Queen Elizabeth National Spinal Injuries Unit for Scotland

ANNUAL REPORT 2015-16

Queen Elizabeth National Spinal Injuries Unit

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Section A Introduction

A1 Queen Elizabeth National Spinal injuries Unit for Scotland

A2 Aim and Date of Designation of Service

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. Commissioned in 1992 it has continued to develop the management of the acute injury and life time care of all of its patients to maximise function and to prevent the complications of paralysis. Facilities include a combined Admission Ward and HDU (Edenhall) and a Rehabilitation Ward (Philipshill) with a Respiratory Care Unit. In addition there is a custom built Step-Down Unit for patients and relatives and Research Mezzanine (Glasgow University) which ensures that researchers are embedded in the Unit. Clinical services are provided at the Glasgow centre and outreach clinics throughout Scotland.

This annual report and its associated appendices contain a comprehensive analysis of the Unit‘s activity and the individual reports of each department or associated body.

A3 Description of Patient Pathways and Clinical Process

The Unit accept all patients who are injured or domiciled in Scotland and are referred with a spinal cord injury. In addition patients with complex fractures without neurological injury but who are at risk of neurological compromise or require expert assessment and treatment are admitted. Multiple pathways exist for the differing aetiologies and source of referrals. Patients are primarily referred from Acute Orthopaedic Services but referrals are received from Accident and Emergency Medicine, General Medicine, Neurosurgical, Vascular and Cardiovascular units throughout Scotland.

A3 A1 Target Group

Traumatic spinal cord injury is relatively uncommon but can result in a devastating disability. It requires highly specialised multidisciplinary care to maximise the chances of recovery and reduce complications. Life expectancy outside specialised units is limited but should approach normal with appropriate immediate care and life long follow up.

Figure One

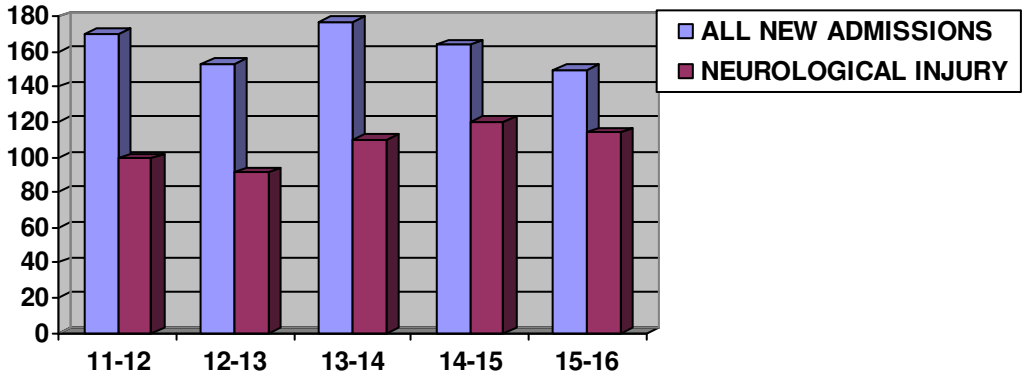


Table One

	11/12	12/13	13/14	14/15	15/16	92-16
ALL NEW ADMISSIONS	170	153	177	164	**150**	**3805**
Neurological	99	91	110	120	**114**	**2060**
Non-neurological	71	62	67	44	**36**	**1745**

All patients referred with a neurological injury (114) were admitted as soon as clinically indicated.

The number of neurological injured patients remains stable. There has been a reduction in the number of beds available for patients without paralysis due to increased numbers of the most badly paralysed patients.

Four hundred and fourteen were referred but not admitted as they fell outside the scope of the service and were not identified as being of a risk of neurological compromise. They were managed in the referral hospital with appropriate advice and support from consultant medical staff. (see section A3:B1)

A number of patients were seen by consultant staff both in the neurosurgical and orthopaedic wards of the new Queen Elizabeth University Hospital (QEUH) and other hospitals. The QEUH is now attracting major trauma from a very wide area and has lead to increasing demands of consultants' time to see patients who would previously merited telephone advice only.

A3 A2 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 with the most severe neurological injuries. They are the most dependent. The numbers are expected to vary considerably each year.

Group II and **Group III** Patients with a significant neurological loss and high dependency. They require the longest period of rehabilitation.

Group IV Patients with partial or no paralysis. Many have sustained major polytrauma with residual weakness and require significant input during their rehabilitation.

Fig Two New Admissions by Case-Mix Complexity

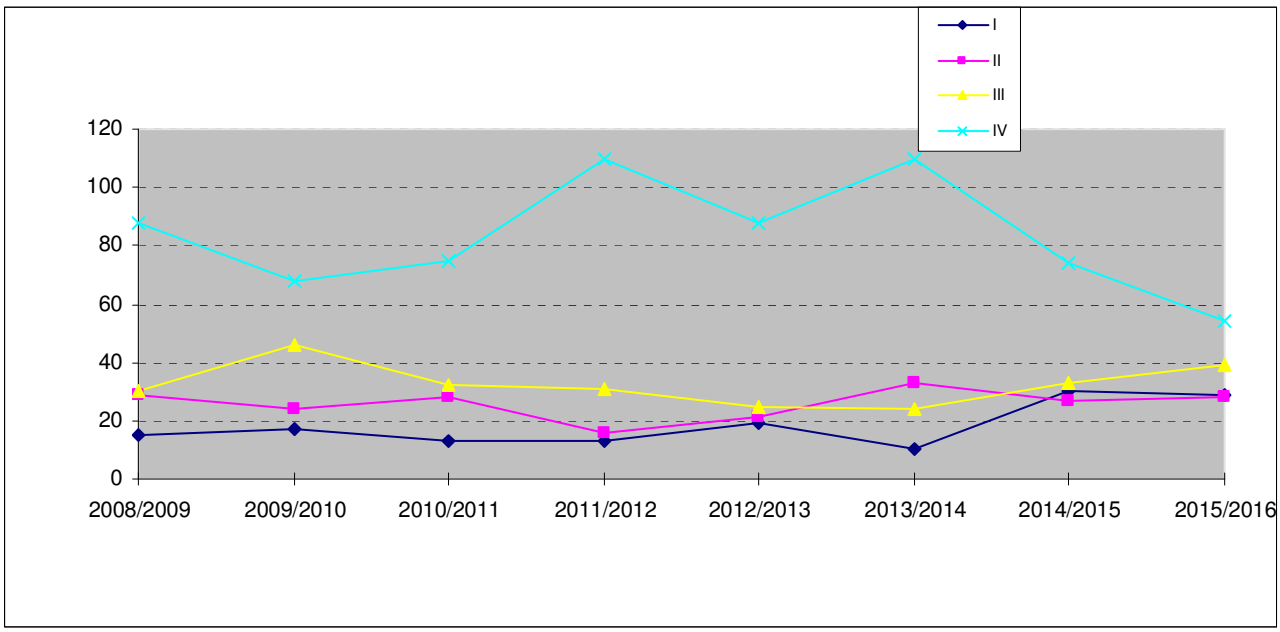


Table Two

GROUP	11/12	12/13	13/14	14/15	15/16	92/16
1	13	19	10	30	29	323
II	16	21	33	27	28	607
III	31	25	24	33	39	821
IV	110	88	110	74	54	2054
Total	170	153	177	164	150	3805

Numbers of Group 1, the high tetraplegic patients, have remained high since the last annual report. These patients have injury levels from C1-C4 (above the shoulders) with severe paralysis on admission. These are the most clinically demanding group with the highest risk of ventilation and other medical problems. Numbers of low tetraplegic (C5-C8) and paraplegic patients were stable

The sustained rise in high tetraplegic patients significantly increases nursing workload. These high tetraplegic (C1-C4) patients had a mean age of sixty years compared with a Unit overall mean age of fifty-three and many had pre-existing conditions. Such patients require high level medical and nursing care and almost constant attendance. It is hoped that this rise remains within normal variation. Long-term trend analysis since 2008 (Fig 2) supports the clinical view that as numbers of high tetraplegics increases (yellow line) the capacity for admitting the intact and minimally paralysed patients' decreases. (turquoise line).

A3: A3 New Admissions by ASIA Impairment Score Level

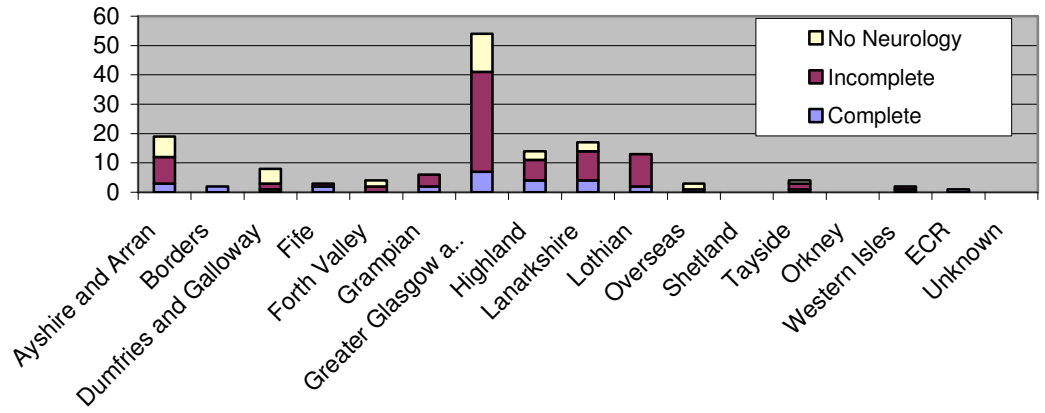
A	Complete: No motor or sensory function
B	Incomplete: Sensory but not motor function is preserved below the neurological level and includes S4-5
C	Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a motor grade less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

The ASIA grading system is recognise internationally as a measure of dependency and can be used to classify improvements over time.

Table Three - New Admissions by Asia Impairment Level & Health Board

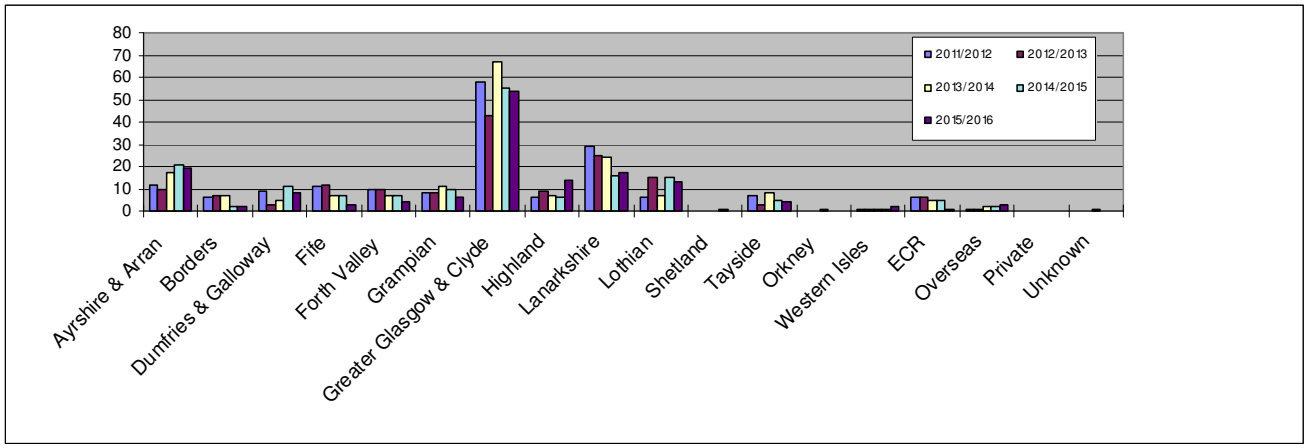
2015/2016	A	B	C	D	E	Total
Ayrshire & Arran	3	1	4	4	7	19
Borders	2	0	0	0	0	2
Dumfries & Galloway	1	1	0	1	5	8
Fife	2	0	0	1	0	3
Forth Valley	0	0	1	1	2	4
Grampian	2	1	3	0	0	6
Greater Glasgow Clyde	7	3	14	17	13	54
Highland	4	0	4	3	3	14
Lanarkshire	4	0	4	5	4	17
Lothian	2	2	3	6	0	13
Overseas	1	0	0	0	2	3
Shetland	0	0	0	0	0	0
Tayside	1	0	1	1	1	4
Orkney	0	0	0	0	0	0
Western Isles	1	0	0	1	0	2
ECR	1	0	0	0	0	1
Unknown	0	0	0	0	0	0
TOTAL	31	8	34	40	37	150

Fig Three Admissions by Neurological Deficit and Health Board



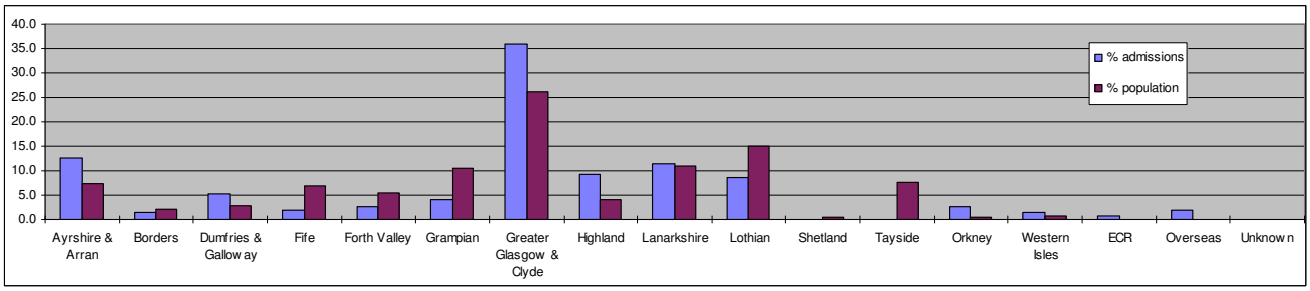
Admission patterns by Health Board are stable. Only Highland has shown a significant change from six in 14/15 to fourteen in 15/16 but the majority of these patients had spinal paralysis and their admission was appropriate. The Unit continues to admit patients from all areas of Scotland. The distribution of admissions and the annual variation since the Unit opened justifies the clinical and economic benefits of a national service.

Fig Four New Admissions by Health Board of Residence 2011-2016



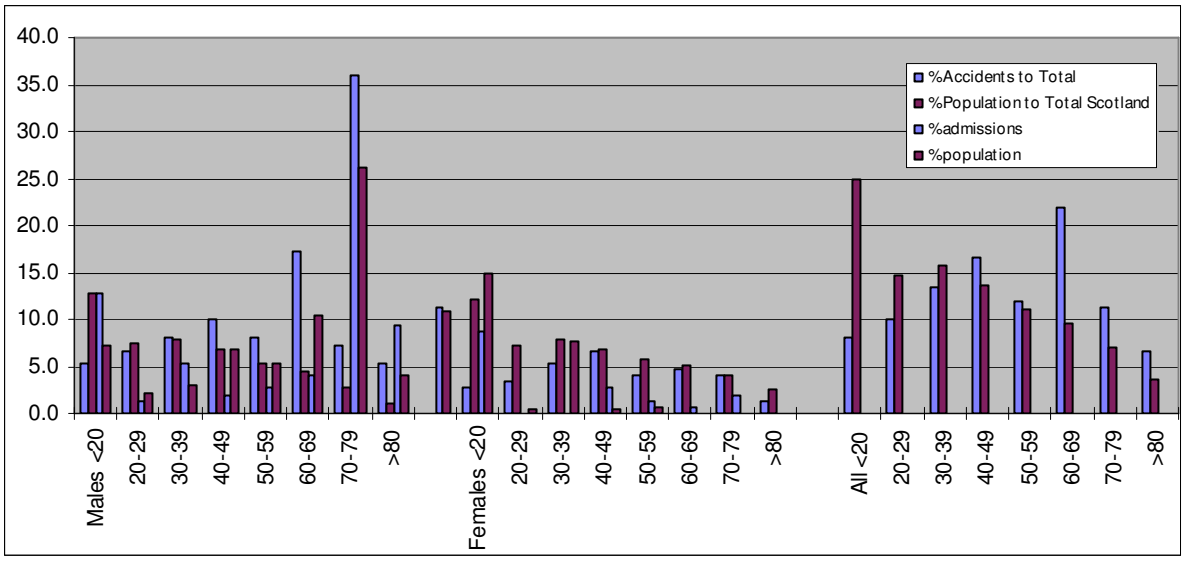
Three non-Scottish patients were admitted while on holiday or work in Scotland (ECR & Overseas) and were repatriated when their condition allowed. The Unit did not admit any private patients.

Fig Five Admissions by Health Board compared with Population Size



The equitable distribution of per-capita admissions within Health Boards is sustained although Glasgow continued to have admission numbers in excess of population size. Closer examination of figures would be needed to confirm if this was reasonable due to a higher number of paralysed patients or possibly due to issues in the local orthopaedic and neurosurgical services.

Fig Six New Admissions by Age Group



The rise in middle-aged patients continues and the Unit has recently published a scientific paper confirming this phenomenon which is recognised internationally. The mean age at admission has risen ten years since 2001. This has major implications both for medical and nursing dependency, and also for the rehabilitation pathway. The older paralysed patients are far frailer and find it much more difficult to cooperate with the therapy. The number of injuries in those under twenty remains low.

Fig Seven

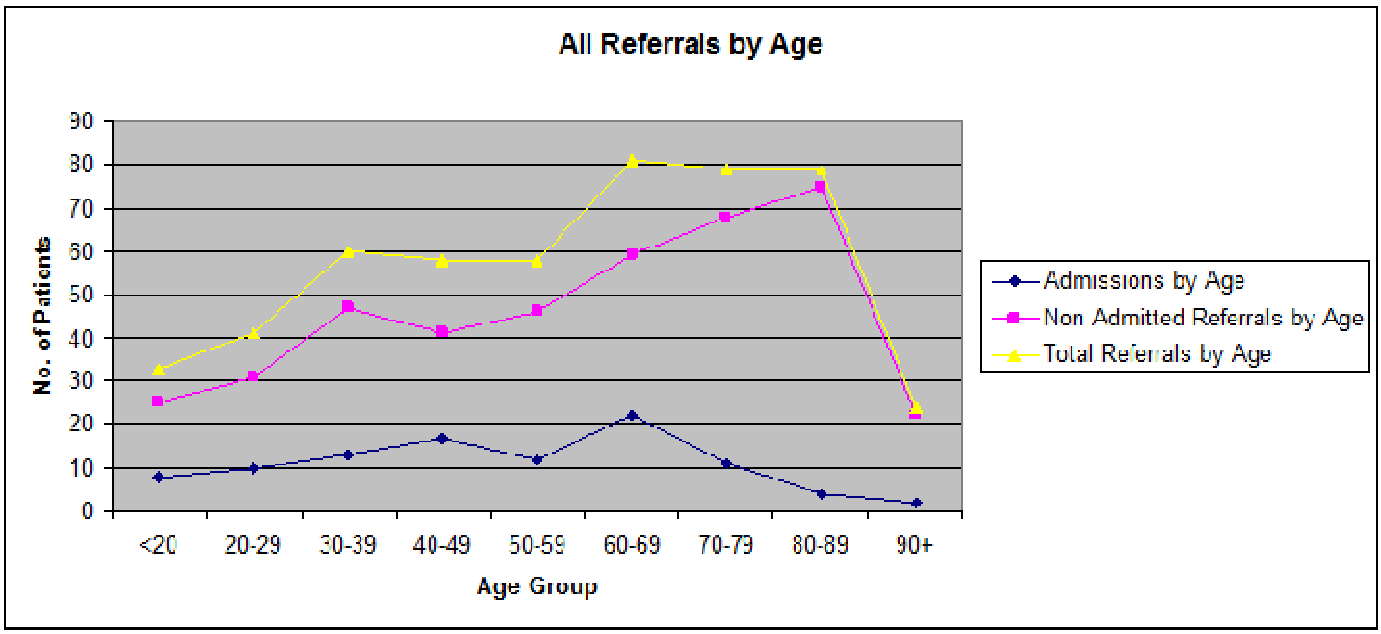


Fig Eight

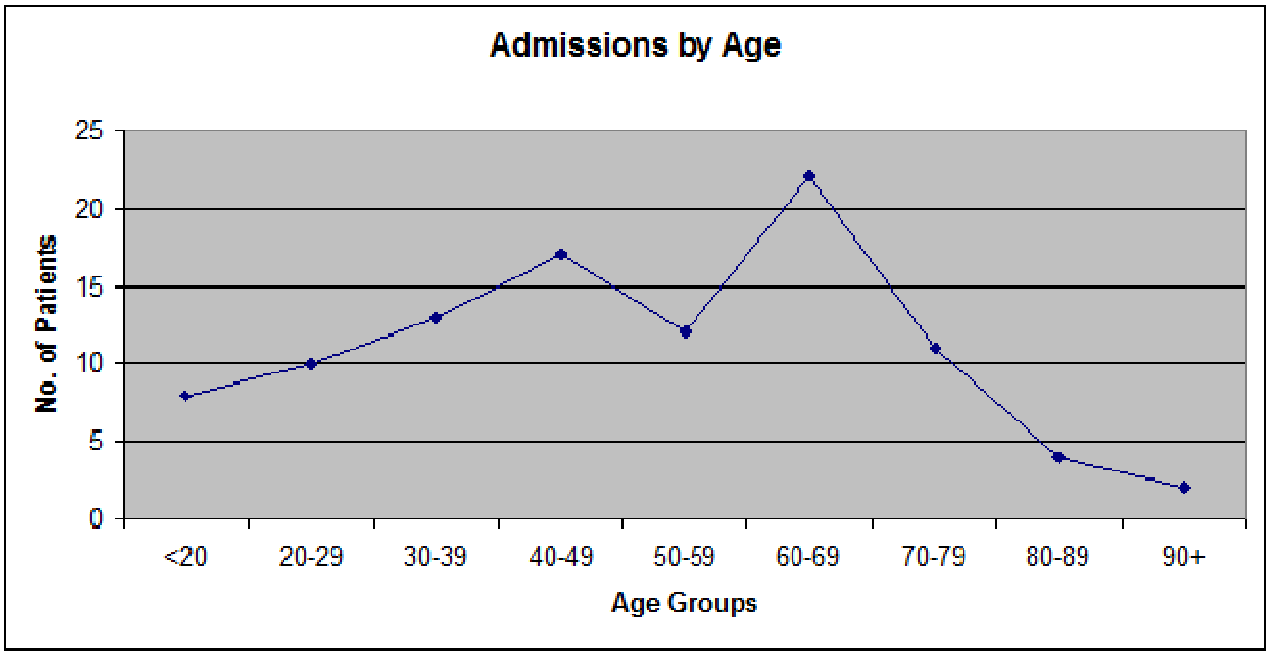
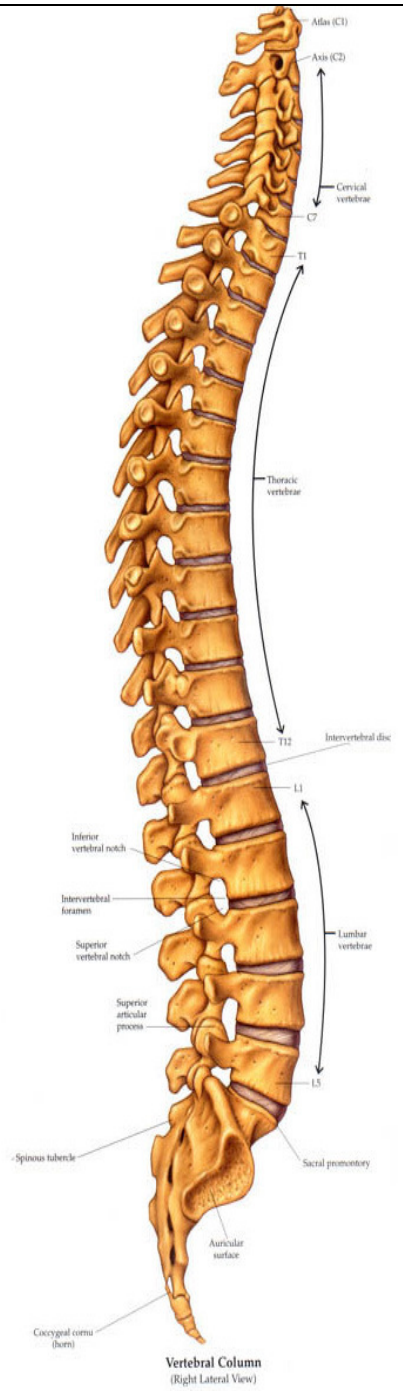


Figure eight shows the age admission profile in more detail and continues to show the gradual increase (move to the right) of the age profile of new admissions.

Table Four - Admissions by Anatomical Level and Severity

	Level	Complete	Incomplete	No Neurology	Total
	C 1	0	1	3	4
	2	1	3	4	8
	3	2	9	0	11
	4	5	20	3	28
	5	6	10	2	18
	6	2	10	2	14
	7	0	1	1	2
	8	0	0	0	0
	Sub-total	16	54	15	85
	T 1	0	1	0	1
	2	0	0	0	0
	3	1	1	0	2
	4	0	3	1	4
	5	2	1	1	4
	6	2	1	2	5
	7	1	0	3	4
	8	1	3	0	4
	9	0	0	1	1
	10	3	6	0	9
	11	1	1	1	3
	12	3	3	4	10
	Sub-total	14	20	13	47
	L 1	0	2	6	8
	2	0	2	1	3
	3	0	2	1	3
	4	0	2	0	2
	5	1	1	0	2
	Sub-total	1	9	8	18
	S1-5	0	0	0	0
	Sub-total				
	TOTAL	31	83	36	150

(Multi-level injuries were counted from the highest level)

This breakdown of injury level shows the large number of the highest (C1-C4) injuries with the greatest clinical need. The overall preponderance of tetraplegic patients puts increasing demands on nursing and therapy time.

A3 B Care Pathway for Service or Programme

The Unit is commissioned to care for all cases of non-progressive spinal cord injury in Scotland. The vast majority of these are traumatic injuries. Immediate care, comprehensive rehabilitation and life-long care is provided at the centre in Glasgow and followed by visits at outreach clinics throughout the country. If appropriate an integrated service is provided with local medical, nursing and AHP services. Close cooperation is sought with social services and voluntary groups to ensure that the difficult transition to secondary care either at home or a care establishment is achieved.

A3 B1 Details of Referral and Admission by Region

The service is commissioned to take referrals for all patients with cord injury or complex fractures with risk of cord damage but there continue to be a large number of referrals for patients' outwith this group who do not require admission. The referral itself is not a neutral process and referrals have lead to delays in management locally.

The total number of referrals has stabilised at 561. The national referral/admission ratio (RAR) is 26% but only 18% in Lanarkshire and 21% in Glasgow. The RAR in the early 2000's was around 70%. This means the vast majority of referrals are not paralysed and have sustained moderate injuries which previously would have fallen within the scope of the local orthopaedic or neurosurgical teams. This may reflect lack of confidence or training issues in orthopaedic and neurosurgical services in the WoS.

There also continue to be many referrals for elderly patients, especially from GGC, with cervical fractures who do not require specialised acute management or rehabilitation. These lie out with the remit of the National Service and are managed locally, in close contact with their family.

Table Five - Health Board Referrals and Outcome

Referring Board	Total Referrals	Admissions	Not Admitted	% Admitted	Complex Advice Given
Greater Glasgow & Clyde	261	54	207	21%	38
Lanarkshire	94	17	77	18%	14
Ayrshire & Arran	77	19	58	25%	14
Dumfries	29	8	21	28%	3
Borders	3	2	1	67%	0
Highland	27	14	13	52%	3
Grampian	8	6	2	75%	1
Forth Valley	14	4	10	29%	3
Tayside	8	4	4	50%	2
Fife	10	3	7	30%	4
Lothian	18	13	5	72%	1
Western Isles	8	2	6	25%	0
ECR	4	1	3	24%	1
Overseas	3	3	0	100	0
Total	564	150	414	27%	84

The number of patients not admitted but requiring complex advice has stabilised at 20%. (84 patients). In occasional cases of complex but neurologically intact patients it remains appropriate for consultants to assist the local team but it is not possible for the National Spinal Injuries Unit staff to micromanage all referrals. There remains an expectation amongst some referrers that the Unit has a responsibility for all spinal problems and such inappropriate referrals can lead to delays in management.

Table Six - Health Board Referrals and Referring Speciality: Non Admissions

Non Admitted referrals

Referring Board	Level of Injury		Referring Specialty				Total
	Cervical	Thor/Lum	Ortho	Neuro	A&E	Other	
Greater Glasgow & Clyde	105	102	90	9	32	76	207
Lanarkshire	45	32	41	0	14	22	77
Ayrshire & Arran	27	31	40	0	8	10	58
Dumfries	9	12	18	0	2	11	21
Borders	0	1	0	0	0	1	1
Highland	6	7	1	0	3	9	13
Grampian	1	1	1	0	0	1	2
Forth Valley	9	1	5	0	2	3	10
Tayside	2	2	1	2	0	1	4
Fife	1	6	2	0	3	2	7
Lothian	4	1	0	0	3	2	5
Western Isles	1	5	0	0	0	6	6
ECR	2	1	1	1	0	1	3
Total	212	202	200	12	67	145	414

The Departmental sources of these non-admitted referrals remain stable. Orthopaedics (48%) remains the principle user of the service. Accident and Emergency (16%) Neurosurgery (3%) provide smaller numbers and “Others” (35%) including Medicine. Neurology, Care of the Elderly etc. provided stable numbers of referrals.

Section B Quality Domains

B1 Efficiency

B1 A Actual v Planned Activity

B1 A1 Table Seven A - In-patient Activity

	11/12	12/13	13/14	14/15	15/16
New admissions	170	153	177	164	150
New outpatients	188	232	271	290	170

B1 A2 Table Seven B - Out-patient activity

	11/12	12/13	13/14	14/15	15/16
Return	2293	2243	2389	2378	**2112**
New	188	232	271	290	**170**

The out-patient activity of the Unit is focused on the post discharge management of acute injuries and lifelong long term follow up. Dedicated clinics in Spinal Medicine, Neurosurgery and Urology supplement the nurse led Annual Review Clinics for those patients with a neurological deficit. Increasingly efficient clinical management limits annual increases in return patients. A drop in new out-patients is noted. This is due to a combination of factors including reduction in the number of urology clinics.

B1 A3 Table Seven C - Summary of Out-patient activity

	11/12	12/13	13/14	14/15	15/16	%
Return	2293	2243	2389	2378	**2112**	**N/A**
DNA Return	527	665	642	610	**613**	**29%**
New	188	232	271	290	**170**	**N/A**
DNA New	33	49	49	58	**43**	**25%**

The number of return outpatients has fallen a little, no pattern is recognised. The DNA rate remains disappointing and may reflect the nature and length of follow up and the fragility of the population. The Unit is working with administration to start a text-based or telephone reminder service for appointments.

B1 A4 Table Eight - Out-patient Clinic Location and Frequency

FREQUENCY	LOCATION - QENSIU
DAILY	**DROP IN**
WEEKLY	**NEW, RETURNS, SKIN, HALO, URODYNAMICS, SPASM, PUMP, ACUPUNCTURE, SPINAL R/V NEUROSURGERY, UROLOGY**
BI MONTHLY	**FERTILITY, MDC/FDC, RESPIRATORY, THORACOLUMBAR**
MONTHLY	**EDINBURGH**
THREE MONTHLY	**ABERDEEN**
SIX MONTHLY	**DUMFRIES, BORDERS, ARBROATH**
ANNUALLY	**HUNTLY**

The location and frequency of out-patient clinics and outreach services are based on the demographic data held on the National Database. Medical, nursing and AHP staff attend the clinics accompanied by Spinal Injuries Scotland for peer group support.

B1 A5 Table Nine - New Out-patient Activity by Health Board

	11/12	12/13	13/14	14/15	15/16
Ayrshire & Arran	15	16	16	26	**6**
Borders	2	2	1	1	**1**
Dumfries & Galloway	3	6	6	5	**2**
Fife	4	2	2	4	**1**
Forth Valley	14	4	11	9	**1**
Grampian	3	0	2	0	**2**
Greater Glasgow Clyde	105	154	193	197	**123**
Highland	4	0	9	7	**5**
Lanarkshire	27	35	21	33	**25**
Lothian	3	7	8	6	**3**
Shetland	0	0	0	0	**0**
Tayside	8	4	0	1	**0**
Orkney	0	0	0	0	**0**
Western Isles	0	1	2	1	**1**
ECR	0	1	0	0	**0**
Unknown	0	0	0	0	**0**
Total	**188**	**232**	**271**	**290**	**170**

New out-patient attendances by Health Board are stable.

B1 A6 Table Ten - Out-patient Activity by Centre

	11/12	12/13	13/14	14/15	15/16	CHANGE YEAR	TOTAL 1992-2016
New QENSIU	188	232	271	290	**170**	(41.3%)	**3204**
Return QENSIU	1876	1878	2014	1995	**1728**	(13%)	**37674**
Edinburgh	174	148	154	157	**155**	(1.2%)	**3803**
Inverness	62	60	63	63	**63**	No Change	**1037**
Aberdeen	85	66	74	76	**71**	(6.5%)	**1029**
Dumfries & Galloway	27	20	17	19	**24**	+ 26.3%	**305**
Borders	15	26	24	25	**29**	+ 16%	**287**
Arbroath	31	26	29	27	**26**	(3.7%)	**300**
Huntly	23	19	14	16	**16**	No Change	**106**
Total	**2481**	**2475**	**2660**	**2668**	**2282**	**(14.4%)**	**47745**

There is expected year to year variation in out-patient attendances. The drop in QENSIU new patient attendances is mainly due to reduction in new urology clinic patients.

B1 A7 Table Eleven - Out-patient Activity by Specialty at QENSIU

		11/12	12/13	13/14	14/15	15/16
Orthopaedics*		**163**	**144**	**139**	**85**	**0**
Thoracolumbar*		**0**	**0**	**0**	**18**	**29**
Neurosurgery	**LA / CM / CB**	**95**	**74**	**94**	**148**	**187**
Urology	**GC / VG**	**390**	**450**	**524**	**490**	**399**
Skin Care		**59**	**68**	**64**	**75**	**44**
Pain / Spasm		**16**	**13**	**17**	**20**	**13**
Neuroprosthetics	**TH / LW**	**32**	**21**	**25**	**25**	**22**
Sexual Dysfunction		**19**	**14**	**22**	**22**	**12**
Respiratory		**9**	**28**	**21**	**15**	**13**
Fertility		**11**	**3**	**8**	**4**	**3**
Spinal Injury Annual Review	**TOTAL**	**1082**	**1063**	**1100**	**1093**	**1006**
	MEDICAL	**690**	**680**	**698**	**715**	**642**
	NURSING	**392**	**383**	**402**	**378**	**364**
Total		**1876**	**1878**	**2014**	**1995**	**1728**

The Spinal Injury Annual Review clinics are a large component of the commitment to life-long care. These are nurse led with only 71% per cent of patients requiring medical input. There is an open door policy for patients and inevitably some activity remains under-reported from drop-in review. Urology clinics are available to investigate or treat bladder dysfunction at any stage. Neuro-prosthetics includes assessment and surgery for upper limb problems principally in tetraplegics.

Many patients previously seen at the Orthopaedic Clinic have been transferred to the Neurosurgical Clinic with proportionate increase in neurosurgical outpatient numbers.

B1 A8 Table Twelve - Day Case Attendances by Reason

	11/12	12/13	13/14	14/15	15/16
Urology /Urodynamics	40	36	41	54	**52**
Halo Fixation	247	146	232	175	**138**
Skin	14	14	18	8	**4**
Orthopaedic/Neurosurgery	0	0	0	0	**0**
Acupuncture / Pain / Spasm	429	429	374	413	**474**
Sexual Dysfunction	2	3	2	3	**4**
Fertility	16	24	12	19	**18**
Other	1	0	1	5	**4**
Total	**749**	**652**	**680**	**677**	**694**

In the absence of a regional service the Unit continues to look after a disproportionate number of patients from the WoS who require a halo brace. Numbers are down this year but this group continue to put excessive demand on the Unit and may reflect local lack of provision or training in this area.

B1 A9 Day Case Activity

Day case activity continues to offer an important service for minor surgical procedures, medical interventions and nursing care. The level of Day Case activity is self-limited due to the finite population of spinal injured patients.

B1 A10 Day Case Attendances by Health Board

Day Case activity remains limited by geographical constraints. No trend is observed. Some patients who could be managed as a day-case require in-patient stay due to difficulties in travelling. If indicated procedures are arranged in the patients' local hospital either by staff from the Unit or appropriate specialists.

Fig Nine

Day Case Attendances by Health Board					
	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016
Ayrshire & Arran	43	87	80	52	**66**
Borders	6	8	8	6	**5**
Dumfries & Galloway	23	9	16	21	**7**
Fife	38	27	25	22	**19**
Forth Valley	54	61	78	45	**48**
Grampian	3	2	4	3	**5**
Greater Glasgow & Clyde	423	367	355	370	**358**
Highland	5	4	7	12	**28**
Lanarkshire	101	36	46	84	**102**
Lothian	41	40	43	49	**41**
Shetland	0	0	0	0	**0**
Tayside	12	11	17	12	**9**
Orkney	0	0	0	0	**5**
Western Isles	0	0	0	0	**1**
ECR	0	0	1	1	**0**
Unknown	0	0	0	0	**0**
Total	**749**	**652**	**680**	**677**	**694**

B1 A11 & A12 Waiting Times Out-patient Clinics

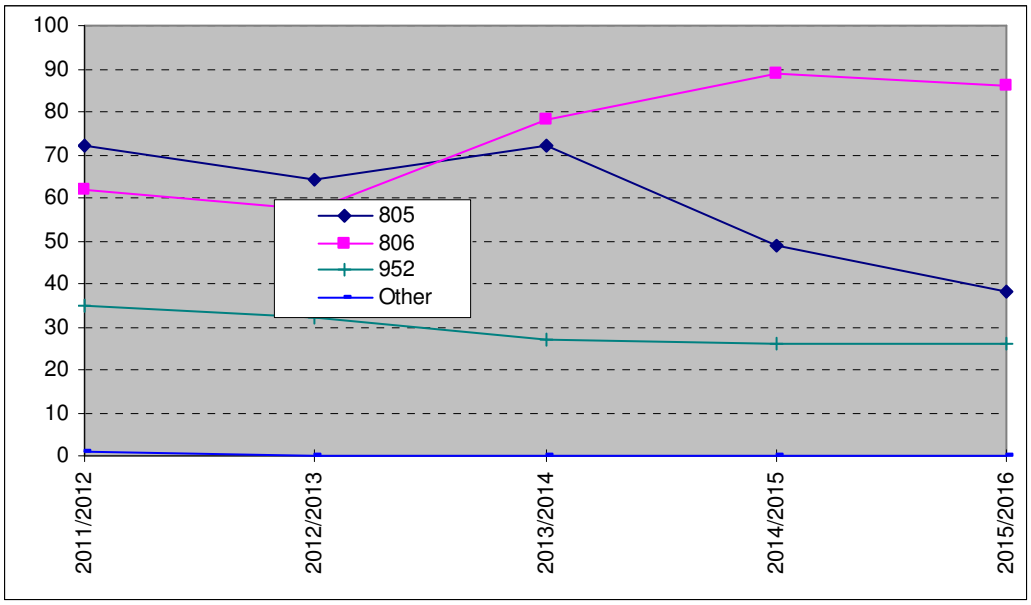
There is an open door policy to the Nurse Led Clinics. Medical advice is always available. A small number of patients with established paralysis move to Scotland every year and the maximum waiting time for these new elective outpatient appointments is four weeks.

B1: B1 Use of Resources

The Unit admits on grounds of clinical priority and safety of transfer. Appropriate support facilities are available in the majority of hospitals in Scotland but international and regional data support early transfer if possible. Current national policy is to transfer patients to QENSIU as soon as clinically stable and this has proved a robust admission policy. Bed availability is dependent on the case mix presenting over time and the length of stay of each patient. The more severe injuries, but not the most severe, have the longest length of stay because of the complexity of their rehabilitation. The degree of injury is important in determining throughput. The sustained increase in the number of the most highly dependent patients (Groups 1 & 2) made extra demands on resources but time to admission was unaffected.

B1 B2 Admissions by Degree of Injury

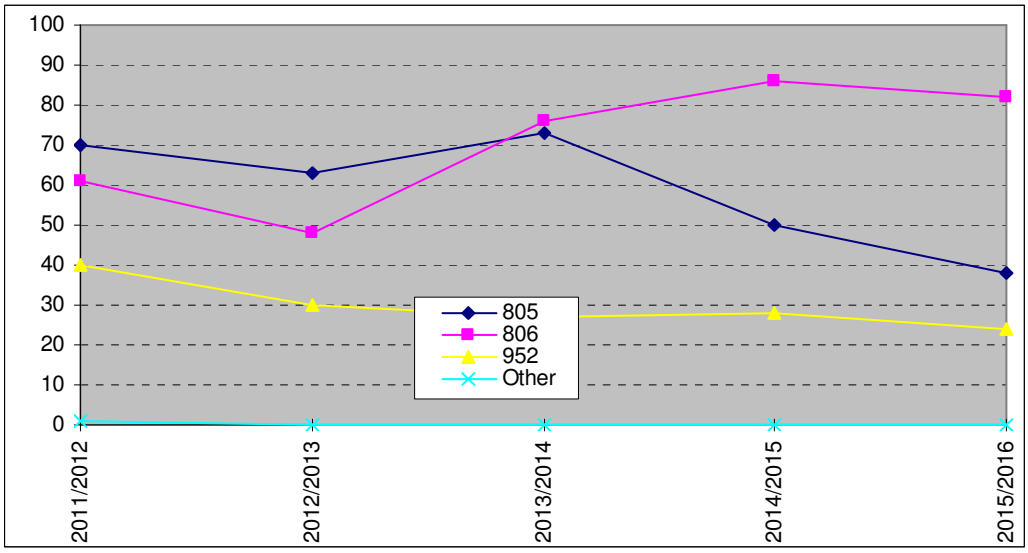
Fig Ten



806: patients with spinal fracture and paralysis
805: patients with spinal fracture but no paralysis
952: patients with paralysis but no fracture. This group includes patients with central cord syndrome (paralysis due to severe cord bruising) and patients with medical cause of paralysis such as stroke. Although these patients may not have fractures some are still very badly paralysed. See B4 for details.

B1 B3 Discharges by Degree of Injury

Fig Eleven



B1 B4 Table Thirteen - Admissions and Discharges for Non Traumatic Spinal Cord Injury (ICD 9 Code 952)

The "non-traumatic" title is misleading but has been kept to ensure accuracy of comparison with historical data. See B2. This is a group of patients who have sustained paralysis without a fracture although most in this group will have sustained very severe ligamentous injury which is a defacto fracture. The clinical effect on the patient and their care needs are indistinguishable from a severe fracture. The largest group of patients are those with central cord damage, characterised by predominantly weak arms.

2015/2016	Admissions	Discharges
Central Cord Lesion	21	18
Infection	2	3
Vascular	2	2
Tumour	1	1
Surgical	0	0
Non-specific Lumbar Lesions	0	0
Penetrating Wounds gun/stab	0	0
Assault	0	0
Other	0	0
Total	26	24

The Unit continues to admit a small number of patients with non-progressive spinal paralysis due to medical causes such as spinal stroke.

B1 B5 Table Fourteen - Length of Stay by Level of Spinal Cord Injury

Discharged Patients

Case Mix	No. of Patients	Mean L.O.S.	Range of L.O.S.
I	26	131	1 - 435
II	23	125	14 - 497
III	39	124	8 – 321
IV	56	25	1 - 176
All	144	87	1 - 497

Numbers of the most severely paralysed patients (group 1) remain high. They are the oldest group (mean age sixty) with grossly disordered pathophysiology and are the most ill group in the early part of their stay with high demands on medical and nursing resource. The rehabilitation goals are limited in this group.

B1 B6 Table Fifteen - Bed Utilisation

National Spinal Injuries Unit Edenhall HDU 12 Philipshill 36		
Bed Compliment	Actual Occupied Bed Days	% Occupied
48	14765	85%

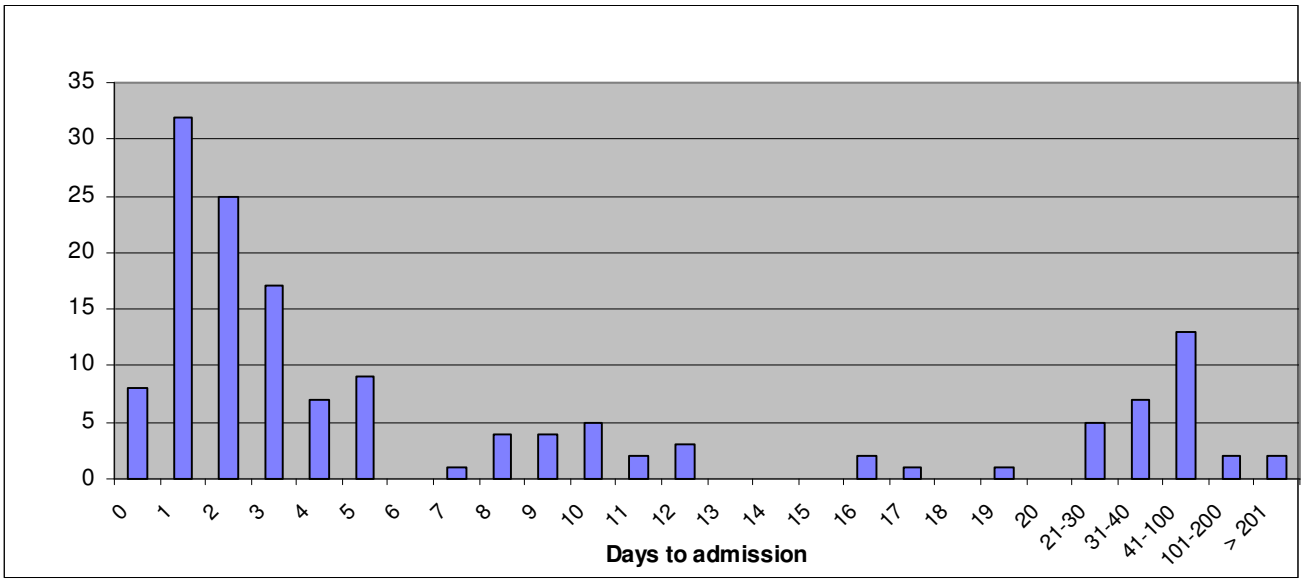
Occupancy figures are stable and allow flexible and efficient use of beds.

B1 B7 Time to Admission, Length of Stay and Delay in Discharge

B1 B8 Time from injury to Admission

The policy is of early admission for neurological injury with non-neurological injury admitted as beds became available. Most patients are referred within twenty-four hours of injury. Early referral is encouraged. In 2015-16 27% of patients were admitted within twenty-four hours of injury and 44% were admitted within forty-eight hours. 66% were admitted within one week. A “long tail” of patients were admitted weeks and months following injury. This time pattern is consistent with previous years. The emphasis remains on early admission to provide immediate support to the patient and family and to prevent complications. A previous audit of acute admissions indicated that in only one third of patients the time of admission was related to bed issues with the rest related to severity of injury, transport difficulties or delay in diagnosis or presentation. The introduction of early intervention strategies will increase pressure for earlier admission.

Fig Twelve



Early referral and co-operation between the staff in the Unit and the referral hospital ensures immediate admission if clinically indicated. Telephone advice is available 24/7 for those patients who are not immediately transferred. The referral proforma, transfer documentation and admission form continues to be successful in facilitating and auditing the process. It has been internationally recognised and copied and is publicly available on www.spinalunit.scot.nhs.uk

Approximately twenty per cent of patients have associated orthopaedic injuries. Co-operation between ITU, the referring hospital and other specialised units can be required (Plastic Surgery, Burns Unit, Maxilla-Facial, Renal etc).

Most patients admitted after seven days, the long tail, have conditions that do not require immediate treatment or have had additional co-morbidities that require medical intervention in the referring hospital prior to transfer. Some new patients have undergone initial rehabilitation in another centre and are admitted to the unit for reassessment or treatment of complications many months or even years post injury.

Table Sixteen - Days to Admission by Range

	No. of Patients	Mean Time (Days)	Range of Time
2011-2112	170	19	0 - 438
2012-2013	153	185	0- 10598
2013-2014	177	151	0 - 8478
2014-2015	164	11	0 - 206
2015-2016	150	35	0 - 2117

Table sixteen includes some patients who were initially managed outside QENSIU and admitted years after injury for elective treatment. These patients are coded as “new injuries” which skews the mean time to admission.

Table Seventeen - Delayed Discharge

	No. of Patients Discharged	No. of Patients Delayed	Mean delay (days)	Range of Delay (days)	NO DELAY
2011/2012	171	2	37	35 – 38	98.8%
2012/2013	141	2	130	62 – 197	98.6%
2013/2014	175	7	34	1 – 91	96%
2014/2015	164	5	38	10 - 104	97%
2015/2016	**144**	**7**	**26**	**6 - 61**	**95%**

Despite discharge planning weeks or months ahead a small number of patients continue to have delays in discharge usually due to lack of suitable accommodation. If accommodation is unavailable patients are transferred back to the referring hospital once they have completed their rehabilitation. Staff at the Unit continues to work with local health teams, social work and housing organisations to minimise delays in return home. This makes increasing demands on nursing, occupational therapy and nursing time.

B1 B9 Re-admissions to the Unit

Most neurologically injured patients discharged from the Unit never require re-admission. They attend annually as out-patients for lifelong follow up. In some cases readmission must be regarded as a failure, most often due to skin problems and self neglect.
There were 47 readmissions to the Unit during the year, a significant shortfall on the contract estimate of two hundred readmissions, skin problems predominate.

B1 B10 Table Eighteen - Ventilated Bed Days

High-level spinal cord injury often requires temporary or permanent ventilator support. The Respiratory Care Team consists of a Consultant Respiratory Physician and a Respiratory Care Sister who work closely with the neuro-anaesthetic service providing in-patient care and a domiciliary ventilation service throughout Scotland.

		No. Patients	Ave. Ventilated Days	Total Ventilated Days
11/12	**Edenhall**	13	29	383
	RCU	5	29	146
12/13	**Edenhall**	16	14	229
	RCU	7	22	151
13/14	**Edenhall**	21	25	529
	RCU	6	79	472
14/15	**Edenhall**	24	25	609
	RCU	5	66	331
15/16	**Edenhall**	**23**	**21**	**491**
	RCU	**2**	**39**	**78**

Each patient is counted only once but may be responsible for multiple episodes of care or inter ward transfers if their condition varies. RCU continues to prove its worth in continuing to provide step-down ventilation within the rehabilitation ward and freeing up acute ventilator beds in Edenhall ward. The number of acutely ventilated patients (Edenhall) remains high and in the mean time on ventilation is stable at about three weeks. RCU has had fewer patients requiring long-term ventilation. Long-term ventilation is fortunately rare and numbers are expected to vary widely year to year.

B1: C: Finance Report 2015-2016

		AfC Banding	WTE	Contract Value 2015/16 (disputed) £	Contract Value YTD (disputed) £	Actual YTD £	Variance YTD £	Year End Forecast £	Year End Forecast Variance £
Dedicated Staff Costs									
Medical			9.19	963,537	963,537	1,071,277	-107,740	1,071,277	-107,740
Administrative		4	6.50	158,555	158,555	139,237	19,318	139,237	19,318
Administrative		3	0.14	3,229	3,229	3,368	-139	3,368	-139
Administrative		2	2.49	56,611	56,611	64,052	-7,441	64,052	-7,441
			9.13	*218,395*	*218,395*	*206,658*	*11,737*	*206,658*	*11,737*
Senior Manager			0.50	35,296	35,296	29,769	5,528	29,769	5,528
Nursing		7	7.80	342,737	342,737	378,612	-35,874	378,612	-35,874
Nursing		6	9.36	427,640	427,640	429,103	-1,463	429,103	-1,463
Nursing		5	52.30	1,783,878	1,783,878	1,908,042	-124,164	1,908,042	-124,164
Nursing		2	23.88	547,972	547,972	596,947	-48,976	596,947	-48,976
Housekeepers		2	2.00	56,319	56,319	46,418	9,901	46,418	9,901
Psychologist		8B	1.00	64,093	64,093	62,195	1,898	62,195	1,898
AHP		7	12.26	541,426	541,426	549,006	-7,580	549,006	-7,580
			13.26	*605,519*	*605,519*	*611,201*	*-5,682*	*611,201*	*-5,682*
Total Staff			**127.42**	**£4,981,293**	**£4,981,293**	**£5,278,026**	**£296,733**	**£5,278,026**	**- £296,733**
Supplies Costs									
Drugs				164,347	164,347	158,606	5,741	158,606	5,741
Surgical Sundries				485,482	485,482	443,266	42,216	443,266	42,216
CSSD/Diagnostic Supplies				4,513	4,513	6,215	-1,702	6,215	-1,702
Other Therapeutic Supplies				121,496	121,496	166,761	-45,265	166,761	-45,265
Equipment/Other admin supplies	**			55,903	55,903	72,522	-16,619	72,522	-16,619
Hotel Services				40,936	40,936	43,613	-2,677	43,613	-2,677
Direct Supplies				**£872,677**	**£872,677**	**£890,983**	**- £18,306**	**£890,983**	**- £18,306**
Charges from other Health Boards									
Lothian Spinal Clinic				5,173	5,173	4,583	590	4,583	590
Charges from other Health Boards				**£5,173**	**£5,173**	**£4,583**	**£590**	**£4,583**	**£590**
Allocated Costs									
Medical Records				104,581	104,581	108,974	-4,393	108,974	-4,393
Building Costs				204,236	204,236	204,379	-143	204,379	-143
Domestic Services				68,378	68,378	71,250	-2,872	71,250	-2,872
Catering				188,133	188,133	196,037	-7,903	196,037	-7,903
Laundry				67,250	67,250	67,298	-48	67,298	-48
Neuroradiology				78,339	78,339	81,612	-3,273	81,612	-3,273
Laboratories				90,338	90,338	94,113	-3,775	94,113	-3,775
Anaesthetics				37,400	37,400	38,962	-1,562	38,962	-1,562
Portering				72,829	72,829	75,887	-3,059	75,887	-3,059
Phones				48,881	48,881	49,404	-524	49,404	-524
Scottish Ambulance Service				9,077	9,077	9,173	-96	9,173	-96
General Services				27,994	27,994	29,461	-1,467	29,461	-1,467
Allocated Costs				**£997,436**	**£997,436**	**£1,026,552**	**- £29,116**	**£1,026,552**	**- £29,116**
Total Supplies				**£1,875,286**	**£1,875,286**	**£1,922,118**	**- £46,832**	**£1,922,118**	**- £46,832**
Overhead Costs									
Rates				59,418	59,418	59,418	0	59,418	0
Capital Charge				435,774	435,774	435,774	0	435,774	0
Overheads				151,511	151,511	151,511	0	151,511	0
Total Overheads				**£646,702**	**£646,702**	**£646,702**	**£0**	**£646,702**	**£ 0**
Total Expenditure			**127.42**	**£7,503,282**	**£7,503,282**	**£7,846,846**	**£343,565**	**£7,846,846**	**- £343,565**
Total Expenditure net of Postgraduate Dean Funding				**£7,381,745**	**£7,381,745**	**£7,725,310**	**£343,565**	**£7,725,310**	**- £343,565**
Income from non-Scottish resident patients						-669	669	-669	669
Total Net Expenditure			**127.42**	**£7,381,745**	**£7,381,745**	**£7,724,641**	**£342,896**	**£7,724,641**	**- £342,896**

**includes £37,986 of under £5k equipment

B1 D Key Performance Indicators Summary

	12-13	13-14	14-15	15-16
New Admissions	153	177	164	**150**
New Outpatients	232	271	290	**170**
Key Performance Indicators				
Referrals				
All patients referred	430	552	586	**564**
Telephone advice	277	253	312	**414**
Complex advice with support/visit	79	122	110	**84**
New patient activity				
All patients admitted with neurological injury	91	110	120	**114**
All patients admitted with non-neurological injury	62	67	44	**36**
Surgical stabilisations:				
- Thoraco lumbar fixations	34+6	42 +4	28	**45**
- Elective removal of metalwork			3	**5**
- Cervical fixations	20+	20+	40	**17**
- Halo immobilizations	20	29	27	**24**
Spinal injury specific surgery:				
- Plastic Surgery	39	UNK	16	**18**
Implant spasm and pain control:				
- New pumps implanted	0	2	1	**1**
- Revision pumps	2	4 Rem / Rev	2	**1**
- Operational pumps	16	17	16	**12**
- Pump Refill QENSIU	12	11	9	**8**
- Pump Refill Local	6	6	7	**4**
Step down unit:				
- Episodes of care	26	28	44	**47**
- Number of families/people	14 / 69	14	19	**32**
- Number of days (nights)	53	72	78	**108**
- Relatives Room				
- Episodes of care	N/A	N/A	N/A	**33**
- Number of families / people	N/A	N/A	N/A	**27**
- Number of days (nights)	N/A	N/A	N/A	**133**
New inpatient occupied bed days				
Total Available (new & return)	17,505	NA	17,369	**17428**
Actual	14,313	NA	14,354	**14765**
Bed Occupancy %	81.7%	NA	82.6%	**85%**
Mean length of stay				
I	**135**	126	98	**131**
II	142	138	129	**125**
III	131	159	118	**124**
IV	28	31	29	**25**

All	80	74	75	**87**
Range of length of stay	1- 414	1 - 455	2 - 416	**1 - 497**
Delays in discharge (actual v's intended)				
Number of patients discharged	141	175	164	**144**
Number of patients with delayed discharged	2	7	5	**7**
Length of delay (mean/mode)	130	34	38	**26**
% with no delay	98.6%	**96%**	97%	**95%**
Day case				
by NHS Board of Residence	See Table	See Table	See Table	See Table B1/A10
by reason for admission	See Table	See Table	See Table	See Table B1/A8
Outpatient activity				
New Patient no's QENSIU	See Table	See Table	See Table	See Table B1/A2
Return Patient no's QENSIU	See Table	See Table	See Table	See Table B1/A2
New Patient QENSIU (DNAs/ % attendance)	21%	18%	20%	**25%**
Return Patient QENSIU (DNAs/ % attendance)	30%	27%	26%	**29%**
New Outreach Clinics by Centre	NA	See Table	See Table	See Table B1/A5
Return Outreach Clinics by Centre	See Tables	See Table	See Table	See Table B1/A6
Attendance at New Outreach Clinics by Centre (DNAs/ % attendance)	NA			
Attendance at Return Outreach Clinics by Centre (DNAs/ % attendance)	See Table			
Outpatients discharged in period	NA			
Number of patients discharged from the service	Life Long Care	Life Long Care	Life Long Care	**Life Long Care**
Actual / Anticipated number of patients in service				
Allied Health Professionals activity	See Appendices	See Appendices	See Appendices	See Appendices
New Patient (DNAs/ % attendance)	See Tables	See Tables	See Tables	See Table B1/A3
Return Patient (DNAs/ % attendance)	See Tables	See Tables	See Tables	See Table B1/A3

As a specialised national service we conform to current and past relevant HEAT targets. (Health Improvement, Efficiency, Access, Treatment Targets) These are incorporated wherever possible in the relevant sections of the report (B3: C)

B2 Effectiveness

B2 A1 Clinical Audit Program

There is a multi-disciplinary audit programme overseen by senior medical and nursing staff. Meetings and presentations are held monthly. During the last year unit staff completed 11 new audits as well as re-auditing 7 previous areas. New audits included an audit of the Liaison Service, staff and patient feedback regarding the rehabilitation programme and hand therapy service audit. Re-audits included delay to admission Aspects of the Scottish Patient Safety Programme are now imbedded in the Unit and provide monthly mini audits of practice including CAUTI and Sepsis. We anticipate that publication of national outcomes from SPSP will allow us to benchmark ourselves against other Scottish wards.

B2 A2 Table Nineteen - Mechanism of Injury

The mechanism of injury of all admissions reflects changes seen in other areas of social activity and change. Falls remain the predominant mechanism of injury. Medical causes, domestic and self-harm remain stable. The number of sporting injuries has reduced but there continues to be a steady number of cycling injuries from all disciplines, on and off road.

	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016
Fall	93	73	104	95	**74**
RTA	**36**	**43**	**28**	**40**	**35**
Motor vehicle	21	21	19	18	18
Motorcyclist	7	9	4	7	8
Bicyclist	4	9	1	14	9
Pedestrian	4	4	4	1	0
Secondary to Medical Diagnosis This includes patients with severe ligamentous injury but no fracture	16	13	16	11	**14**
Industrial Injury	5	8	4	4	**4**
Assault	3	0	0	1	**1**
Penetrating Injuries	0	0	0	0	**0**
Sporting Injury	13	12	14	8	**7**
Domestic Injury	1	0	0	0	**0**
Self Harm	3	4	11	5	**3**
Other	0	0	0	0	**0**
Total	**170**	**153**	**177**	**164**	**150**

B2 A3 Clinical Governance

Senior medical and nursing staff meet quarterly with colleagues in the Health Board Clinical Governance programme. Standing items include Clinical Incident Review, Mortality Review, Risk Register and putting audit into practice. There was one (category 4) clinical incident which was formally investigated and resulted in changes to local policy on emergency blood transfusions. The Unit continues to adopt National Management Guidelines as appropriate. In the last year there was one death.

B2 B Clinical Outcomes/complication rates / external benchmarking

The Unit has provided outcome and activity figures since 1998 in this Annual Report and in specialised ad hoc reviews. Clinicians and researchers have published many papers in the literature on a number of topics. Details of publications and complication rate are outlined in Sections B1 and B3.

External benchmarking remains a goal. In 2014 national commissioning started in England and Wales and it was hoped that this would provide a reference database but so far it has not been possible to obtain their data for comparison purposes. It has been difficult to find international partners with which to compare activity: many countries rely on a combination of public and work insurance to pay for care and we are not aware of any other publicly funded spinal service which provides lifelong care to such a geographically distinct

population. The Scottish database continues to combine management and clinical information enabling service management and development.

B2 C Service Improvement

The service is subject to continual review.

B2 D Research

Morbidity and mortality following spinal cord injury was reduced dramatically following the introduction of specialised spinal cord injury units. Life expectancy has been increased from a few years to approaching normal and the complications of injury are routinely monitored for, treated or prevented.

Research in basic sciences, prevention and clinical treatment including translational approaches is a fundamental and embedded function of the unit. The ultimate aim is to act as a host and supporter of all basic scientists who can have a positive impact on the care of the traumatic spinal cord injured. We have set up **SCI ²**.The **S**cottish **C**entre for **I**nnovation in **S**pinal **C**ord **I**njury as an umbrella to support translational research in a clinical setting. The unit is principally supported by Glasgow University whose Centre for Rehabilitation Engineering is based in the GU funded Research Mezzanine.
The Unit has a portfolio of research ranging from pre clinical e.g. olfactory ensheathed cells and scaffolds to clinical e.g. acute intervention studies, osteoporosis, brain computer interface, vibration and biomechanical modelling.
Upcoming studies in the next quarter include a multi-centre study using a new spinal scaffold designed for implantation at the site of injury within a spinal cord contusion. It provides structural support to the patient's spinal tissue and a supportive matrix to facilitate endogenous repair processes and non-invasive spinal cord stimulation.

Two papers reviewing the demographics of spinal cord injury in Scotland over the last 20 years have been published in peer reviewed journals in the last year.

The first Scottish Spinal Research Network meeting was held in the Queen Elizabeth Teaching and Learning Centre and hosted by QENSIU. The meeting was well attended by Clinicians and Academics alike, from Scotland and beyond.

The Imaging Centre for Excellence is due for completion later in 2016 and is located adjacent to the QENSIU. The Centre will include a world class new 7 Tesla MRI scanner. This state of the art imaging facility will allow an expansion of our portfolio of research.

Ruth Walker, Medical Student from Aberdeen Royal Infirmary, as part of an intercalated degree carried out a survey assessing the priorities of patients with spinal cord injury in Scotland. She presented this work at the Scottish Spinal Injuries Network meeting.
With an ageing population in Scotland, a greater proportion of spinal cord injuries (SCI) are caused by falls in the elderly population. The aim of this study is to determine the priorities of young, middle aged and elderly patients with a SCI. Patients of the Queen Elizabeth National

Spinal Injuries Unit (QENSIU) were invited to complete a survey ranking the importance of the following functions: arm/hand function; upper body/trunk strength and balance; bladder/bowel function, elimination of dysreflexia; sexual function; elimination of chronic pain; normal sensation and walking movement. A total of 157 participants were included in the study. The responses demonstrated that walking movement was more important to elderly patients than young patients, whilst arm/hand function was more important to young tetraplegic patients than elderly tetraplegic patients.

Papers and Authorship
See Appendix for Research Profile

B3 A1 Safety Risk Register

The Unit complies with all corporate, regional and local requirements and supports risk awareness and risk management.

B3 B1 Clinical Governance: Critical Incidence Reporting

A formal Critical Incident Reporting system is in place with a Clinical Incident defined as a potential or actual danger to patients, which could have been prevented by a change in practice. The Unit is included in the Regional Services Directorate for reporting purposes

Table Twenty and Twenty-one – Incident Reporting Summary

Category	2014/2015	2015/2016
Pressure Ulcer Care	33	9
Medication Incident	7	10
Clinical – other	0	1
Contact with object	4	5
Infection Control	0	0
Medical Device & Equipment	7	2
Abscondment	1	1
Slips, trips and falls	**49**	**56**
Other	10	28
Security	1	2
Moving & Handling	12	4
Violence & Aggression	30	30
Contact with or exposure to hazard	3	2
Challenging Behaviour	0	1
Fire Alarm actuation	4	4
Needlestick injury	6	2
Patients record missing	0	1
Transfusion incident	0	2
Building fault	4	2
Staffing levels	2	1
Catering Issues	0	1
Anaesthetic Practice	1	0
Discharge / Transfer issue	1	0
Total	**175**	**164**

Slips, Trips and Falls	
Fall from bed	3
Fall from chair	25
Fall from level	4
Slip / trip on level	10
Suspected fall	9
Other	2
Unwitnessed	1
Controlled	2

Pressure Ulcer Care	
Total Inherited	1 grade 2
Total Hospital Acquired	7 grade 2 1 grade 3

Overall	
1 - Negligible	102
2 - Minor	52
3 - Moderate	9
4 - Major	1
5 - Extreme	0
Total	**164**

The Unit maintains an active CI reporting system and has encountered one level four incident this year.

B3 C1 Scottish Patient Safety Programme (SPSP)

The Scottish Patient Safety Programme aims to improve the safety and reliability of hospital care throughout Scotland. This is achieved by using evidence based tools to improve the reliability and safety of everyday health care. The current aims are to:

- Reduce Hospital Acquired Infection
- Reduce adverse drug incidents
- Increase critical care outcomes]
- Increase organizational and leadership culture and safety
- Healthcare Associated Infection (HAI)

There are five work streams, Edenhall Ward is within the Critical care/HDU work stream and Philipshill Ward is in the general work stream.

B3 C2 Table Twenty-two and Twenty-three - Hospital Acquired Infection

Sporadic MRSA cases continue to arise within the Unit and staff work within GGC Infection Control guidelines to minimise cases. Periods in isolation significantly affect the rehabilitation timetable and every attempt is made to reduce this to a minimum.

	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016
Total patients req. Isolation	0	N/A	All	6	**4**
Salmonella	0	0	0	0	**0**
Clostridium Difficile	0	0	0	2	**0**
MRSA	4	4	14	5	**4**
Streptococcus pyogenes	1	1	1	0	**0**
Scabies/ TB /Varicella Zoster	0	0	0	0	**0**
MDR Acinetobacter				1	**0**
Patients treated in isolation				4	**3**
Patients not treated in isolation			8	4	**1**
Patients not suitable for isolation			3	3	**1**
No single room available			5	1	**0**

2015-2016	MRSA	C.Diff	MDR Acinetobacter
Edenhall	2	0	0
Philipshill	2	0	0

Edenhall Ward receives patients in the early stage after multiple trauma and many come from ITU or HDU areas and are a high risk group. The relatively low rates of infection are a tribute to the standard of nursing care and policies within the Unit especially as regards bowel and bladder care.

B3 C3 Clinical Quality Indicators

Senior nursing staff monitor the following key quality indicators in accordance with GGC policy.

Documentation Audits are carried out on alternate months. Ten sets of patients' notes are selected randomly to ensure we are adhering to GGC Record Keeping.

Sepsis Six Bundle Both wards have implemented the Sepsis Six Bundle. This major initiative from the Scottish Patient Safety Programme is audited by evaluating data monthly. Sepsis Six ensures reliable person centred response for the deteriorating patient with reliable recognition and immediate care delivery.

Catheter Associated Urinary Tract Infection (CAUTI) This is well-established on both wards.

Meal Time Bundle is a GGC initiative to monitor and improve patient meals and nutrition.

Active Patient Care Active Care is a framework document which aims to embed person-centred care and to help prevent adverse events such as falls and pressure ulcers. Its aim is to be person centred using planned care timings based on clinical judgement to pre-empt the care needs of patients.

Caring Behaviours Assurance System Both wards have been involved in the CBAS programme, each area has designated champions and have created a PCQI (person centred quality instrument) for their area. See B5.

Care Assurance System (CAS)

CAS has been developed to provide an assurance framework to support the delivery of safe, effective and person centred care across three West of Scotland Health Boards. (NHSGGC, Ayrshire & Arran & Lanarkshire)

The framework which contains 13 professional care standards is based on a model used within Salford Royal NHS Foundation Trust. Each standard encompasses the 4 Leading Better Care Domains:

- Safe and effective patient care
- Enhancing the patients experience of care
- Leading, managing and developing the performance of the team
- Contributing to the organisations objectives.

CAS which was launched in NHSGGC on October 2015 also encompasses a number of the national drivers which the Spinal Unit has been actively involved in. This includes the Scottish Patient Safety Programme, Person Centred Health Care Collaborative, Older People in Acute Hospital Settings and HEI/HAI. Assurance visits to wards and departments will take place this year.

Thanks are due to Education Sister Helena Richmond for supervising the above projects.

B3 C4 Overall CQI Compliance Trends 2011-2016

As part of Leading Better Care 3 clinical quality indicators are assessed monthly providing real time data to the wards.

B3 C5 KSF Targets

The Unit is compliant with KSF (Knowledge, Skill Framework) targets. All nursing and administration staff are up to date and have been reviewed in the last twelve months.

B3 D Adverse Events

B3 D1 Pressure Sore Prevalence

Traditionally we have monitored point prevalence but have now moved to recording total sore numbers recorded on the ward.

Table Twenty-three Overall Pressure Ulcer

Pressure Ulcer developed outwith QENSIU = **18**			Pressure Ulcer developed during stay in QENSIU= **15**		
Grade 2 = 16	Grade 3 = **2**	Grade 4 = 0	Grade 2 = 12	Grade 3 = **2**	Grade 4 = **1**

All pressure sores must be considered to be a failure of care to some extent. The best way of preventing sores outwith the Unit is to continue to admit patients as soon as clinically safe to do so. The “red flag” team of Unit nursing and medical staff review every sore developing on the ward and make recommendations on any necessary changes in care. When appropriate they involve the GGC Tissue Viability nurses.

B3 E Complaints / Compliments

B3 E1 Complaints

A formal complaint/suggestion system is in place at both Unit and hospital level. This has proved invaluable in monitoring quality and modifying the service. The management recorded six formal complaints, three partially upheld which were fully investigated and proved useful in reviewing current practice, two not upheld and one withdrawn. Assistance was given in advising regarding complaints involving management of patients out with the Unit which also have relevance to in house treatment. A proactive approach is followed with Spinal Injuries Scotland, Aspire and Back Up to improve all aspects of our service.

B3 E2 Compliments

Significant contributions are received from grateful patients, families and community groups to assist in purchasing items for patient treatment and comfort.

B4 Timely (Access)

B4 a) Waiting / Response Times

QENSIU admits acutely injured spinal patients as soon as their condition allows. There is no waiting list for admission. In 2015-16 27% of patients were admitted within one day of injury and 66% within one week. The time to admission has been stable over several years. It has proven difficult to decrease this time; there is likely to be a cohort of polytrauma patients who will always require several days for resuscitation and treatment of life and limb-threatening injuries before they are fit for transfer.

B4 b) Review of Clinical Pathway

The national pathway has proven to be robust and provides a safe model for delivery of care to spinal-injured patients in Scotland. It has not been possible to obtain benchmarking figures from other UK centres but informal discussion with colleagues suggests that the Scottish figures would compare favourably against other centres.

B5 Person Centred

B5 A Patient Carer/Public Involvement

The Unit is fully committed to the development of integrated care and peer review. Regular patient focus groups are used and relatives and carers events are held in house and in cooperation with Spinal Injury Scotland (SIS).We comply fully with all national and local initiatives. The patient Education and Social Integration Programme is being expanded with the help of SIS.

B5 B Example: Leading Better Care/Person Centred Care
Caring Behaviours Assurance System (CBAS)

Commissioned by the Chief Nurse for NHS Scotland the Caring Behaviours Assurance System (CBAS) is a way of exploring the perceptions of everyone involved in the delivery of healthcare with a view to enhancing understanding and co-operation, so that action can be put in place to assure greater satisfaction with the quality of care given and received.

CBAS reflects 'the Seven Cs' identified in the Scottish Government's Healthcare Quality Strategy (May 2010) which states:

People in Scotland have told us that they need and want the following things from the NHS and we have built this strategy around these priorities:

- **Caring** and **Compassionate** staff and services
- Clear **Communication** and explanation about conditions and treatment
- Effective **Collaboration** between clinicians, patients and others
- A **Clean** and safe care environment
- **Continuity** of care
- Clinical excellence

Both wards have identified CBAS champions which promote and take the above priorities forward.

Person Centred Health

As a result of the patients and carers feedback the unit has produced an "Introduction to the Unit" brochure. An educational manual has been developed in collaboration with service users. Furnishings and utensils have been purchased for the step down facility to enhance the patient and relative stay. Staff practices have changed which promote dignity and a new development is the introduction of practical classes to support the theoretical education.

- As a result of the above initiatives patient feedback resulted in:
- New nurse call system more compatible with patient's needs
- Introduction of a meal times coordinator to enhance the mealtime experience
- Change to way some personal care tasks are carried out
- Increased frequency of relative support days

B5 C User Survey

The Unit is fully committed to regularly obtaining feedback and responding to issues raised. Patient Stories satisfaction questionnaires are used and are included at appropriate sections of the report. **Questionnaires** are used as appropriate.

B5 D Family Unit / Step Down Unit

The step down facilities continue to support acute admissions, long stay and pre-discharge patients. 32 patients and their families have used the family suite on 47 occasions for a total of 108 nights. Evaluation of this facility has been positive with patients commenting it helps in the preparation for discharge. 27 families of acute admissions on 33 occasions have taken the opportunity to use the relative's rooms in the first few days of admission totalling 133 days. Families have appreciated being so close during the early stages of injury.

B6 Equitable

B6 A Fair for all: Equality & Diversity

The Unit has developed to ensure equal access for all geographical areas of Scotland.

Table Twenty-four - Out-patient Services

	11/12	12/13	13/14	14/15	15/16
Return	2293	2243	2389	2378	**2112**
New	188	232	271	290	**170**

Table Twenty-five - Out-patient Clinic Location

FREQUENCY	LOCATION - QENSIU
DAILY	DROP IN
WEEKLY	NEW, RETURNS, SKIN, HALO, URODYNAMICS, SPASM, PUMP, ACUPUNCTURE, SPINAL R/V NEUROSURGERY, UROLOGY
BI MONTHLY	FERTILITY, MDC/FDC, RESPIRATORY, THORACOLUMBAR
MONTHLY	EDINBURGH
THREE MONTHLY	ABERDEEN
SIX MONTHLY	DUMFRIES, BORDERS, ARBROATH
ANNUALLY	HUNTLY

Table Twenty-six - Out-patient By Centre

	11/12	12/13	13/14	14/15	15/16	CHANGE YEAR	TOTAL 1992-2016
New QENSIU	188	232	271	290	**170**	(41.3%)	**3204**
Return QENSIU	1876	1878	2014	1995	**1728**	(13%)	**37674**
Edinburgh	174	148	154	157	**155**	(1.2%)	**3803**
Inverness	62	60	63	63	**63**	No Change	**1037**
Aberdeen	85	66	74	76	**71**	(6.5%)	**1029**
Dumfries & Galloway	27	20	17	19	**24**	+ 26.3%	**305**
Borders	15	26	24	25	**29**	+ 16%	**287**
Arbroath	31	26	29	27	**26**	(3.7%)	**300**
Huntly	23	19	14	16	**16**	No Change	**106**
Total	**2481**	**2475**	**2660**	**2668**	**2282**	**(14.4%)**	**47745**

Table Twenty-seven - Number of patients on the Spinal Outreach clinic lists

Clinic	April 2012	April 2013	April 2014	April 2015	April 2016
Inverness	80	82	77	81	**63**
Aberdeen / Huntly	117	118	118	120	**87**
Borders	35	36	34	39	**29**
Dumfries	27	29	26	30	**24**
Arbroath	35	37	33	39	**26**
Edinburgh			142	134	**155**
Total	**294**	**302**	**430**	**443**	**384**

Table Twenty-eight - New Out-patient Activity by Health Board

	11/12	12/13	13/14	14/15	15/16
Ayrshire & Arran	15	16	16	26	**6**
Borders	2	2	1	1	**1**
Dumfries & Galloway	3	6	6	5	**2**
Fife	4	2	2	4	**1**
Forth Valley	14	4	11	9	**1**
Grampian	3	0	2	0	**2**
Greater Glasgow Clyde	105	154	193	197	**123**
Highland	4	0	9	7	**5**
Lanarkshire	27	35	21	33	**25**
Lothian	3	7	8	6	**3**
Shetland	0	0	0	0	**0**
Tayside	8	4	0	1	**0**
Orkney	0	0	0	0	**0**
Western Isles	0	1	2	1	**1**
ECR	0	1	0	0	**0**
Unknown	0	0	0	0	**0**
Total	**188**	**232**	**271**	**290**	**170**

B6 B Geographical Access

B6 B1 Nationwide services

As a national service it is important to provide outpatient and domiciliary services throughout Scotland. This has resulted in the development of the Liaison Sister service and out-reach clinics in areas identified on our database as having a concentration of patients. All outreach clinics are now Medical Consultant led with Nursing and Occupational Therapy staff attending as required. Volunteers from SIS see and advise patients and carer. There is a continued demand for nurse specialists to provide important in-patient and outpatient advice to local care teams as well as patients themselves. As well as two Liaison Sisters there is an Education Sister, Respiratory Sister, and Discharge Planner. They all provide assistance to the Senior Nurse.

The Spinal Nurse Specialist team (Liaison Sisters) continue to visit patients wherever they are domiciled in Scotland. These visits may be post discharge visits, follow up visits or for education/training of families or carers. A telephone help and advice service continues to be

maintained by the Spinal Nurse Specialist team taking approximately 10 - 15 telephone calls per day.

Sister Prempeh 105 visits covering 8,290 miles.

Sister Woods 116 visits covering 7,884 miles.

Sister Duffy 69 visits covering 7,011 miles.

Total numbers of visits, clinics and meetings carried out by the liaison nurses was 672 covering 23,185 miles.

B6 B2 Table Twenty-nine - Attendance and Location Outreach Clinics

Location	% Attendance 14-15	% Attendance 15-16	Number of Clinics	Number of Patients
Aberdeen	89%	**82%**	**5**	**71**
Inverness	97%	**93%**	**4**	**63**
Dumfries	90%	**100%**	**2**	**24**
Arbroath	90%	**79%**	**3**	**26**
Borders	94%	**96%**	**2**	**29**
Huntly	95%	**88%**	**1**	**16**
Edinburgh	N/A	**92%**	**11**	**155**
Ave Rate	**92%**	**90%**	**28**	**384**

Outreach attendance remains high. Patients are contacted beforehand to confirm that the appointment is still convenient and appropriate.

B6 B3 Table Thirty - Annual Activity: Liaison Sisters

Name	Meetings	Clinics	Visits	Miles	External Teaching
L. Woods	**139**	**17**	**116**	**7884**	**10**
S. Prempeh	**110**	**16**	**105**	**8290**	**17**

B6 B4 Table Thirty-one - Annual Activity: Respiratory Support Nurse

The Respiratory Support Sister remains very successful in coordinating in-patient and domiciliary ventilation. All patients requiring assisted ventilation at home have been visited during the year with 7011 road miles travelled.

Name	Meetings	Clinics	Visits	Teaching Sessions	Respiratory Referrals	Miles
L. Duffy	**25**	**13**	**69**	**210 staff**	**18**	**7011 + air miles**

A major role has been coordinating discharge for those requiring assisted ventilation with social services and an appropriate care and training package.

B6 B5

Table Thirty-two - Annual Activity Education Sister: Helena Richmond

Name	Meetings	Clinics	Internal Teaching	External Teaching	Outreach Clinics	Patient Education	Relatives Day
H. Richmond	**62**	**0**	**374**	**459**	**0**	**345**	**2**

B6: B6 Location of Lothian Outreach Clinic

The Edinburgh outreach clinic is now well-established at Astley Ainslie Hospital. We understand this hospital will close and we have plans to move the clinics to the to the Royal Edinburgh Hospital which is nearby and no disruption is expected to the service. Difficulties continue to be experienced in the drive towards E.P.R., Trakcare and PACs with outreach clinics.

B6 B7 Table Thirty-three - Supporting Surgical Services

Multi-disciplinary medical rehabilitation is the keystone of the workload in Spinal Cord Injury. Surgical support is required from orthopaedics, neurosurgery and Soft Tissue Pressure Sore surgery. Approximately twenty per cent of the patients have additional limb injuries.

Service	Clinics	Patients	Acute Spinal Operations	Elective Operations
Thoracolumbar 2 x Month	16	29	Thoracolumbar fixations 45	5
Neurosurgery LA, CM, CB 4 x Month	41	187	Cervical fixations 17	
Skin Care MF	37	44	1	17

All referrals and new admissions are discussed at the weekly team meeting with spinal and surgical consultants. This endures a consensus approach to management for the benefit of the patients and mutual support of consultant staff for difficult clinical decisions. The team of spinal surgeons Mr Mathieson' Mr Barrett and Mr Alakandy performed all the spinal fixations. Thanks are due to this surgical team for moving some of the surgery to the new QEUH and also for working through the recent crisis of neurosurgical theatre closure in Glasgow.
New orthopaedic spinal surgeons moved to QEUH in 2015 and we continue to explore ways of joint working between orthopaedic and neurosurgical teams.
Mr Fraser continues to provide expert plastic and soft tissue surgery for complex pressure sores.

Section C Looking Ahead / Expected Change/Developments

There continues to be a slow transition to electronic records and the Unit continues to use predominantly paper-based records due to difficulties in accessing e-records from outreach clinics. Patients may have notes from several hospitals and the national spinal paper notes continue to provide the most reliable and accessible source of information.

The senior spinal doctor is reaching retirement age and we are searching for potential candidates in the UK and beyond. This maybe an opportunity to make a proleptic appointment to ensure a seamless continuation of service. At the same time a bid has been made to NSD to eventually convert the existing associate specialist post to a fourth consultant post which would ensure a consultant led service in all aspects of the Unit and also give much more flexibility in job planning and rota coverage.

We have submitted a bid to employ a Sports Therapist to complement the formal rehabilitation process.

The Horatio's Garden team are half-way through the construction phase to landscape the Unit grounds. The opening is planned for September 2016. Thanks are due both to the charity and also to staff for working through inevitable building disruption.

The new Queen Elizabeth University Hospital opened in May 2015 and, as expected, has attracted most seriously ill and injured patients from the catchment areas covered by three large hospitals. The number of referrals from the area is stable but on-site referrals inevitably make more demands on senior medical time to assess these patients.

Section D Summary of Highlights (Celebration and Risk)

The original concept, funding and organisation of the care of spinal cord injury in Scotland have proved durable and flexible over the last twenty years. This is reinforced by international recognition, a successful track record in research and its influence in service planning in the UK.

The therapy programme within the Unit (organisation of gym time etc) was essentially unchanged since 1992, staff have introduced changes to the programme which includes formal timetabling and rehabilitation classes as well as gym time.

Production designers from the Glasgow College of Art (Prof A Macdonald and Gemma Wheeler, PhD student have studied and redesigned the treatment pathway from injury to discharge. Initial patient trials have been very positive and this project is likely to considerably change rehabilitation planning and design to optimise patient outcomes.

Demographics, expectations and service delivery patterns are evolving and it is appropriate that the service now proceeds to a full review of the nature provision and financing of the service. Key elements in forward planning are to ensure that the Unit continues to provide a necessary specialised service for an identifiable need and to produce it efficiently and equitably.

Thanks must be given to the National Services Division and NHS Greater Glasgow and Clyde for their help and support in delivering the service.

Alan McLean FRCP
Queen Elizabeth National Spinal Injuries Unit

Acknowledgement is made to Ana Bewick and Irene McGonigle for producing the report and to Mariel Purcell, Michele Paterson and Helena Richmond for their contributions to the main report. Many thanks are due to all of the team that assisted in the maintenance of the database. The Appendix is a huge testament to the work done by all in developing and supporting the Unit.

The front cover shows a word cloud/sketch by Mathis Riehle including key points from the Scottish Spinal Research Network Meeting hosted by Dr Purcell on the 24th November 2015. It demonstrates several of the research strands underway at QENSIU with collaborators.