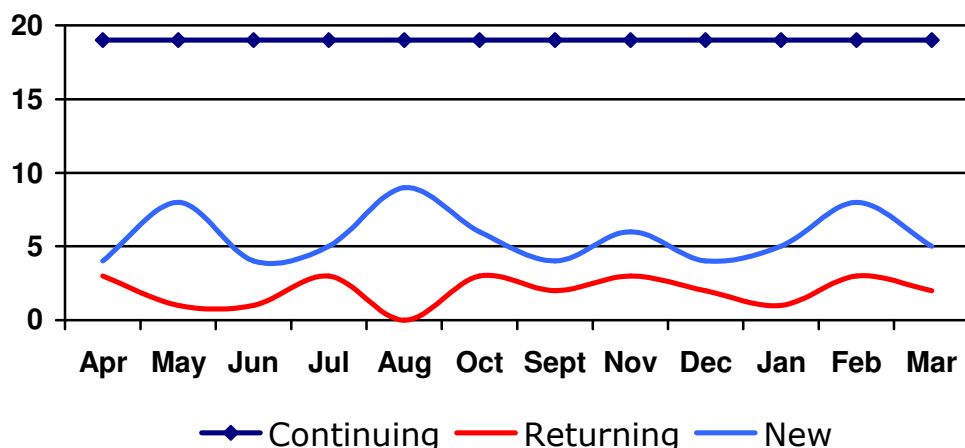
- April: Celebrating ten years of supporting the Queen Elizabeth National Spinal Injuries unit.
- May: Completed initial EFQM assessment
- September: Momentum renewed SQMS accreditation
- September: Section 16 Grant awarded for Outreach extension to this programme
- September: 700th patient referred to the service.
- January: Two week placement offered to Princes Trust trainee
- February: Awarded grant from Abbey Bank to purchase equipment for wireless network E Mail / Internet facility in Philipshill Ward

Plans for 2004/2005

- Obtain accreditation to offer patients chance to obtain ECDL (European Computer Driving Licence)
- Make application for AOL Community Award enabling us to explore the potential for supporting patients in their home remotely from the Unit
- Enhance the Wireless Network to include all Philipshill Ward
- Upgrade to Version 7 of Dragon Naturally Speaking
- Investigate fully the benefits of speech enhancers for ventilator dependant patients.
- Follow up on the appropriateness of a speech recognition measurement program designed for people with dysarthric, for potential use by spinal cord injury ventilator dependent patients.
- Follow up on a design for a mouth operated mouse for tetraplegics developed at the Clinical Engineering Dept at Withington Hospital, Manchester.
- Plans for support facilities to introduce electronic links with patients in isolated areas of the country, providing a remote facility for training and technical support.
- We will monitor progress on one or two innovative trial telemedicine projects in England and Wales, where rehabilitation and assessments are being performed remotely with a view to improving patient service.
- Through membership of the AAATE (Association for the Advancement of Assistive Technology in Europe) we will monitor various projects of interest within European and follow up on any technical developments likely to prove a positive improvement for the independence of spinal cord injured patients.
- There is a small movement of major computer users away from Microsoft Operating Systems to the more accessible Linux open software. We need to begin to understand the implications of this software and its compatibility and availability of A/T devices.

- For those of us working in the field of assistive technology it is apparent that there is a lack of comprehension among health care professionals about the benefits these devices can offer people with special needs. To this end Momentum are bringing together plans to hold an Assistive Technology Conference in Glasgow sometime during this fiscal year. The aim would be to impart some of our expertise and knowledge on the subject to those professionals involved with, funding agencies, employers, and all those with an interest in helping others achieve independent living through technology.

The projected performance Targets for 2004 / 2005



Future Technologies

There are several emerging technologies likely to have a significant impact on future assistive technology devices for spinal cord injured patients, they are: -

Eye Gaze Technology

These devices record the human eyeball movement to access and control a computer. The tracking is performed by two charge couple device cameras, one tracing the locus of the eyeball; and the other plotting head movement, with the resultant motion interpreted into mouse cursor movements. The conclusion, after watching a demonstration at the Welsh Assistive Technology Conference, is that external screen reflection is a problem. Further development work is required to eliminate this problem before it can become a viable commercial proposition. Currently too many manual mouse interventions are required for it to be of use by high level injury patients.

Of interest is the fact that reflection has been a problem on optical head operated mouse for many years. This has now been virtually eliminated with Tracker 2000 equipment; it also uses charge couple device technology. Although it was a short demonstration at the Welsh Conference, it was disappointing to see know problems re-appearing. Therefore it is my considered judgement that it is only a matter of time before we see this on the market place as a feasible solution.

Brain Wave Technology

Control of devices by brain wave has been under development for a number of years now. As a spin off from the United States Air Force F18 fighter project a mouse cursor can now be controlled by brain activity.

This system can be thought of as the next generation in the evolution of human computer interfaces. Hence its potential importance to spinal cord injured patients.

The system is controlled by electrical voltages found on the surface of the forehead. When muscles of a body contract a corresponding voltage is detected on the surface of the skin. In a similar fashion the actions of the brain result in the production of voltages that migrate to the surface of the skin.

Three different types of control signals are derived: -

ElectroOculoGraphic (EOG) signals are typically used to detect left and right cursor motion. The ElectroEncephaloGraphic (EEG) signals reflect mental/brainwave activity and is typically used for vertical cursor movement. Switch activation or keyboard commands use ElectroMyoGraphic (EMG) signals.

This technology will revolutionise the way we all interface with computers. Once fully developed, the spinal cord injury sector will find this technology a quantum leap in obtaining access to a whole range of domestic devices as well as computers.

Speech Enhancers

Early in recovery patients who are ventilator dependant, who may benefit by the use of speech recognition are prevented from doing so because of the volume and clarity of their speech. Emerging devices from the United States

Speech Enhancers improve the clarity, speech rate and volume by processing the speech to radically reduce the ambient noise and improves the clarity to make it “hyper-intelligible”, and finally controls their speech rate.

The down side of this technology is as follows: -

- The system designed to fit on wheelchairs is about £5000.
- Training to become an evaluator / assessor has to be performed in the United States. Although we have been offered a free place on the next conference in November 2004.
- There are currently no agencies, evaluators or assessors United Kingdom.

In summary, I do not believe that our current throughput of ventilator dependent patient referrals justifies the high cost for equipment. However, we will keep a watching brief over this technology and any changes to the above situation will be monitored.

Equipment Expenditure Requirements 2004 / 2005

Item	Justification	Cost	Spend
Laptop	Improve availability of Philipshill Ward wireless network	£900	3 rd Qtr 2004
Dragon Naturally Speaking Version 7	Upgrade Existing Service	£120	3 rd Qtr 2004
WiVik Version 3	Replacement System	£400	4 th Qtr 2004
SoftType Version 3	Replacement System	£260	4 th Qtr 2004

CorelDraw Graphic Suite 12	Replacement Software	£420	4 th Qtr 2004
Pentium IV Desk Top	Replace Existing Pentium III	£850	1 st Qtr 2005
BigKeys Keyboard	Expand on existing equipment	£220	1 st Qtr 2005

Total equipment expenditure needs is, £3,170

Concerns and Issues

Space

A request to the Spinal Injury Unit Management team for more space has been viewed favourably. The proposal is to create a dedicated room, where high level injury patients could be taken in their beds, for computer access devices such as speech recognition, head set devices etc.

This would alleviate space in the existing Computer Room for paraplegic patients, where more space could be allocated for their less sophisticated devices such as large key boards, tracker balls and joy sticks.

Two year Outlook

- To improve support to patients after discharge by installing commercial remote control software, enabling problems relating to assistive technology and training to be resolved from a central point within the National Spinal Injuries Unit.
- To offer training and assistive technology support service that is in synergy and supportive of Glasgow City Council's strategy of "Equal Access for Employment".
- To be considered a Centre of Competence within the UK Spinal Injury Units for trials of new and emerging assistive technology.

Five year Outlook

- Offer an in-house service over a more flexible operating period than at present, for example, opening at weekends and evenings, when times are less busy for patients
- Introduce inpatients to a wider variety of leisure / recreational devices that can be "driven" by computer technology, such as cross stitching by sewing machine or the introduction of a Microsoft XP Windows based Media Centre PC. (Assuming European availability)
- Under the auspices of the AAATE, lead a pro-active role in defining relevant specifications for the design and development of new assistive technology devices.
- To build on the experiences and infra-structure developed for Glasgow City Council's "Equal Access for Employment" initiative, enabling similar benefits to be laid across other parts of the country for the benefit of spinal cord injured people requiring access to employment.

Geoff Orry
May 2004

APPENDIX D Spinal Injuries Scotland

Report on the work of SIS at the Queen Elizabeth National Spinal Injuries Unit [QENSIU] from 1st April 2003 to 31st March 2004.

SIS has continued to have a successful voluntary presence working both in and the spinal unit and alongside unit staff at the Outreach clinics. Within the unit our twice-monthly patient visiting scheme has escalated from the “official” visits on the first and third Wednesdays of each month into being at the unit at least twice weekly at the request of either staff, patients or patients’ families. We have also continued to work as part of the joint volunteers group. SIS has also increased the amount of community work we have done with the unit in order to raise awareness of Spinal Injury an example being the co-ordination, with the unit and Coloplast of the SpinalNet first birthday celebration. On top of this we have provided speakers and display boards for case study days for professionals, have given student doctors from the unit a day of “life outside” with an SCI person and have given lectures at various awareness courses aimed at families of SCI people. Further afield, we have attended Outreach clinics in Inverness, Aberdeen, Borders General, Arbroath and Dumfries and have taken part in the second unit Roadshow, which took place in Inverness.

Patient Visiting

SIS endeavour to visit the unit on the first and third Wednesdays of the month. These visits generally take place in the afternoon and occasionally also the same evening. We also provide support volunteers for any patients who may require our assistance at all the Joint Volunteer’s Group “Night’s In”. On top of this we have a direct contact with all patients needing assistance at any time, through the Phillipshill Ward clerkess, who is also a director of SIS.

96% of the scheduled visits have been attended; the others were cancelled due to staff or volunteer shortages.

Wherever possible, visits are undertaken by one able-bodied and one spinal cord injured representative. This provides support for both patients and relatives and we are able to answer questions on all non-medical aspects of the injury. The most frequent questions remain on housing, employment rights, benefits and legal matters but many people, family members in particular just want a bit of reassurance.

All staff and volunteers representing SIS at the QENSIU are fully trained and have their training updated regularly to ensure their skills are appropriate and that they have more than sufficient knowledge of the injury and it’s implications.

It is our aim to encourage as many SCI people as possible to join SIS while they are still in the unit, primarily because it gives them access to all our services as early as possible but also because reaching people after they leave the unit is infinitely more difficult although our presence at so many of the Outreach clinics now has served to dilute the issue of “lost” patients considerably.

Community Awareness

We have been delighted to continue the three- way bond between SIS, QENSIU and St Constantine’s Children’s Liturgy Group or “the Connie’s Kids” as they are now famously known. This local parish group of 4-14 year old children are regular visitors to the “Nights-in” providing entertainment and lifting everyone’s spirits. On top of this they have raised thousands of pounds for the charity and are fantastic ambassadors for both the unit and SIS.

Outreach Clinics, Education and Roadshows

We continue to have representatives at as many outreach clinics as our staff commitments will allow and are grateful to the QENSIU for the opportunity to be part of these and meet patients we who might otherwise never know about. These give us an opportunity to gain more members and also to become more aware of the geographical problems that people outwith the central belt face when coping with their injury – an issue that as the years go by seems to become increasingly highlighted, particularly in older members.

SIS gave a talk at the Roadshow, held in Inverness earlier this year, and as mentioned, we have given talks and presentations at courses for patients families, medics from across Scotland and of course the patients themselves.

It has now become an annual event that we take the medical students who are on placement in the unit over the summer for a day. The students are sent out with a SIS volunteer to discover for themselves what life is really like with SCI and the barriers met on a daily basis.

It was with great pride that SIS once again welcomed the other members of SIT (Spinal Injuries Together) to the unit. SIT are the five main charities for SCI in the UK: SIS, SIA, Aspire, Spinal Research and Backup and work together to ensure that SCI people receive the best possible services from each charity without reciprocation.

Joint Volunteer Group

SIS, is part of the joint volunteers group (JVG), which is the umbrella of all main voluntary groups in the unit. The group aim to ensure that voluntary services within the QENSIU are relevant to the patients themselves rather than to the volunteers involved, which is often a problem. SIS is currently striving to improve the services provided by the group so that together the JVG can offer a varied, appropriate and attractive programme of evenings to encourage patients to interact socially with each other and their friends and families post injury. These nights have been running for a few years now and continue to be popular.

In conclusion

Spinal Injuries Scotland continues to maintain and develop its work both in and with the QENSIU. The relationship we have with the unit is quite unique and not enjoyed by any organisations in the English units. It is through this that we are able to provide such an extensive non-medical care package to all members, while in the unit a

APPENDIX F**Clinical Psychology Services**

The purpose of the Clinical Psychology Service in the National Spinal Injuries Unit is to provide a service to patients, families and staff, to reduce psychological distress following spinal cord injury and help promote psychological well-being by the systematic application of knowledge derived from psychological theory and data.

The Clinical Psychologist aims to help service users identify problems and source coping strategies to maximise psychological and physical well-being. The Clinical Psychologist does this by employing 4 core skills: assessment, formulation, intervention and evaluation. Collectively these core skills provide a psychological framework for understanding the problem faced by the service user and provide intervention strategies to begin to treat the problem. The types of problems faced by patients include, issues of adjustment to diagnosis and prognosis, mood problems including anxiety, depression and anger, relationship issues, family issues, realistic and unrealistic goal setting, drug and alcohol problems, issues of motivation, post traumatic stress disorder and pain management.

Clinical Psychology Services have been provided to the unit on a part time basis (0.5 wte) since October 2003. In this time a total of 57 in-patients and 7 out-patients have been referred to the service. Currently there is no waiting list and on average all patients are seen for his or her first assessment within 5 days of the initial referral. Although all interventions are individually tailored to the patients' needs and therefore the amount of contact with the service varies, most patients are seen weekly for formal treatment. Currently there is no formal provision for psychological services for out-patients. In addition the Clinical Psychologist routinely contributes to patient care and management through consultations with nursing, therapy and medical staff and with their families.

From May 2004 the number of Clinical Psychology sessions provided to the Unit will increase to 0.9 sessions.

APPENDIX I: Raw Data

DA1: New Admissions

	Admissions
1992/1993	59
1993/1994	128
1994/1995	137
1995/1996	150
1996/1997	164
1997/1998	167
1998/1999	163
1999/2000	180
2000/2001	199
2001/2002	164
2002/2003	165
2003/2004	201
Total	1877

DA2: New Admissions by Case-mix Complexity

Admissions	I	II	III	IV	Total
1992/1993	9	15	16	19	59
1993/1994	6	18	47	57	128
1994/1995	13	24	32	68	137
1995/1996	6	30	39	75	150
1996/1997	13	20	52	79	164
1997/1998	17	24	46	80	167
1998/1999	4	32	27	100	163
1999/2000	8	27	28	117	180
2000/2001	13	24	40	122	199
2001/2002	11	24	30	99	164
2002/2003	14	23	32	96	165
2003/2004	8	28	28	137	201
Total	122	289	417	1049	1877

DA3: New Admissions by Health Board of Residence

	1992/ 1993	1993/ 1994	1994/ 1995	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	Total
Argyll & Clyde	9	22	21	28	28	29	24	28	28	12	18	27	274
Ayrshire & Arran	4	12	9	9	12	12	12	17	20	16	17	21	161
Borders	0	2	2	1	2	3	0	2	0	3	2	2	19
Dumfries & Galloway	2	3	4	5	5	6	16	13	7	10	10	13	94
Fife	3	3	5	4	3	4	1	3	2	7	4	6	45
Forth Valley	2	8	10	9	8	13	6	11	17	9	4	12	109
Grampian	2	2	3	2	6	6	8	4	8	8	9	7	65
GGHB	19	32	43	46	45	28	37	28	47	44	47	48	464
Highland	6	6	5	2	5	7	10	4	6	16	6	5	78
Lanarkshire	5	19	19	21	20	22	27	40	25	20	23	22	263
Lothian	3	7	6	6	8	14	6	11	14	8	8	14	105
Shetland	0	0	0	1	2	0	0	0	0	1	0	0	4
Tayside	2	5	4	4	4	8	3	6	5	5	3	5	54
Orkney	0	0	0	0	0	1	0	0	0	0	0	2	3
Western Isles	0	7	1	4	5	2	5	0	3	2	3	5	37
ECR	1	0	5	7	9	10	6	11	12	2	8	9	80
Private	1	0	0	1	2	2	2	1	0	1	0	0	10
Unknown	0	0	0	0	0	0	0	1	5	0	2	1	9
Overseas	0	0	0	0	0	0	0	0	0	0	1	2	3
TOTAL	59	128	137	150	164	167	163	180	199	164	165	201	1877

DA4: Admissions by Health Board compared with population size

	1992/1993 - 2001/2002	2002/ 2003	2003/ 2004	Total	% to Total	Population Size	% to Total
Argyll & Clyde	229	18	27	274	14.6%	430500	8.4
Ayrshire & Arran	123	17	21	161	8.6%	376500	7.3
Borders	15	2	2	19	1%	106100	2.1
Dumfries & Galloway	71	10	13	94	5%	147600	2.9
Fife	35	4	6	45	2.4%	349300	6.8
Forth Valley	93	4	12	109	5.8%	274600	5.4
Grampian	49	9	7	65	3.5%	531200	10.4
GGHB	369	47	48	464	24.7%	909600	17.7
Highland	67	6	5	78	4.2%	208700	4.1
Lanarkshire	218	23	22	263	14%	560800	10.9
Lothian	83	8	14	105	5.6%	767800	15.0
Shetland	4	0	0	4	0.2%	23020	0.4
Tayside	46	3	5	54	2.9%	393600	7.7
Orkney	1	0	2	3	0.2%	19800	0.4
Western Isles	29	3	5	37	2%	28880	0.6
ECR	63	8	9	80	4.3%		
Overseas	10	1	2	13	0.7%		
Unknown	6	2	1	9	0.5%		
TOTAL	1511	165	201	1877		5128000	

DA5: Admissions by Degree of Injury

	805	806	952	Other	Total
1992/1993	16	24	16	3	59
1993/1994	36	43	36	13	128
1994/1995	49	33	40	15	137
1995/1996	45	44	43	18	150
1996/1997	60	50	39	15	164
1997/1998	62	50	42	13	167
1998/1999	80	36	36	11	163
1999/2000	94	44	34	8	180
2000/2001	100	60	26	13	199
2001/2002	76	62	23	3	164
2002/2003	71	58	36	0	165
2003/2004	112	49	35	5	201
Total	801	553	406	117	1877

DA6: Discharges by Degree of Injury

Discharges	805	806	952	Other	Total
1992/1993	12	8	8	3	31
1993/1994	38	44	40	13	135
1994/1995	48	39	30	14	131
1995/1996	44	40	51	19	154
1996/1997	63	44	31	13	151
1997/1998	60	50	46	14	170
1998/1999	75	38	37	12	162
1999/2000	93	37	35	7	172
2000/2001	99	52	25	13	189
2001/2002	81	51	22	3	157
2002/2003	70	68	34	1	173
2003/2004	94	56	32	5	187
Total	777	527	391	117	1812

DA7: Admissions and Discharges for Non Traumatic Spinal Cord Injury (ICD 9 Code 952) by aetiology

<u>Admissions</u>	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Central Cord Lesion	22	15	12	11	23	24
Infection	2	2	4	4	1	2
Vascular	7	8	3	1	4	1
Tumour	3	2	0	1	1	0
Intra medullary Cyst	0	0	0	0	0	0
Non-specific Lumbar Lesions	0	0	2	0	3	3
Stab Wounds	0	0	0	2	4	3
Other	2	7	4	4	0	2
Total	36	34	25	23	36	35

Discharges	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Central Cord Lesion	18	16	16	10	23	23
Infection	3	2	1	3	2	2
Vascular	9	6	5	3	4	2
Tumour	2	2	0	0	1	1
Intra medullary Cyst	0	1	0	0	0	0
Non-specific Lumbar Lesions	0	3	1	0	0	3
Stab Wounds	0	3	1	2	4	1
Other	5	2	1	4	0	0
Total	37	35	25	22	34	32

DA8: Daycase attendances by Health Board

	1994/ 1995	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	Total
Argyll & Clyde	23	38	44	71	80	95	59	94	65	93	662
Ayrshire & Arran	21	14	48	37	39	42	54	84	62	43	444
Borders	0	0	1	4	1	2	0	0	0	0	8
Dumfries & Galloway	4	4	0	0	9	4	2	8	8	12	51
Fife	0	2	4	6	3	16	16	4	4	6	61
Forth Valley	16	5	5	11	24	8	11	42	10	25	157
Grampian	0	0	3	2	5	1	2	2	0	1	16
Greater Glasgow	68	95	94	158	207	228	160	164	195	240	1609
Highland	1	5	5	5	7	2	0	2	3	0	30
Lanarkshire	21	50	67	95	179	153	177	138	125	100	1105
Lothian	0	9	9	18	27	28	11	15	16	48	181
Shetland	0	0	0	0	0	0	0	0	0	0	0
Tayside	1	8	9	4	5	5	2	1	2	17	54
Orkney	0	0	0	0	0	0	0	0	0	0	0
Western Isles	1	0	0	0	0	0	0	1	3	2	7
ECR	0	0	0	0	0	6	1	1	2	10	20
Total	156	230	289	411	586	590	495	556	495	597	4405

DA9 : Admissions by age group

Males										
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>90	Total
1992/1993	9	15	9	6	3	3	4	1	0	50
1993/1994	11	24	16	9	11	10	4	4	0	89
1994/1995	8	26	17	14	17	12	4	1	0	99
1995/1996	11	19	20	19	15	6	4	0	0	94
1996/1997	12	19	19	17	20	11	9	1	0	108
1997/1998	12	22	26	23	19	11	13	3	0	129
1998/1999	9	30	21	16	18	16	4	2	0	116
1999/2000	15	26	28	16	22	11	5	0	0	123
2000/2001	17	30	23	22	18	15	9	4	0	138
2001/2002	14	22	32	20	17	19	5	2	0	131
2002/2003	6	20	25	20	16	15	12	2	0	116
2003/2004	10	20	23	16	18	26	13	0	1	127
Total	134	273	259	198	194	155	86	20	1	1320
Females										
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>90	Total
1992/1993	1	1	1	2	2	2	0	0	0	9
1993/1994	11	7	6	7	1	4	2	1	0	39
1994/1995	2	6	11	3	5	4	5	2	0	38
1995/1996	6	9	11	12	6	4	3	5	0	56
1996/1997	6	7	10	7	9	8	6	3	0	56
1997/1998	5	7	9	2	5	5	3	0	2	38
1998/1999	8	8	6	4	6	3	9	3	0	47
1999/2000	8	10	9	7	8	6	5	2	2	57
2000/2001	1	13	9	11	8	6	5	7	1	61
2001/2002	4	8	5	4	0	6	1	4	1	33
2002/2003	4	9	4	9	8	4	6	4	1	49
2003/2004	3	17	10	17	6	11	7	3	0	74
Total	59	102	91	85	64	63	52	34	7	557
All Admissions										
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>90	Total
1992/1993	10	16	10	8	5	5	4	1	0	59
1993/1994	22	31	22	16	12	14	6	5	0	128
1994/1995	10	32	28	17	22	16	9	3	0	137
1995/1996	17	28	31	31	21	10	7	5	0	150
1996/1997	18	26	29	24	29	19	15	4	0	164
1997/1998	17	29	35	25	24	16	16	3	2	167
1998/1999	17	38	27	20	24	19	13	5	0	163
1999/2000	23	36	37	23	30	17	10	2	2	180
2000/2001	18	43	32	33	26	21	14	11	1	199
2001/2002	18	30	37	24	17	25	6	6	1	164
2002/2003	10	29	29	29	24	19	18	6	1	165
2003/2004	13	37	33	33	24	37	20	3	1	201
Total	193	375	350	283	258	218	138	54	8	1877

DA 10: Age & Sex of New Patients by Category of Injury
Female Patients 2003/2004

Casemix	No. of patients	Mean Age	Range of Ages
I	0	0	0
II	5	67	52 – 80
III	8	45	21 – 76
IV	61	45	17 – 85
Females	74	46	17 - 85

DA 11: Age & Sex of New Patients by Category of Injury
Male Patients 2003/2004

Casemix	No. of patients	Mean Age	Range of Ages
I	8	61	38 – 72
II	23	51	16 – 73
III	20	41	15 – 70
IV	76	45	15 – 93
Males	127	47	15 - 93

DA 12: Age & Sex of New Patients by Category of Injury
All Patients 2003/2004

Casemix	No. of patients	Mean Age	Range of Ages
I	8	61	38 – 72
II	28	54	16 – 80
III	28	42	15 – 76
IV	137	45	15 – 93
All Patients	201	47	15 - 93

DA 13: Length of Stay for Traumatic Injury by level of Spinal Cord Lesion 2003/2004

Casemix	No. of patients	Mean L.O.S. (days)	Range of L.O.S.
I	6	395	197– 915
II	24	162	8 – 419
III	30	132	8 – 370
IV	127	20	0 – 135
All	187	69	0 - 915

DA 14: All Discharges

1992/1993	31
1993/1994	135
1994/1995	131
1995/1996	154
1996/1997	151
1997/1998	170
1998/1999	162
1999/2000	172
2000/2001	189
2001/2002	157
2002/2003	173
2003/2004	187
Total	1812

DA15: Discharges by Casemix Complexity

Discharges	I	II	III	IV	Total
1992/1993	2	7	8	14	31
1993/1994	9	19	47	60	135
1994/1995	10	20	33	68	131
1995/1996	11	34	38	71	154
1996/1997	7	16	49	79	151
1997/1998	19	22	46	83	170
1998/1999	7	26	33	96	162
1999/2000	5	27	22	118	172
2000/2001	10	28	34	117	189
2001/2002	6	19	29	103	157
2002/2003	18	28	31	96	173
2003/2004	6	24	30	127	187
Total	110	270	400	1032	1812

DA16: Discharges by ASIA Impairment Level & Health Board

2003/2004	A	B	C	D	E	Total
Argyll & Clyde	1	1	1	7	10	20
Ayrshire & Arran	1	1	0	2	13	17
Borders	1	0	2	1	0	4
Dumfries & Galloway	0	0	0	0	12	12
Fife	2	1	1	2	2	8
Forth Valley	1	0	0	5	6	12
Grampian	2	0	1	3	2	8
Greater Glasgow	8	0	2	11	20	41
Highland	0	0	0	1	6	7
Lanarkshire	1	2	0	7	13	23
Lothian	0	1	1	8	5	15
Overseas	1	0	0	0	0	1
Shetland	0	0	0	0	0	0
Tayside	2	0	1	0	2	5
Orkney	0	0	0	1	0	1
Western Isles	0	0	0	1	4	5
ECR	1	0	0	2	5	8
Private	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
TOTAL	21	6	9	51	100	187

DA17: Discharges by ASIA Impairment Level & Health Board

Discharges	A	B	C	D	E	Total
1999/2000	25	1	12	25	108	172
2000/2001	35	9	8	30	107	189
2001/2002	23	7	10	43	74	157
2002/2003	21	10	13	52	77	173
2003/2004	21	6	9	51	100	187

DA18: Delay between actual and Intended date of discharge

	No. of patients discharged	No. of patients delayed	Mean delay (days)	Range of delay (days)
1999/2000	172	21	122	22 - 410
2000/2001	189	27	68	1 - 877
2001/2002	157	11	19	1 - 107
2002/2003	173	8	46	2 - 212
2003/2004	187	7	52	1 - 188

DA19: Time between accident & admission

	No.of patients	Mean Time (Days)	Range of Time
1999-2000	180	158.3	0 - 18770
2000-2001	199	163.3	0 - 12575
2001/2002	164	103	0 - 12012
2002/2003	165	62	0 - 4948
2003/2004	201	83	0 - 6596

DA20: Ventilated Bed Days

		No. Patients	Ave. Ventilated Days	Total Ventilated Days
1998/1999		12	121	1452
1999/2000	Edenhall	12	63.4	761
	RCU	4	187	748
2000/2001	Edenhall	12	71.5	858
	RCU	10	80.9	809
2001/2002	Edenhall	19	33	643
	RCU	2	40.5	81
2002/2003	Edenhall	11	28	304
	RCU	4	102	408
2003/2004	Edenhall	17	25	427
	RCU	3	160	481

STAFF LIST

ALLAN DB
AL-HADITHI M
ARMSTRONG N
BERRY J
BEWICK A
BRADLEY C
BRIGGS J
BROWN FIONA
CALDWELL M
CAMERON S
CAMERON S
CAMPBELL D
CAMPBELL K
CASSIDY D
CHISHOLM S
CLARK I
CONN G
CRAIG K
CRAWFORD S
CRAWFORD W
CURRY J
DARGAN H
DARKIN J
DAVIS K
DONNELLY S
DOUGLAS F
DUFF L
DUFFY L
DUNCANSON T
DUNSMORE I
EDEN C
FARREN P
FERRY D
FISHER N
FLANNIGAN E
FOLEY C
FORREST S
FRASER M
GILBRIDE A
GOVAN E M
GRAY A
GRIFFIN M
HASLER J
HANDS L
HANNAH M M
HEMS T
HENDRY EA
HOBSON S
HONEYMAN MA
HOWAT A
HUNTER S
IRVINE G
JIGAJINNI MV
JOHNSON F
JOSEPH G
JOHNSTON RA

KELLY VA
KENNEDY LA
KING S
LAIRD P
LANG L
LAZZERINI C
LEVY C
LILLEY S
LOCHRIE T
LOWE M
McALLISTER K
McALOON E
McCARRON K
McCUE K
MacDONALD L
MacDONALD S
McFADYEN M M
McGROARTY J
MacKAY M
McKEAND A
MacLENNAN K
MacKILLOP M
McLEAN A
McMAHON R C
McMURTRIE I
MacNEIL S
MAGEE E
MANN C A
MARIMUTHU R
MARSHALL K
MARTIN D
MERCHANT P
MERRY J A
MONTEITH M
MOYES L A
MULHOLLAND L
MURPHY J
NELSON E
ORRY G
PATERSON M
PREMPEH S
PRITCHARD L
RANKIN M
RENNIE K
RICHMOND H
ROBERTSON S
ROBERTSON K
ROBERTSON P
ROONEY B
ROONEY M
RUSSELL E
SHANLEY B
SLOAN C
SMILLIE V
SMITH L
SMITH M

STEWART W
THOMSON C
THOMSON M
TURNER M
WALES J
WALLACE J B
WATSON J B
WATSON L
WILSON J
WOODS L