Queen Elizabeth National Spinal Injuries Unit for Scotland

ANNUAL REPORT 2016-17

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 contains a comprehensive analysis of the Unit's activity.

A3 Description of Patient Pathways and Clinical Process

The Unit accepts 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

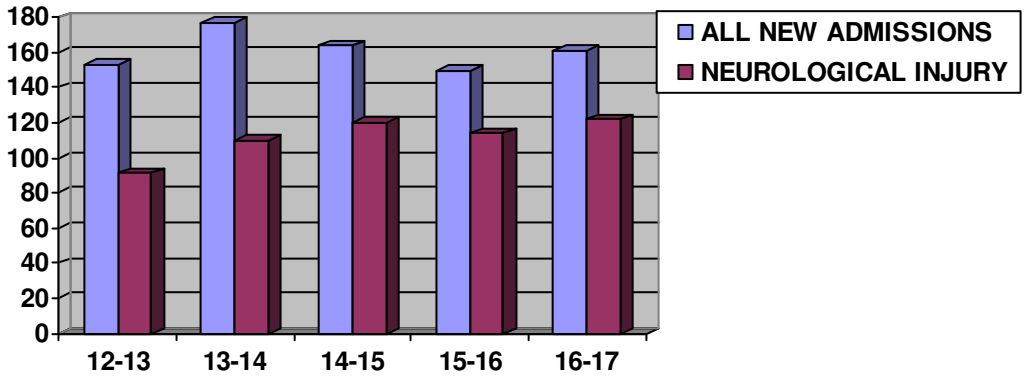


Table One

	12/13	13/14	14/15	15/16	16/17	92-17
ALL NEW ADMISSIONS	153	177	164	150	**161**	**3966**
Neurological	91	110	120	114	**122**	**2182**
Non-neurological	62	67	44	36	**39**	**1784**

All 122 patients referred with a neurological injury were admitted as soon as clinically indicated.

There has been a gradual rise in the number of neurological injured patients since the Unit was opened. 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 thirty seven patients 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 Queen Elizabeth University Hospital (QEUH) and other hospitals. The QEUH continues to attract major trauma from a very wide area and this has led to increasing demands of consultants' time to see patients who would have 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

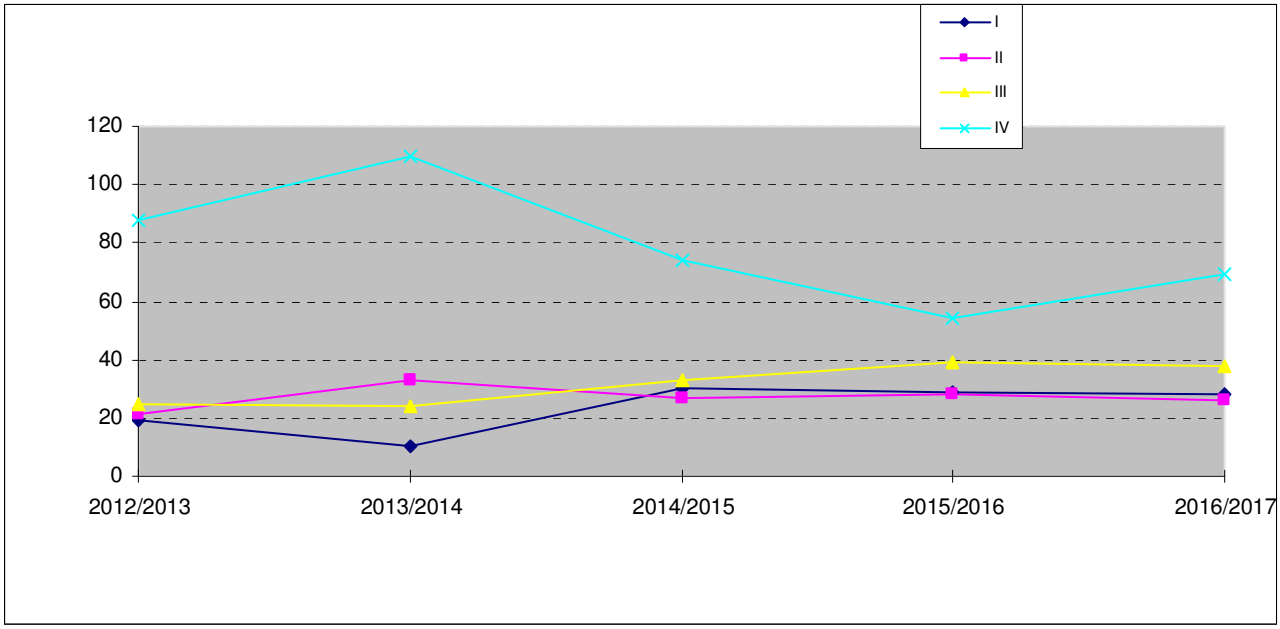


Table Two

GROUP	12/13	13/14	14/15	15/16	16/17	92/17
1	19	10	30	29	28	**351**
II	21	33	27	28	26	**633**
III	25	24	33	39	38	**859**
IV	88	110	74	54	69	**2123**
Total	153	177	164	150	161	**3966**

Numbers of Group 1, the high tetraplegic patients, remain high over the past three years. 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 also show a sustained increase.

The sustained rise in high tetraplegic patients significantly increases nursing workload. These high tetraplegic (C1-C4) were older 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 but a twenty-five year review suggests that there is an established trend of increasing numbers of older, more severely paralysed patients. See Appendix.

A3: A3 New Admissions by ASIA Impairment Score Level

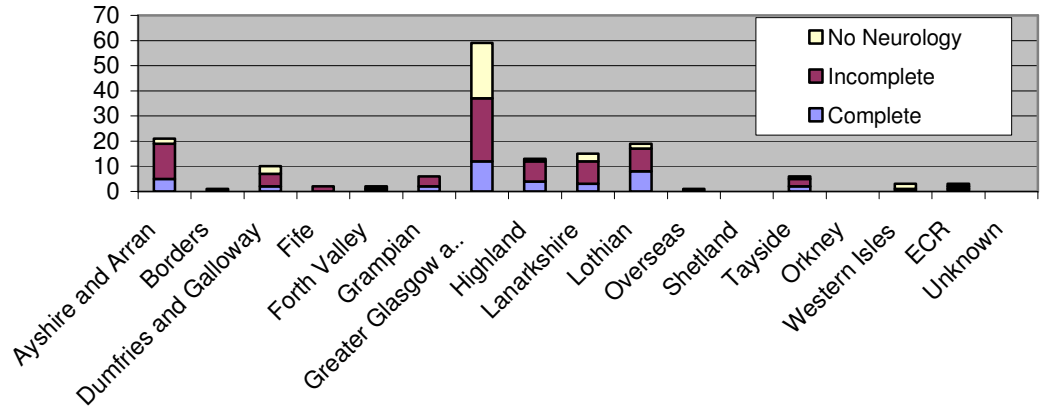
A	Complete: No motor or sensory function
B	Incomplete: Sensory but not motor function is preserved below the neurological level and includes S4-5
C	Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a motor grade less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

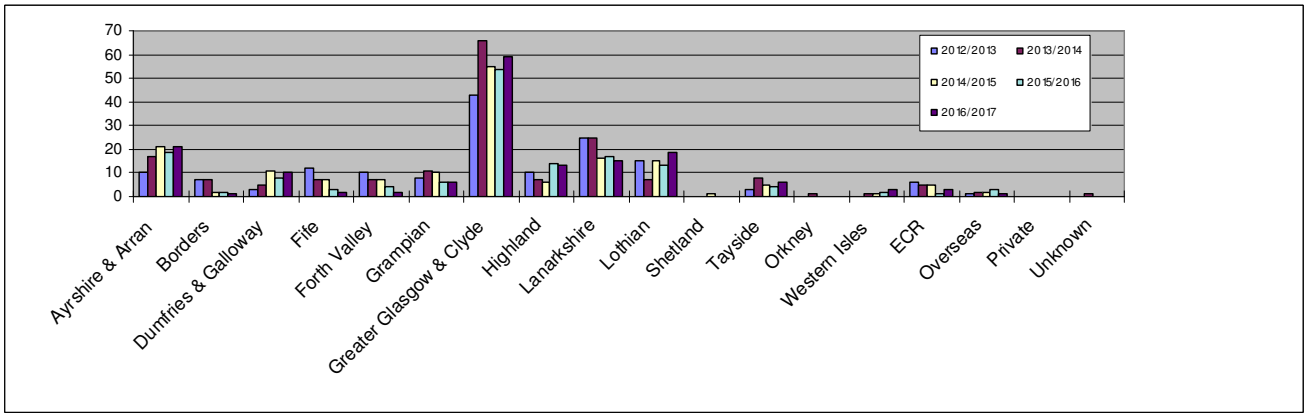
2016/2017	A	B	C	D	E	Total
Ayrshire & Arran	5	1	3	10	2	21
Borders	0	0	0	0	1	1
Dumfries & Galloway	2	0	1	4	3	10
Fife	0	0	0	2	0	2
Forth Valley	0	0	1	0	1	2
Grampian	2	1	2	1	0	6
Greater Glasgow Clyde	12	3	3	18	23	59
Highland	4	0	1	7	1	13
Lanarkshire	4	0	4	4	3	15
Lothian	8	1	7	1	2	19
Overseas	0	1	0	0	0	1
Shetland	0	0	0	0	0	0
Tayside	2	1	0	3	0	6
Orkney	0	0	0	0	0	0
Western Isles	0	0	0	1	2	3
ECR	1	0	1	0	1	3
Unknown	0	0	0	0	0	0
TOTAL	40	8	23	51	39	161

Fig Three Admissions by Neurological Deficit and Health Board



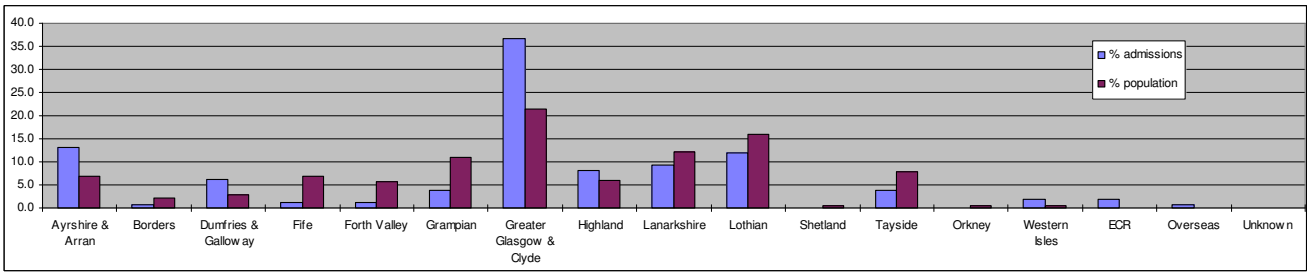
Admission patterns of paralysed patients by Health Board are stable. The Unit continues to admit patients from all areas of Scotland. The distribution of admission of paralysed patients and the annual variation since the Unit opened justifies the clinical and economic benefits of a national service. There is a continued skew towards the WoS patients admitted without paralysis. This is discussed further in A3:B1.

Fig Four New Admissions by Health Board of Residence 2012-2017



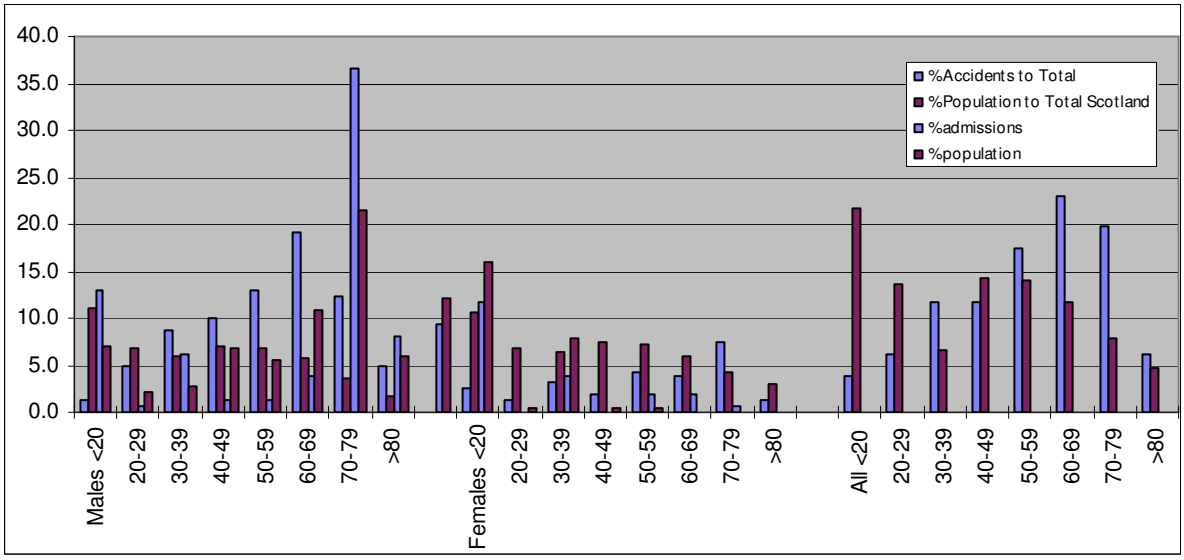
Four non-Scottish patients were admitted while on holiday or work in Scotland (ECR & Overseas) and were repatriated when their condition allowed. This number is constant. The Unit did not admit any private patients.

Fig Five Admissions by Health Board compared with Population Size



The equitable distribution of per-capita admissions within Health Boards is sustained although both GGC and Ayrshire and Arran 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 and older patients continues. Communication with colleagues throughout Europe confirms that this is an international phenomenon. This has major implications both for medical and nursing dependency, and also for the rehabilitation pathway as discussed in the Appendix. 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

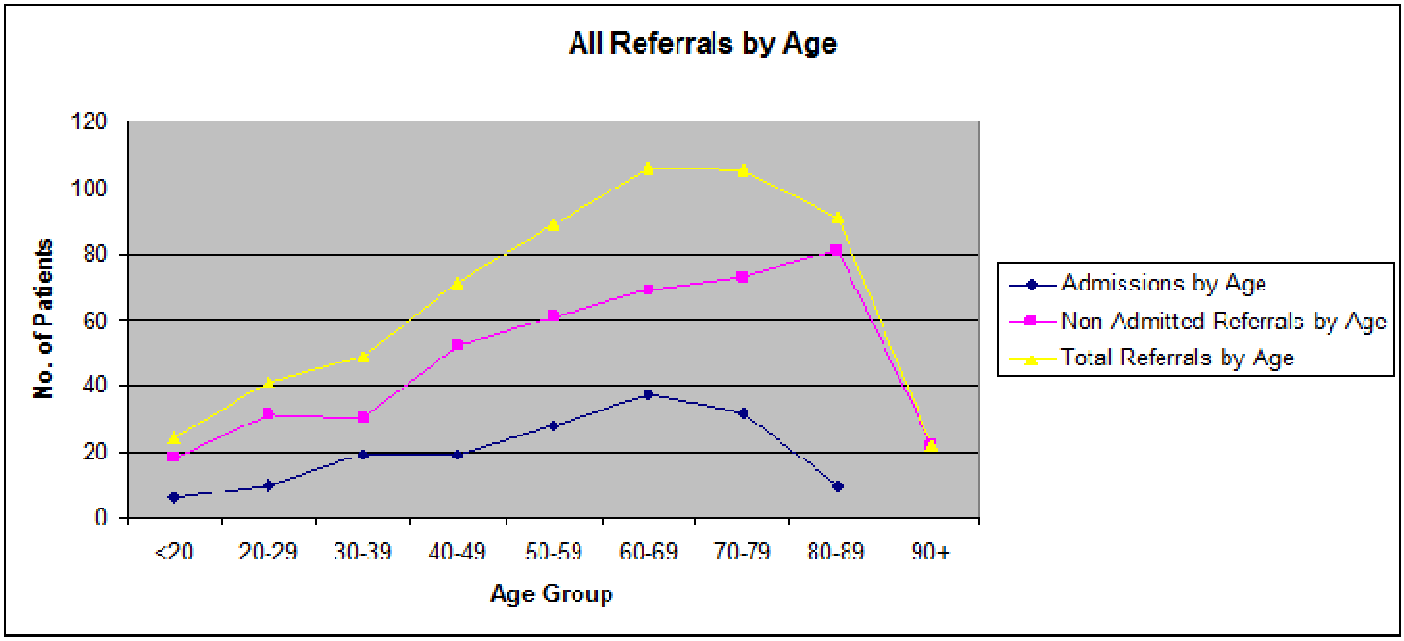


Fig Eight

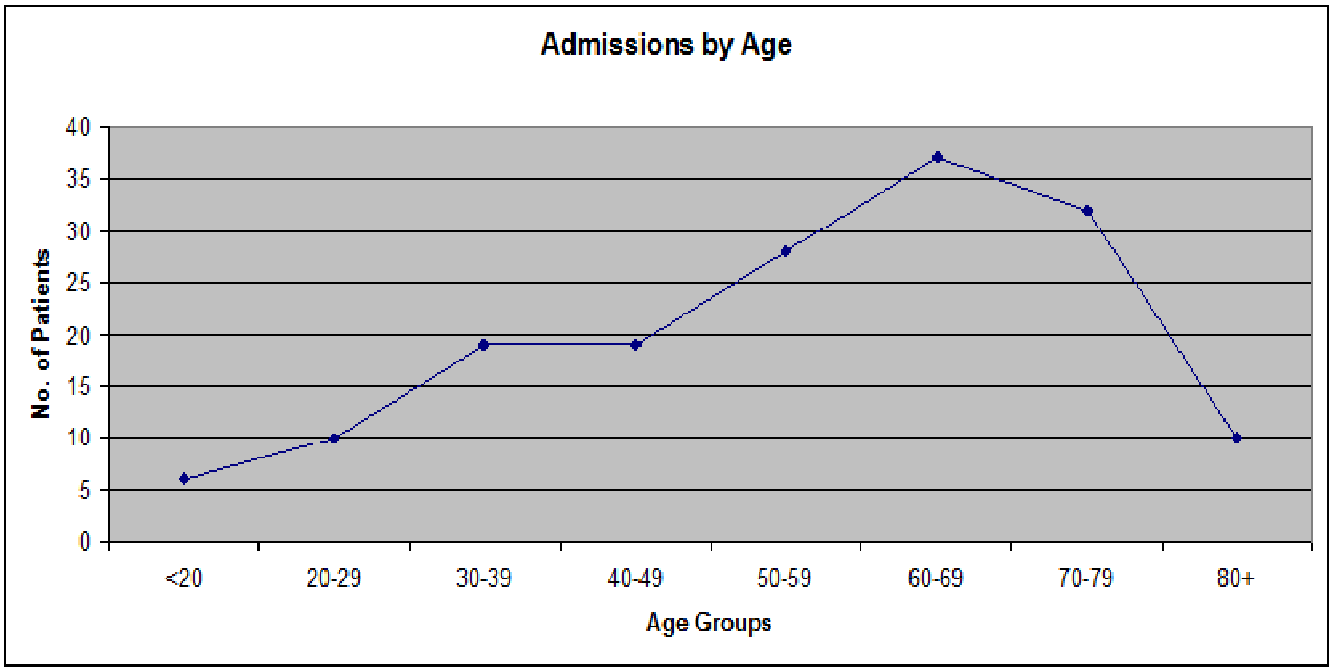
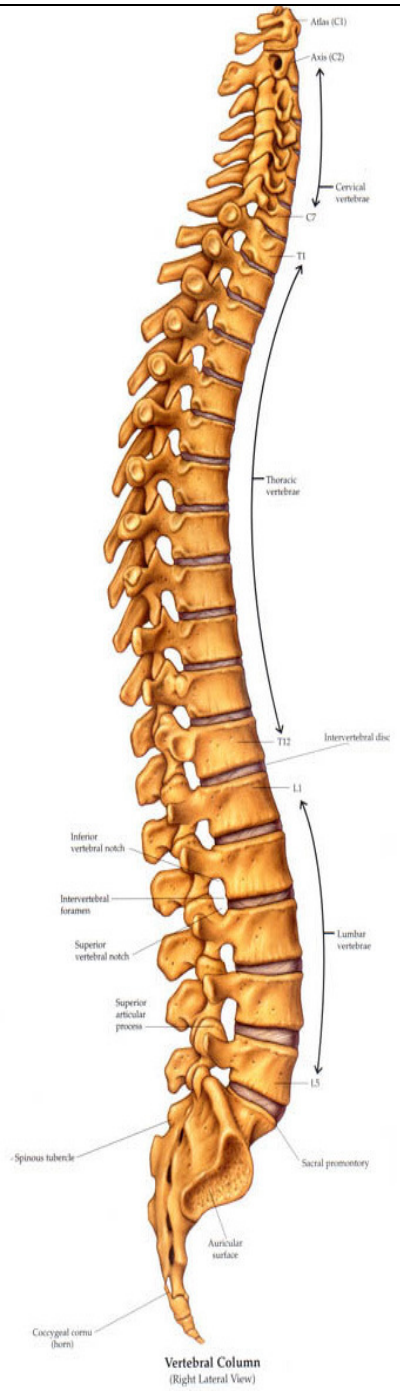


Figure eight shows the age admission profile in more detail and continues to show the gradual increase (move to the right) of the age profile of new admissions.

Table Four - Admissions by Anatomical Level and Severity

	Level	Complete	Incomplete	No Neurology	Total
	C 1	0	2	1	3
	2	1	1	3	5
	3	6	11	1	18
	4	0	16	0	16
	5	3	19	4	26
	6	1	16	3	20
	7	1	2	4	7
	8	0	0	0	0
	Sub-total	12	67	16	95
	T 1	1	1	0	2
	2	2	0	0	2
	3	1	0	0	1
	4	5	0	0	5
	5	2	1	0	3
	6	4	2	0	6
	7	4	1	0	5
	8	1	2	0	3
	9	0	0	0	0
	10	2	2	2	6
	11	1	1	0	2
	12	1	1	4	6
	Sub-total	24	11	6	41
	L 1	2	2	7	11
	2	0	1	4	5
	3	1	0	4	5
	4	0	2	1	3
	5	0	0	1	1
	Sub-total	3	5	17	25
	S1-5	0	0	0	0
	Sub-total				
	TOTAL	39	83	39	161

(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 continues to put 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 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 inappropriate referrals can lead to delays in management locally.

The total number of referrals has stabilised at 598. The national referral/admission ratio (RAR) is 27% but only 17% in Lanarkshire and 20% 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 is an increasing number of referrals for elderly patients, with cervical fractures who do not require specialised acute management or rehabilitation. These lie outwith the remit of the National Service and are managed locally.

Table Five - Health Board Referrals and Outcome

Referring Board	Total Referrals	Admissions	Not Admitted	% Admitted	Complex Advice Given
Greater Glasgow & Clyde	291	59	232	20%	86
Lanarkshire	89	15	74	17%	22
Ayrshire & Arran	71	21	50	30%	13
Dumfries	39	10	29	26%	9
Borders	3	1	2	33%	1
Highland	25	13	12	52%	6
Grampian	12	6	6	50%	2
Forth Valley	12	2	10	17%	3
Tayside	9	6	3	66%	0
Fife	6	2	4	33%	2
Lothian	30	19	11	63%	7
Western Isles	5	3	2	60%	1
ECR	5	3	2	60%	1
Overseas	1	1	0	100%	0
Total	598	161	437	27%	153

The number of patients not admitted but requiring complex advice has increased significantly at 35% (153 patients). In these cases the referring team will have contacted the Spinal Unit several times for advice. In occasional cases of complex but neurologically intact patients it remains appropriate for consultants to assist the local team but it is not possible or sensible for the National Spinal Injuries Unit staff to micromanage referrals which ordinarily should be under the care of the local orthopaedic or medical team. 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	117	115	114	4	38	76	232
Lanarkshire	38	36	30	0	24	20	74
Ayrshire & Arran	30	20	36	0	4	10	50
Dumfries	14	15	15	0	6	8	29
Borders	2	0	1	0	1	0	2
Highland	5	7	7	0	1	4	12
Grampian	3	3	1	3	0	2	6
Forth Valley	5	5	6	0	2	2	10
Tayside	2	1	0	3	0	0	3
Fife	0	4	3	0	0	1	4
Lothian	2	9	0	3	2	6	11
Western Isles	1	1	0	0	0	2	2
ECR	1	1	1	0	0	1	2
Overseas	0	0	0	0	0	0	0
Total	220	217	214	13	78	132	437

Orthopaedics (49%) remains the principle user of the service. Accident and Emergency (18%) Neurosurgery (3%) provide smaller numbers and “Others” (30%) include Medicine, Neurology, Care of the Elderly etc. We have noted a rise in referrals for non-traumatic and progressive conditions and these are redirected appropriately.

Section B Quality Domains

B1 Efficiency

B1 A Actual v Planned Activity

B1 A1 Table Seven A - In-patient Activity

	12/13	13/14	14/15	15/16	16/17
New admissions	153	177	164	150	161
New outpatients	232	271	290	170	91

B1 A2 Table Seven B - Out-patient activity

	12/13	13/14	14/15	15/16	16/17
Return	2243	2389	2378	2112	**1943**
New	232	271	290	170	**91**

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 further drop in new out-patients is noted due to changes in configuration of urology clinics. The current figures more accurately represent the spinal workload.

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

	12/13	13/14	14/15	15/16	16/17	%
Return	2243	2389	2378	2112	**1943**	**N/A**
DNA Return	665	642	610	613	**540**	**28%**
New	232	271	290	170	**91**	**N/A**
DNA New	49	49	58	43	**24**	**26%**

The number of return outpatients has fallen a little further mainly due to changes in urology provision. The DNA rate remains disappointing and may reflect the nature and length of follow up and the fragility of the population. The Unit has worked with Health Records colleagues to start a text reminder service for appointments and it will be interesting to see if this reduces the DNA rates.

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, GENERAL SPINAL REVIEW NEUROSURGERY, UROLOGY
BI MONTHLY	FERTILITY, SEXUALITY, 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

	12/13	13/14	14/15	15/16	16/17
Ayrshire & Arran	16	16	26	6	**7**
Borders	2	1	1	1	**0**
Dumfries & Galloway	6	6	5	2	**3**
Fife	2	2	4	1	**0**
Forth Valley	4	11	9	1	**3**
Grampian	0	2	0	2	**1**
Greater Glasgow Clyde	154	193	197	123	**59**
Highland	0	9	7	5	**3**
Lanarkshire	35	21	33	25	**12**
Lothian	7	8	6	3	**2**
Shetland	0	0	0	0	**0**
Tayside	4	0	1	0	**1**
Orkney	0	0	0	0	**0**
Western Isles	1	2	1	1	**0**
ECR	1	0	0	0	**0**
Unknown	0	0	0	0	**0**
Total	**232**	**271**	**290**	**170**	**91**

New out-patient attendances show further reduction in WoS due to change in urology provision.

B1 A6 Table Ten - Out-patient Activity by Centre

	12/13	13/14	14/15	15/16	16/17	CHANGE YEAR	TOTAL 1992-2017
New QENSIU	232	271	290	170	**91**	(46.5%)	**3295**
Return QENSIU	1878	2014	1995	1728	**1565**	(9.4%)	**39239**
Edinburgh	148	154	157	155	**148**	(4.5%)	**3951**
Inverness	60	63	63	63	**59**	(6.3%)	**1096**
Aberdeen	66	74	76	71	**77**	+8.5%	**1106**
Dumfries & Galloway	20	17	19	24	**11**	(54.2)%	**316**
Borders	26	24	25	29	**42**	+ 44.8%	**329**
Arbroath	26	29	27	26	**24**	(7.7%)	**324**
Huntly	19	14	16	16	**17**	+6.3%	**123**
Total	**2475**	**2660**	**2668**	**2282**	**2034**	**(10.9%)**	**49779**

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. The apparent large changes in the smaller outreach clinics (D&G, Borders) is due to timing of bi-annual clinics which may not fall neatly within the reporting period.

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

		12/13	13/14	14/15	15/16	16/17
Orthopaedics*		144	139	85	0	0
Thoracolumbar*		0	0	18	29	5
Neurosurgery	LA / CM / CB	74	94	148	187	204
Urology	GC / VG	450	524	490	399	235
Skin Care		68	64	75	44	32
Pain / Spasm		13	17	20	13	9
Neuroprosthetics	TH	21	25	25	22	48
Sexual Dysfunction		14	22	22	12	11
Respiratory		28	21	15	13	18
Fertility		3	8	4	3	4
Spinal Injury Annual Review	TOTAL	1063	1100	1093	1006	999
	MEDICAL	680	698	715	642	605
	NURSING	383	402	378	364	394
Total		1878	2014	1995	1728	1565

The Spinal Injury Annual Review clinics remain the main component of the Outpatient activity. These are nurse led with only sixty-one 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/ad hoc review. Urology returns continue to reduce. Neuro-prosthetics includes assessment and surgery for upper limb problems principally in tetraplegics.

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

B1 A8 Table Twelve - Day Case Attendances by Reason

	12/13	13/14	14/15	15/16	16/17
Urology/Urodynamics	36	41	54	52	62
Halo Fixation	146	232	175	138	143
Skin	14	18	8	4	11
Orthopaedic/Neurosurgery	0	0	0	0	0
Acupuncture / Pain / Spasm	429	374	413	474	442
Sexual Dysfunction	3	2	3	4	3
Fertility	24	12	19	18	20
Other	0	1	5	4	4
Total	652	680	677	694	685

B1 A9 Day Case Activity

Day case numbers are stable and these services offer important care 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 and there is a natural tend towards seeing patients closer to Glasgow. Halo service attendance from WoS patients remains high. Some of these patients did not have a halo and were treated in a collar alone but still required weekly or fortnightly follow-up with x-rays and nursing/medical review. 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					
	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017
Ayrshire & Arran	87	80	52	66	**56**
Borders	8	8	6	5	**6**
Dumfries & Galloway	9	16	21	7	**11**
Fife	27	25	22	19	**20**
Forth Valley	61	78	45	48	**35**
Grampian	2	4	3	5	**8**
Greater Glasgow & Clyde	367	355	370	358	**335**
Highland	4	7	12	28	**22**
Lanarkshire	36	46	84	102	**125**
Lothian	40	43	49	41	**52**
Shetland	0	0	0	0	**0**
Tayside	11	17	12	9	**5**
Orkney	0	0	0	5	**5**
Western Isles	0	0	0	1	**0**
ECR	0	1	1	0	**5**
Unknown	0	0	0	0	**0**
Total	**652**	**680**	**677**	**694**	**685**

B1 A11 & A12 Waiting Times Out-patient Clinics

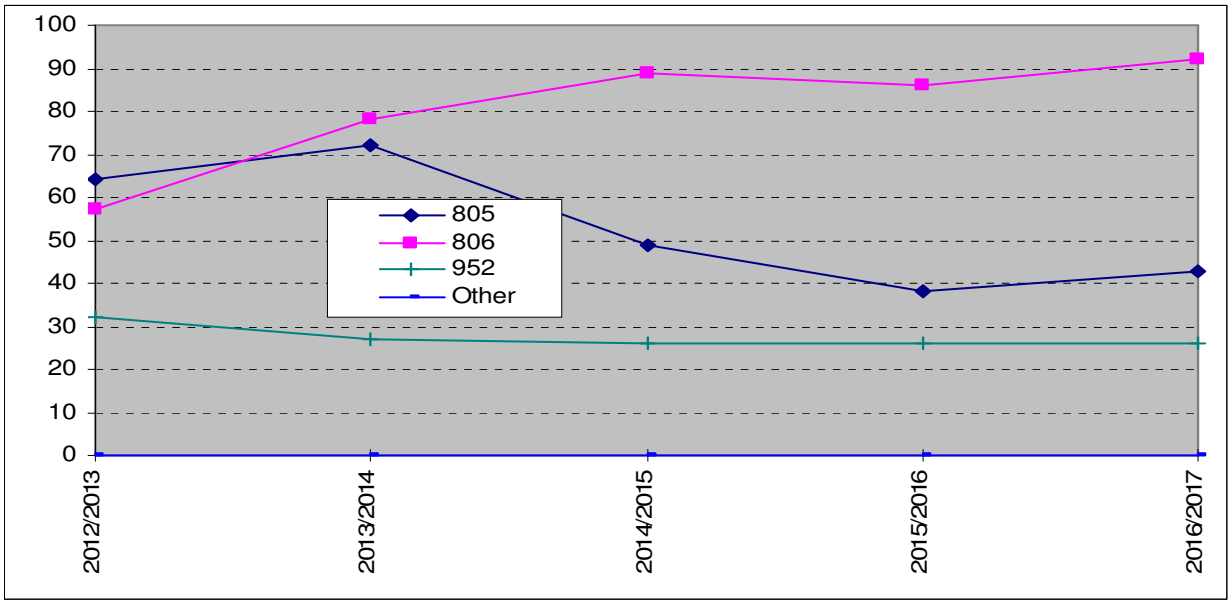
There is an open door policy to the Nurse Led Clinics. Medical advice is always available. A small number of patients with established paralysis move to Scotland every year and the maximum waiting time for these new elective outpatient appointments remains at four weeks.

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 over twenty-five years. 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

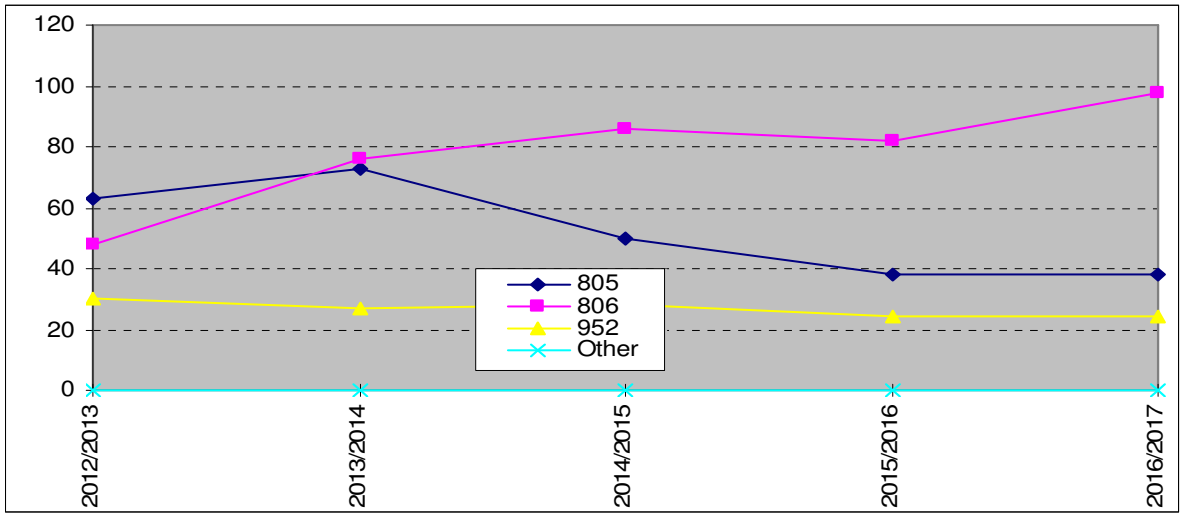
Fig Ten



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.

B1 B3 Discharges by Degree of Injury

Fig Eleven



B1 B4 Table Fourteen - Length of Stay by Level of Spinal Cord Injury

Discharged Patients 16-17

Case Mix	No. of Patients	Mean L.O.S.	Range of L.O.S.
I	33	145	25 – 280
II	27	113	4 - 339
III	36	102	2 - 213
IV	64	24	1 - 160
All	160	82	1 - 339

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 B5 Table Fifteen - Bed Utilisation

National Spinal Injuries Unit Edenhall HDU 12		Philipshill 36
Bed Compliment	Actual Occupied Bed Days	% Occupied
48	14834	87%

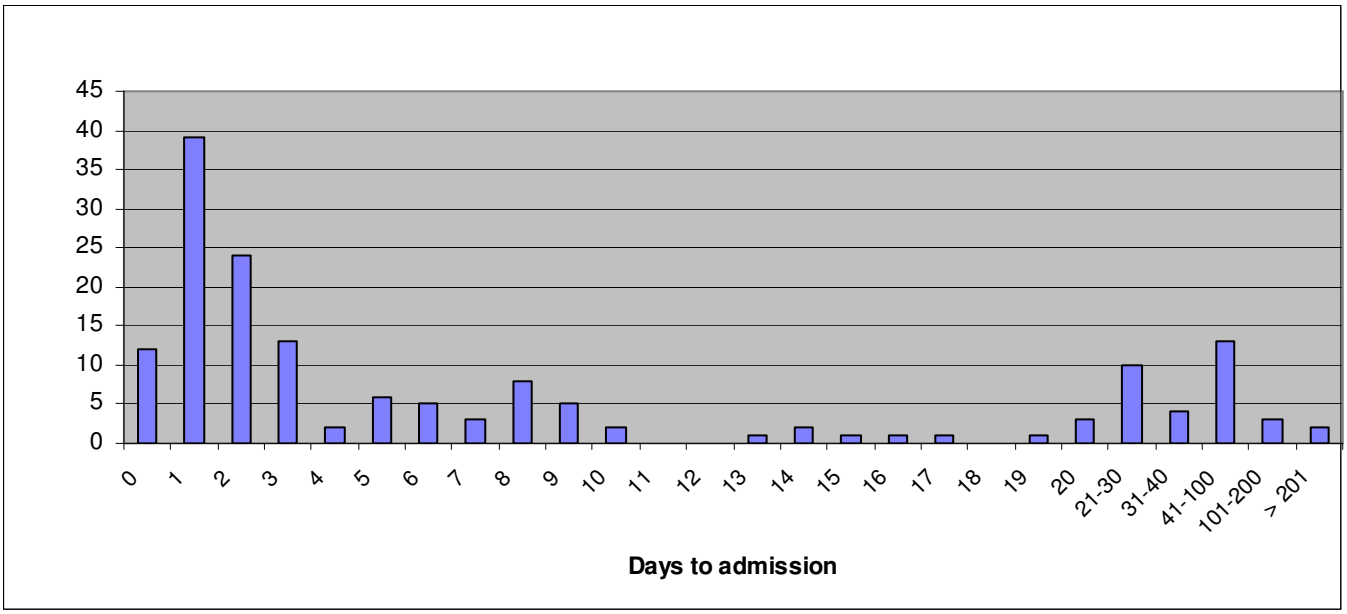
Occupancy figures are stable and allow flexible and efficient use of beds.

B1 B6 Time to Admission, Length of Stay and Delay in Discharge

B1 B7 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 2016-17 32% of patients were admitted within twenty-four hours of injury and 47% were admitted within forty-eight hours. These percentages are stable. 65% were admitted within one week. As usual 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.

Fig Twelve



Early referral and co-operation between the staff in the Unit and the referral hospital ensures immediate admission if clinically indicated. Consultant 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, Maxillofacial, 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
2012-2013	**153**	**185**	**0- 10598**
2013-2014	**177**	**151**	**0 - 8478**
2014-2015	**164**	**11**	**0 - 206**
2015-2016	**150**	**35**	**0 - 2117**
2016-2017	**161**	**38**	**0 - 2278**

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" and grossly skew the mean time to admission but these numbers are included for consistency transparency.

Table Seventeen - Delayed Discharge

	No. of Patients Discharged	No. of Patients Delayed	Mean delay (days)	Range of Delay (days)	NO DELAY
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%
2016/2017	**160**	**9**	**27**	**7 – 76**	**94%**

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. The Unit is now working with GGC Delayed Discharge policy which is funded to provide extra resource to patients without a home. It is now to the patient's advantage to be labelled "delayed discharge" as soon as possible to access this funding. Numbers are expected to increase in this group.

B1 B8 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 34 readmissions to the Unit during the year, a significant shortfall on the contract estimate of two hundred readmissions, skin problems predominate.

B1 B9 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
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
16/17	**Edenhall**	**16**	**14**	**287**
	RCU	**2**	**121**	**242**

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 in Edenhall Ward remains stable at around 20 per annum over the last five years. 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 2016-17

	AfC Banding		Contract Value 2016/17	Contract Value YTD	Actual YTD	Variance YTD	Year End Forecast	Year End Forecast Variance
		WTE	**£**	**£**	**£**	**£**	**£**	**£**
Dedicated Staff Costs								
Consultant		5.71	849,661	849,661	875,002	-25,341	875,002	-25,341
Specialty Doctor		1.00	79,949	79,949	90,804	-10,855	90,804	-10,855
Senior Medical		*6.71*	*929,610*	*929,610*	*965,806*	*-36,196*	*965,806*	*-36,196*
Junior Medical		*2.48*	143,294	143,294	143,294	0	143,294	0
		9.19	*1,072,904*	*1,072,904*	*1,109,100*	*-36,196*	*1,109,100*	*-36,196*
Administrative	4	6.50	161,742	161,742	139,005	22,737	139,005	22,737
Administrative	3	0.14	3,294	3,294	3,507	-213	3,507	-213
Administrative	*2*	2.49	57,749	57,749	*75,143*	*-17,394*	*75,143*	*-17,394*
		9.13	222,784	222,784	217,655	5,129	217,655	5,129
Senior Manager		0.50	36,006	36,006	30,659	5,347	30,659	5,347
Nursing	7	7.80	349,627	349,627	359,905	-10,278	359,905	-10,278
Nursing	6	9.36	436,236	436,236	437,283	-1,047	437,283	-1,047
Nursing	5	52.30	1,889,323	1,889,323	1,990,026	-100,703	1,990,026	-100,703
Nursing	2	23.88	558,986	558,986	574,627	-15,641	574,627	-15,641
Housekeepers	2	2.00	57,451	57,451	47,831	9,619	47,831	9,619
		95.84	*3,327,628*	*3,327,628*	*3,440,331*	*-112,703*	*3,440,331*	*-112,703*
Psychologist	8B	1.00	65,381	65,381	67,607	-2,226	67,607	-2,226
AHP	7	12.26	552,309	552,309	565,642	-13,333	565,642	-13,333
		13.26	*617,690*	*617,690*	*633,249*	*-15,559*	*633,249*	*-15,559*
Total Staff		**127.42**	**5,241,006**	**5,241,006**	**5,400,335**	**-159,329**	**5,400,335**	**-159,329**
Supplies Costs								
Drugs			165,990	165,990	160,458	5,532	160,458	5,532
Surgical Sundries			490,337	490,337	424,424	65,913	424,424	65,913
CSSD/Diagnostic Supplies			4,558	4,558	4,827	-269	4,827	-269
Other Therapeutic Supplies			122,711	122,711	160,179	-37,468	160,179	-37,468
Equipment/Other admin supplies			56,462	56,462	47,562	8,900	47,562	8,900
Hotel Services			41,345	41,345	41,786	-441	41,786	-441
Direct Supplies			**881,403**	**881,403**	**839,236**	**42,167**	**839,236**	**42,167**
Charges from other Health Boards								
Lothian Spinal Clinic			5,225	5,225	1,571	3,654	1,571	3,654
Charges from other Health Boards			**5,225**	**5,225**	**1,571**	**3,654**	**1,571**	**3,654**
Allocated Costs								
Medical Records			105,627	105,627	109,740	-4,113	109,740	-4,113
Building Costs			206,279	206,279	205,816	463	205,816	463
Domestic Services			69,753	69,753	71,751	-1,999	71,751	-1,999
Catering			190,015	190,015	197,414	-7,400	197,414	-7,400
Laundry			68,601	68,601	67,771	830	67,771	830
Neuroradiology			79,913	79,913	82,186	-2,272	82,186	-2,272
Laboratories			92,154	92,154	94,775	-2,621	94,775	-2,621
Anaesthetics			38,151	38,151	39,236	-1,085	39,236	-1,085
Portering			74,293	74,293	76,421	-2,128	76,421	-2,128
Phones			49,370	49,370	49,752	-382	49,752	-382
Scottish Ambulance Service			9,168	9,168	9,238	-69	9,238	-69
General Services			28,274	28,274	29,668	-1,394	29,668	-1,394
Allocated Costs			**1,011,597**	**1,011,597**	**1,033,767**	**-22,170**	**1,033,767**	**-22,170**
Total Supplies			**1,898,225**	**1,898,225**	**1,874,574**	**23,651**	**1,874,574**	**23,651**
Overhead Costs								
Fixed Costs								
Rates			60,012	60,012	60,012	0	60,012	0
Capital Charge			435,774	435,774	435,774	0	435,774	0
Overheads			153,026	153,026	153,026	0	153,026	0
Total Overheads			**648,812**	**648,812**	**648,812**	**0**	**648,812**	**0**
Total Expenditure		**127.42**	**7,788,043**	**7,788,043**	**7,923,721**	**-135,678**	**7,923,721**	**-135,678**
Post Graduate Dean Funding			-122,752	-122,752	-122,752	0	-122,752	0
Total Expenditure net of PDF			**7,665,291**	**7,665,291**	**7,800,969**	**-135,678**	**7,800,969**	**-135,678**
Income from non-Scottish resident patients					-104,985	104,985	-104,985	104,985
Total Net Expenditure		**127.42**	**7,665,291**	**7,665,291**	**7,695,984**	**-30,693**	**7,695,984**	**-30,693**

B1 D Key Performance Indicators Summary

	13-14	14-15	15-16	16-17
New Admissions	177	164	150	**161**
New Outpatients	271	290	170	**91**
Key Performance Indicators				
Referrals				
All patients referred	552	586	564	**598**
Telephone advice	253	312	414	**437**
Complex advice with support/visit	122	110	84	**153**
New patient activity				
All patients admitted with neurological injury	110	120	114	**122**
All patients admitted with non-neurological injury	67	44	36	**39**
Surgical stabilisations:				
- Thoraco lumbar fixations	42 +4	28	45	**32**
- Elective removal of metalwork		3	5	**9**
- Cervical fixations	20+	40	17	**23**
- Halo immobilizations	29	27	24	**28**
Spinal injury specific surgery:				
- Plastic Surgery	UNK	16	18	**8**
Implant spasm and pain control:				
- New pumps implanted	2	1	1	**0**
- Revision pumps	4 Rem / Rev	2	1	**1**
- Operational pumps	17	16	12	**12**
- Pump Refill QENSIU	11	9	8	**8**
- Pump Refill Local	6	7	4	**4**
Step down unit:				
- Episodes of care	28	44	47	**51**
- Number of families/people	14	19	32	**51**
- Number of days (nights)	72	78	108	**135**
- Relatives Room				
- Episodes of care	N/A	N/A	33	**44**
- Number of families / people	N/A	N/A	27	**44**
- Number of days (nights)	N/A	N/A	133	**315**
New inpatient occupied bed days				
Total Available (new & return)	NA	17,369	17428	**16764**
Actual	NA	14,354	14765	**14834**
Bed Occupancy %	NA	82.6%	85%	**87%**
Mean length of stay				
I	126	98	131	**145**
II	138	129	125	**113**
III	159	118	124	**102**
IV	31	29	25	**24**
All	74	75	87	**82**

Range of length of stay	1 - 455	2 - 416	1 - 497	**1 - 339**
Delays in discharge (actual v's intended)				
Number of patients discharged	175	164	144	**160**
Number of patients with delayed discharged	7	5	7	**9**
Length of delay (mean/mode)	34	38	26	**27**
% with no delay	**96%**	97%	95%	**94%**
Day case				
by NHS Board of Residence	See Table	See Table	See Table B1/A10	See Table B1/A10
by reason for admission	See Table	See Table	See Table B1/A8	See Table B1/A8
Outpatient activity				
New Patient no's QENSIU	See Table	See Table	See Table B1/A2	See Table B1/A2
Return Patient no's QENSIU	See Table	See Table	See Table B1/A2	See Table B1/A2
New Patient QENSIU (DNAs/ % attendance)	18%	20%	25%	**26%**
Return Patient QENSIU (DNAs/ % attendance)	27%	26%	29%	**28%**
New Outreach Clinics by Centre	See Table	See Table	See Table B1/A5	See Table B1/A5
Return Outreach Clinics by Centre	See Table	See Table	See Table B1/A6	See Table B1/A6
Attendance at New Outreach Clinics by Centre (DNAs/ % attendance)				
Attendance at Return Outreach Clinics by Centre (DNAs/ % attendance)				
Outpatients discharged in period				
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 Table B1/A3	See Table B1/A3
Return Patient (DNAs/ % attendance)	See Tables	See Tables	See Table B1/A3	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

Audit Meetings are held monthly in the National Spinal Injuries Unit.

In the last year sixteen primary audits have been performed along with at least monthly re-audits.

Audits have been presented by all disciplines of the Multi-disciplinary Team and reflects the Team's constant desire to monitor and improve the overall service provided to patients.

Examples of Audits presented include:

a. An Audit of outpatient bladder management
b. An Audit of the domiciliary ventilation service
c. An Audit of patients' attendance at gym sessions

Some change in practice has resulted from our audit programme resulting in a better outcome for patients confirmed by re audit, for example there has been a reduction in urinary tract infections resulting from the introduction of the bladder management bundle.

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 and self harm remains low. Analysis of the injuries cause by non-traumatic problems shows an equal split between infectious (discitis, abscess etc) and vascular (stroke, bleed etc) causes.

	2012/ 2013	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**
Fall	73	104	95	74	**89**
RTA	**43**	**28**	**40**	**35**	**33**
Motor vehicle	21	19	18	18	17
Motorcyclist	9	4	7	8	9
Bicyclist	9	1	14	9	6
Pedestrian	4	4	1	0	1
Medical	13	16	11	24	**23**
Industrial Injury	8	4	4	5	**7**
Assault	0	0	1	1	**0**
Penetrating Injuries	0	0	0	0	**0**
Sporting Injury	12	14	8	7	**4**
Domestic Injury	0	0	0	0	**0**
Self Harm	4	11	5	4	**2**
Other	0	0	0	0	**3**
Total	**153**	**177**	**164**	**150**	**161**

B2 A3 Clinical Governance

Senior medical and nursing staff meet quarterly with colleagues in the Directorate Clinical Governance programme. Standing items include Clinical Incident Review, Mortality Review, Risk Register and putting audit into practice. There were no category 4 or 5 incidents in the Unit. The Unit continues to adopt National Management Guidelines as appropriate.

There were six deaths in the Unit. This is a crude mortality rate of 4% and reflects the age and severity of paralysis of these patients. All cases were reviewed at Mortality Meetings. One patient sustained a massive pulmonary embolus five minutes after arrival in the Unit, the remaining patients were all elderly and frail. It was concluded that there was nothing else that could have been done to alter the outcome in these cases.

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 but it is becoming clear that any comparisons with other countries will be limited. For the purposes of the (untriggered) service review commissioned by NSD in February 2017 the Lead Clinician contacted colleagues in several similar-sized countries with comprehensive health and social care systems but was unable to find a system of spinal care close enough to allow meaningful comparison. We are not aware of any other publicly funded spinal service which provides lifelong care to such a geographically distinct population. We believe that the acuity and level of care provided in Glasgow, and the detail in the twenty-five year old database are probably unique worldwide.

B2 C Service Improvement

The service is subject to continual review.

B2 D Research

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.
Forthcoming studies in the next year 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.

Under the guidance of Dr Purcell as Director of Research the Unit has advanced plans to develop stem cell research with colleagues in the University of Glasgow and the Scottish Blood Transfusion Service.

The second Scottish Spinal Research Network meeting will be held on 22nd June 2017 the Queen Elizabeth Teaching and Learning Centre and hosted by QENSIU.

The Imaging Centre for Excellence was completed in February 2017 and is located adjacent to the QENSIU. The Centre includes a world class 7 Tesla MRI scanner. QENSIU staff have

close links with the imaging clinicians and scientists. As yet the scanner lacks the necessary spinal imaging hardware (coil @ £100k approx) but the medical team in QENSIU are already in discussion with university colleagues about using the scanner for spinal research.

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	Number
Pressure Ulcer Care	23
Medication incident	20
Contact with object	9
Exposure to hazard	3
Medical Device & Equipment	5
Abscondment	3
Slips, trips and falls	47
Other	30
Security	1
Moving & Handling	8
Violence & aggression	35
Fire alarm actuation	4
Needlestick injury	7
Building fault	1
Challenging Behaviour	8
Stress	3
Other – transport	3
Consent issues	2
Lost specimen	1
Treatment issues	2
Discharge / transfer issue	1
Total	**216**

All category 4/5 clinical incidents are investigated according to GGC policy. During the year no category 4/5 clinical incidents arose on the Unit.

Slips, Trips and Falls	
Fall from bed	10
Fall from chair	17
Fall from level	13
Slip / trip on level	3
Controlled	1
Unwitnessed	3

Pressure Ulcer Care	23
Total Inherited	8
Total Hospital Acquired	15

Overall	
1 - Negligible	134
2 - Minor	72
3 - Moderate	10
4 - Major	0
5 - Extreme	0
Total	**216**

B3 C1 Scottish Patient Safety Programme (SPSP)

The Unit has been participating in the SPSP programme for the past 4 years. Many of the work streams are now embedded into every day practice. Due to the sustained reliability of data collection figures the frequency of data submission has been reduced or discontinued as per SPSP guidelines.

In 2016 the Unit commenced the Deteriorating Work stream. The aim of this work stream is to improve recognition of the deteriorating patient and response to the deterioration using a structured review. The aim is 95% of deteriorating patients will have a structured response. Both wards have submitted monthly data and improved their response to 90%. We are continuing to revise using PDSA cycles to improve our compliance.

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

Monitoring of infection control practices is now being recorded using an electronic tool called Symbiotix. The audit tool will be looking at compliance with Standard Infection Control Precautions, Transmission based precautions and compliance with PVC, CVC and Urinary Catheter care plans. In 2016 Edenhall scored 88% (Green status). Philipshill scored 93% (Gold status).

	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017
Total patients req. Isolation	N/A	All	6	4	**1**
Salmonella	0	0	0	0	**0**
Clostridium Difficile	0	0	2	0	**2**
MRSA	4	14	5	4	**0**
Streptococcus pyogenes	1	1	0	0	**0**
Scabies/ TB /Varicella Zoster	0	0	0	0	**0**
MDR Acinetobacter			1	0	**0**
Patients treated in isolation			4	3	**1**
Patients not treated in isolation		8	4	1	**0**
Patients not suitable for isolation		3	3	1	**0**
No single room available		5	1	0	**0**

2016-2017	MRSA	C.Diff	MDR Acinetobacter
Edenhall	0	0	0
Philipshill	0	2	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 continue to be 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.

Both wards are maintaining green status (95% or above compliance) in Pressure Ulcer, Falls and Food, Fluid and Nutrition CQIs.

Care of Older People in Acute Care In support of the above standards the Unit has implemented “What matters to me” by introducing this question into the active patient care documentation. Redesign of patient care plans to ensure a more person centred approach. Roll out of TIME bundle in relation to delirium. There are three dementia champions between 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 organisation's objectives.

CAS which was launched in NHSGGC in 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 2012-2017

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

Table Twenty-three Overall Pressure Ulcer

Pressure Ulcer developed outwith QENSIU = **9**			Pressure Ulcer developed during stay in QENSIU = **14**		
Grade 2 = 3	Grade 3 = 2	Grade 4 = 4	Grade 2 = 12	Grade 3 = 0	Grade 4 = 2

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 new 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 team recorded four formal complaints. Consultants and senior nursing staff continue to provide advice to the CLO regarding complaints involving management of patients outwith the Unit.

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 2016-17 32% of patients were admitted within one day of injury and 65% within one week. The time to admission has been stable over several years. It remains difficult to decrease this time further; 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. By comparison the mean admission times to some other UK units are two to three months. The gradual increase in numbers of patients paralysed by stroke or infection is likely to increase the average time to admission because these patients usually have a much more complicated pathway to diagnosis than the trauma group.

B4 b) Review of Clinical Pathway

The national pathway to admission, designed twenty-five years ago 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

As part of the Unit's ongoing commitment to patient involvement and person centred care, a pilot study was run in 2016 which sought to collect patient's views on their rehabilitation experience from admission through to discharge. Interviews were carried out in the week preceding a patient's discharge and the information gained from these interviews has shaped feedback and training to staff, highlighted areas of good practice, and has been key in allowing staff to reflect on and develop their own practice. Patient interviews prior to discharge have now become routine practice in the Unit and an honorary research assistant has recently been appointed to continue the collection, collation, and dissemination of this invaluable information.

B5 B 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 patient and carer feedback the Unit has produced the educational manual, it was provided in CD format and written in Urdu and Portuguese. Furnishings and utensils have been purchased for the step down facility to enhance the patient and relative stay.

As a result of the above initiatives patient feedback resulted in:

- Introduction of a formal prognosis meeting with medical staff including written information
- Change in patient education delivery
- Introduction of practical rehab classes supported by spinal charities

B5 C User Survey

We expect that the exit interviews will provide a rich source of user views on the service.

B5 D Family Unit / Step Down Unit

Usage of this essential resource is rising. The step down facilities continue to support acute admissions, long stay and pre-discharge patients. 51 patients and their families have used the family suite on 51 occasions for a total of 135 nights. Evaluation of this facility has been positive with patients commenting it helps in the preparation for discharge. 44 families of acute admissions on 44 occasions have taken the opportunity to use the relatives' rooms in the first few days of admission totalling 315 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

	12/13	13/14	14/15	15/16	16/17
Return	2243	2389	2378	2112	**1943**
New	232	271	290	170	**91**

Table Twenty-five - Out-patient Clinic Location

FREQUENCY	LOCATION - QENSIU
DAILY	DROP IN
WEEKLY	NEW, RETURNS, SKIN, HALO, URODYNAMICS, SPASM, PUMP, ACUPUNCTURE, GENERAL SPINAL REVIEW, 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

	12/13	13/14	14/15	15/16	16/17	CHANGE YEAR	TOTAL 1992-2017
New QENSIU	232	271	290	170	**91**	(46.5%)	**3295**
Return QENSIU	1878	2014	1995	1728	**1565**	(9.4%)	**39239**
Edinburgh	148	154	157	155	**148**	(4.5%)	**3951**
Inverness	60	63	63	63	**59**	(6.3%)	**1096**
Aberdeen	66	74	76	71	**77**	+8.5%	**1106**
Dumfries & Galloway	20	17	19	24	**11**	(54.2%)%	**316**
Borders	26	24	25	29	**42**	+ 44.8%	**329**
Arbroath	26	29	27	26	**24**	(7.7%)	**324**
Huntly	19	14	16	16	**17**	+6.3%	**123**
Total	**2475**	**2660**	**2668**	**2282**	**2034**	**(10.9%)**	**49779**

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

Clinic	April 2013	April 2014	April 2015	April 2016	April 2017
Inverness	82	77	81	82	**104**
Aberdeen / Huntly	118	118	120	124	**126**
Borders	36	34	39	37	**34**
Dumfries	29	26	30	31	**42**
Arbroath	37	33	39	35	**43**
Edinburgh		142	134	155	**157**
Total	**302**	**430**	**443**	**464**	**506**

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

	12/13	13/14	14/15	15/16	16/17
Ayrshire & Arran	16	16	26	6	**7**
Borders	2	1	1	1	**0**
Dumfries & Galloway	6	6	5	2	**3**
Fife	2	2	4	1	**0**
Forth Valley	4	11	9	1	**3**
Grampian	0	2	0	2	**1**
Greater Glasgow Clyde	154	193	197	123	**59**
Highland	0	9	7	5	**3**
Lanarkshire	35	21	33	25	**12**
Lothian	7	8	6	3	**2**
Shetland	0	0	0	0	**0**
Tayside	4	0	1	0	**1**
Orkney	0	0	0	0	**0**
Western Isles	1	2	1	1	**0**
ECR	1	0	0	0	**0**
Unknown	0	0	0	0	**0**
Total	**232**	**271**	**290**	**170**	**91**

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 15 - 20 telephone calls per day.

Sister Prempeh 115 visits covering 7,584 miles.

Sister Woods 92 visits covering 6,984 miles.

Sister Duffy 106 visits covering 6,602 miles.

Total numbers of visits, clinics and meetings carried out by the liaison nurses was 744 covering 21,170 miles. Activity is stable.

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

Location	% Attendance 15-16	% Attendance 16-17	Number of Clinics	Number of Patients
Aberdeen	82%	**91%**	**5**	**77**
Inverness	93%	**92%**	**4**	**59**
Dumfries	100%	**100%**	**1**	**11**
Arbroath	79%	**89%**	**3**	**24**
Borders	96%	**100%**	**3**	**42**
Huntly	88%	**94%**	**1**	**17**
Edinburgh	92%	**90%**	**11**	**148**
Ave Rate	**90%**	**92%**	**28**	**378**

Outreach attendance remains high. Patients are contacted beforehand to confirm that the appointment is still convenient and appropriate. (Dumfries clinics are held bi-annually but only one fell in the reporting period).
Difficulties continue to be experienced in the drive towards electronic systems at outreach clinics. QENSIU staff often cannot access local e-systems to order tests or view results. Despite extensive discussion with IT colleagues the lack of national policy in this area is worrying and may affect our ability to provide care at outreach clinics.

B6 B3 Table Thirty - Annual Activity: Liaison Sisters

Name	Meetings	Clinics	Visits	Teaching Sessions	Miles
L. Woods	**142**	**17**	**92**	**10**	**6,984**
S. Prempeh	**128**	**17**	**115**	**8**	**7,584**

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

The Respiratory Support Sister remains very successful in co-ordinating inpatient and domiciliary ventilation. All patients requiring assisted ventilation at home have been visited during the year with 6602 road miles travelled.

Name	Meetings	Clinics	Visits	Teaching Sessions	Respiratory Referrals	Miles
L. Duffy	**31**	**18**	**106**	**136 staff**	**15**	**6602 + 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	**78**	**0**	**318**	**468**	**0**	**609**	**2** (34 relatives in total)

B6: B6 Location of Lothian Outreach Clinic

The Edinburgh outreach clinic has been at Astley Ainslie Hospital for several years. We understand this hospital will close and we have plans to move the clinics to the Royal Edinburgh Hospital which is nearby and no disruption is expected to the service.

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	5	5	Thoracolumbar fixations 32	9
Neurosurgery LA, CM, CB 4 x Month	44	204	Cervical fixations 23	14
Skin Care MF	26	32	8	0

Numbers of procedures are stable. All referrals and new admissions are discussed at the weekly team meeting with spinal and surgical consultants. This ensures 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 maintaining the thoracolumbar fixation service in the QEUH.

Mr Fraser continues to provide expert plastic and soft tissue surgery for complex pressure sores.

Section C Looking Ahead / Expected Change/Developments

There is a slow transition to electronic records and the Unit continues to use predominantly paper-based records due to difficulties in accessing E-records across Health Board boundaries. 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 (MF) has intimated his intention to retire in summer 2017 and the replacement post has been advertised. The existing Speciality Doctor post will eventually be converted to a consultant post which will ensure a consultant led service in all aspects of the Unit and also give much more flexibility in job planning and rota coverage.

Horatio's Garden was opened in September 2016. The garden is exceptionally beautiful and well planned and in spring weather all the available outdoor spaces are being used by patients and relatives. Extraordinary thanks are due to Dr Olivia Chapple and her team who built the garden and, importantly, continue to work closely with staff to maintain and use the space for the benefit of patients.

The Queen Elizabeth University Hospital is established on campus and continues to attract the most seriously ill and injured patients from the region. 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 Unit first received patients in 1992 and the original concept, admission and treatment pathways remain robust over twenty-five years. Despite an increase in numbers of paralysed patients, their age and severity of paralysis the Unit continues to look after the majority of newly paralysed patients, in most cases, from the first week of injury through to lifelong care. Time from injury to admission remains low and we believe this model of prompt admission and treatment provides the best possible long-term outcomes for patients.

The rehabilitation goal planning model remains efficient but needs revising and senior staff are redesigning the pathway. Changes include the introduction of formal prognosis meetings with patients and more use of goal-focussed meetings.

The Unit is currently undergoing an (untriggered) major external review which we expect will provide a focus for future development.

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
Lead Clinician
Queen Elizabeth National Spinal Injuries Unit

Acknowledgement is made to Leanne Wright 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 front cover shows patients and staff members celebrating the opening of Horatio's Garden.

APPENDIX 2016-17

Spinal Cord Injury in Scotland
– ageing population

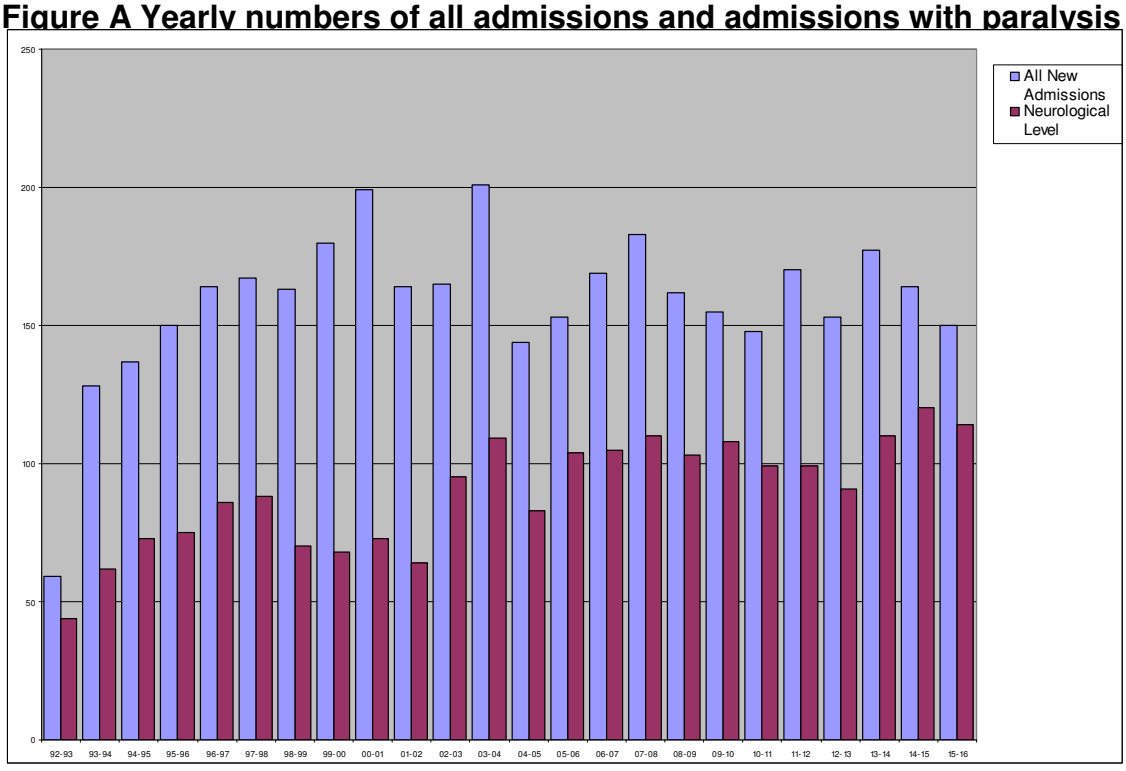
Spinal cord injury in Scotland: a twenty-five year review

The Unit has kept data on all admissions since its opening in 1992. These data provide a unique resource to allow analysis of national trends in injury patterns. Members of staff have published papers describing outcomes of injury and shifts in age and patterns of injury. Our PhD student researched this topic using our historical figures and national demographic data. The most important findings are discussed below.

Increasing numbers of paralysed patients

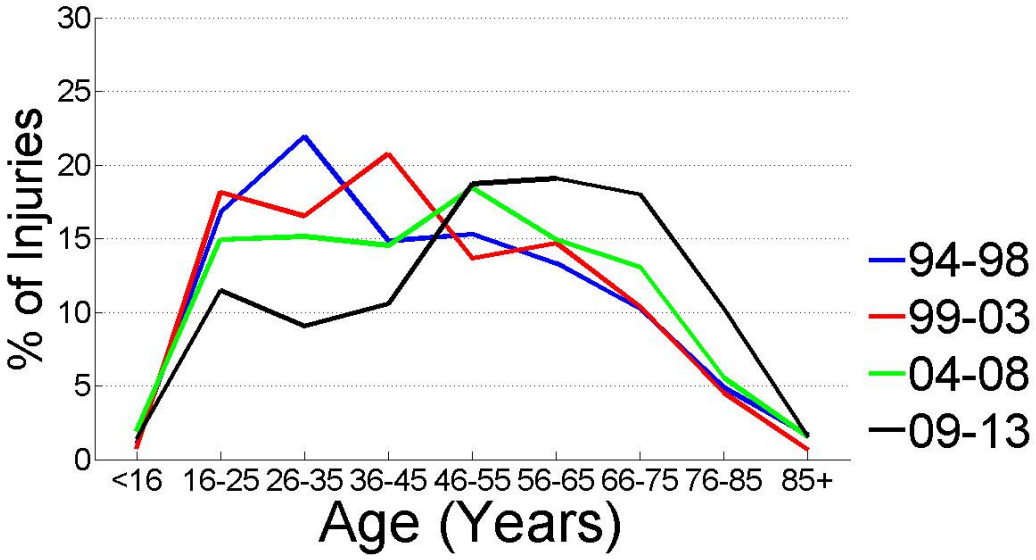
Table A shows absolute numbers of annual total patients (light blue) and paralysed patients (purple) each year. Since the Unit opened there has been a clear and sustained increase in the number of patients with paralysis.

Figure A Yearly numbers of all admissions and admissions with paralysis



Increasing age of patients

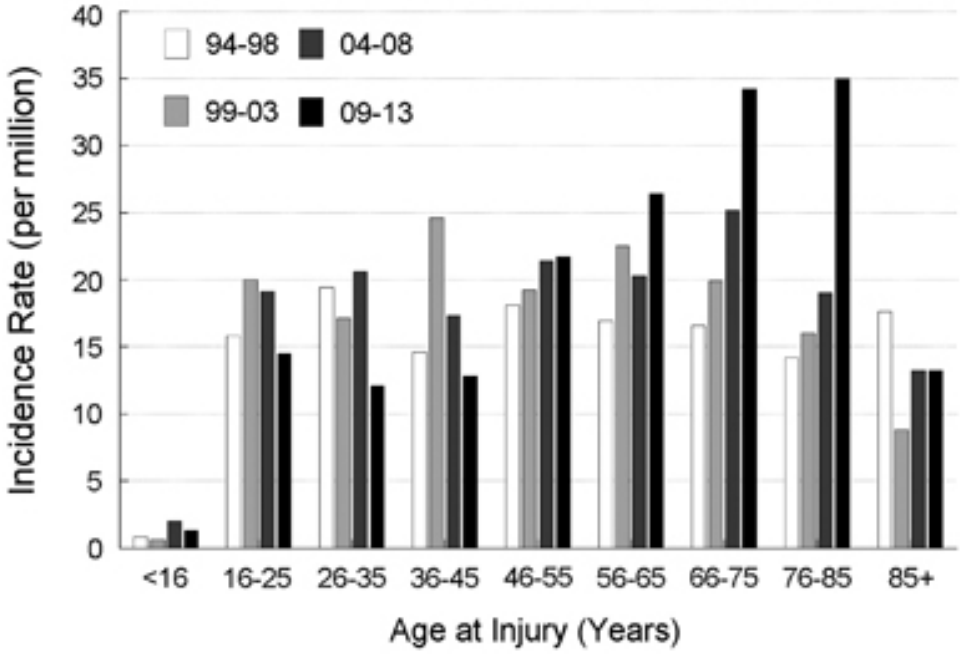
There has been a rise in the average age of patients. When the Unit opened the median age at admission was forty-three, it is now fifty-three. The Unit is now admitting a large number of elderly patients with significant comorbidity. The trend is not obvious on year to year analysis. In Figure B we show twenty years of data (1994-2013) in four five-year blocks. This shows the gradual shift to the right (older) of admission age in ten year cohorts. In the 94-98 block a clear peak is demonstrated in the 26-35 age group. In the 09-13 block the peak is in the 55-65 block.



Severity of injury

Figure C shows the national incidence of paralysis in ten-year age cohorts for the first twenty years of the Unit's existence. There has been a doubling of incidence in the older age cohorts (66-85yo). Closer analysis of these figures has shown that this increase is due predominantly to cervical injuries.

Figure C Rising incidence of injuries in older population



Summary

Over the last twenty-five years there has been a major change in the age profile of patients admitted to the Unit this is unlikely to be due to reporting bias. There are more people with paralysis, they are older and they are more likely to have high spinal cord injury. These findings have implications for the staffing model, the Unit is looking after iller and older patients. Some of these patients are too frail to cooperate fully with our established rehabilitation model and Unit staff are redesigning the pathway to accommodate these patients, some of whom have limited goals.

Dr Alan N McLean
Lead Clinician
QENSIU