Queen Elizabeth National Spinal Injuries Unit

Annual Report
2018/19

NHS Greater Glasgow and Clyde

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Executive Summary

Introduction

The Queen Elizabeth National Spinal Injuries Unit is sited on the campus of the Queen Elizabeth University Hospital and hosted by NHS Greater Glasgow and Clyde Health Board.

Aim and Date of Designation of Service

The 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.

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 it accepts some patients with complex fractures without neurological injury but who are at risk of paralysis. The number of these patients is gradually reducing in accordance with national policy but the Unit continues to receive patients whose injuries exceed the capacity of the treating health board and for whom no other pathway is available. Patients are primarily referred from Acute Trauma Services but referrals are also received from Accident and Emergency Medicine, General Medicine, Neurosurgical, Vascular and Cardiovascular units throughout Scotland.

The Unit admits most new patients within hours or days of injury. There is a high dependency unit for ill and ventilated patients and spinal surgery is performed in around one-third of cases. Patients with paralysis may remain in the Unit for several months and after emergency treatment and rehabilitation the Unit provides lifelong care, support and follow-up.

There are close links with national patient support groups and charities whose teams are embedded in the Unit.

The Unit is also a major clinical trial centre for investigations in both acute and long-term spinal injury.

The national pathway to admission, designed over twenty-five years ago has proven to be robust and provides a safe model for delivery of care to spinal-injured patients in Scotland. Discussion with colleagues internationally suggests that the Scottish figures would compare favourably against other international centres especially with regard to quick admission times and the model of lifelong care.

Key activity

During the reporting period, April 2018 to March 2019 the Unit admitted **138** new patients, and treated **757** daycases and **1797** out-patients, including **381** patients in outreach clinics across the country. Surgeons performed **forty** spinal operations.

Further details can be found on the dedicated website at www.spinalunit.scot.nhs.uk

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1. Service Delivery

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.

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.

Table One - 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
BI MONTHLY	FERTILITY, SEXUALITY, RESPIRATORY
MONTHLY	EDINBURGH
THREE MONTHLY	ABERDEEN, INVERNESS
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 and ensure convenient local access for patients across Scotland. Medical, nursing and AHP staff attend the clinics accompanied by Spinal Injuries Scotland for peer group support.

2. Activity Levels

QENSIU admits acutely injured spinal patients as soon as their condition allows. There is no waiting list for admission. In 2018-19 32% of patients were admitted within one day of injury, 53% within two days, and 71% within one week. The time to admission has improved a little since last year but it will be 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. Patients paralysed by

stroke or infection will always increase the mean time to admission because these patients usually have a much more complicated pathway to diagnosis than the trauma group.

All 107 patients referred with a neurological injury were admitted as soon as clinically indicated. Numbers of paralysed patients are a little reduced year on year and the national figure remains at around 100-120/year, a crude incidence rate of 2.3/100,000.

Figure One New admIssions: total and neurologically injured

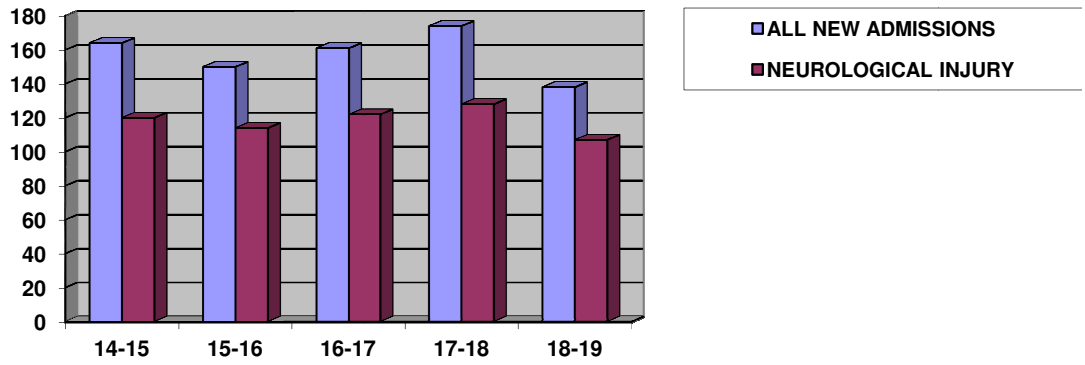


Table Two

	14/15	15/16	16/17	17/18	18/19	92-19
ALL NEW ADMISSIONS	164	150	161	174	**138**	**4278**
Neurological	120	114	122	128	**107**	**2417**
Non-neurological	44	36	39	46	**31**	**1861**

Three hundred and eighty-eight 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.

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.

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

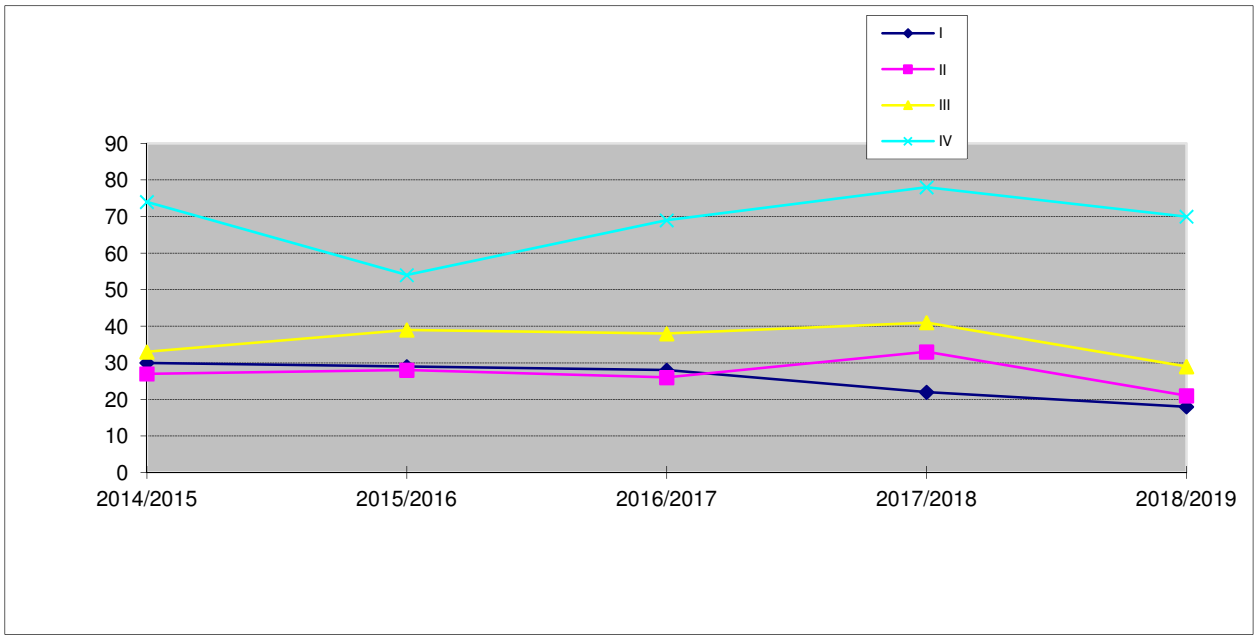


Table Three - New admissions by case-mix complexity 2014-2019

GROUP	14/15	15/16	16/17	17/18	18/19	92/19
1	30	29	28	22	18	**391**
II	27	28	26	33	21	**687**
III	33	39	38	41	29	**929**
IV	74	54	69	78	70	**2271**
Total	164	150	161	174	138	**4278**

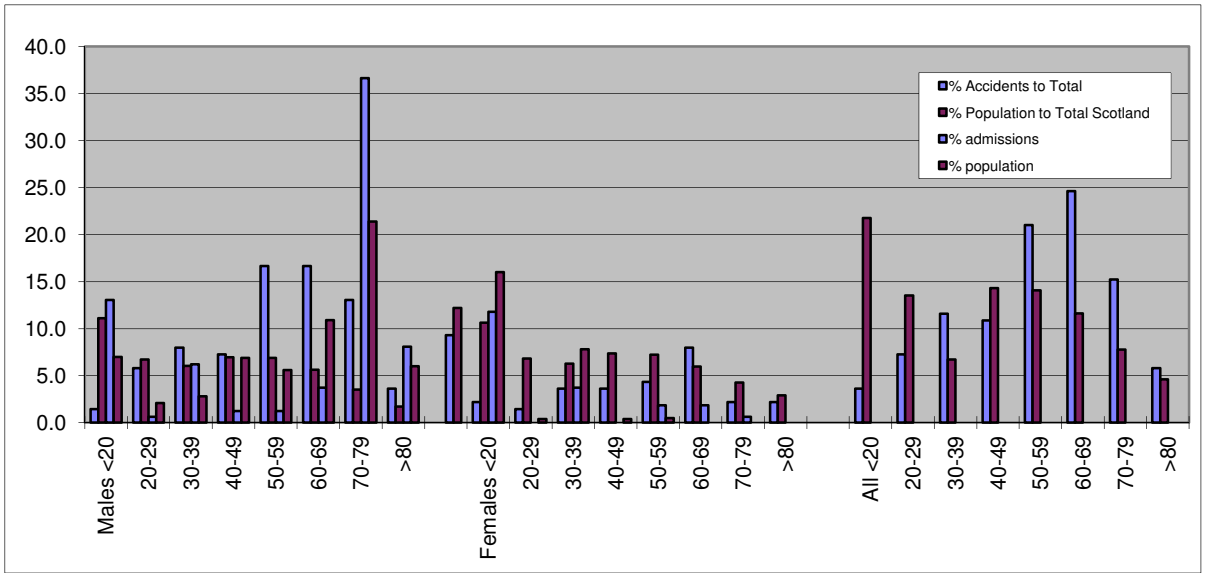
Numbers of Groups 1, the high tetraplegic patients have fallen over the last four years. These patients have injury levels from C1-C4 (above the shoulders) with severe paralysis on admission. These are the most clinically demanding group with the highest risk of ventilation and other medical problems. Numbers of low tetraplegic (C5-C8) and paraplegic patients have fallen a little.

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.

Fig Three New Admissions by Age Group



There was a further rise in middle-aged and older patients who 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 Four Admissions by Age

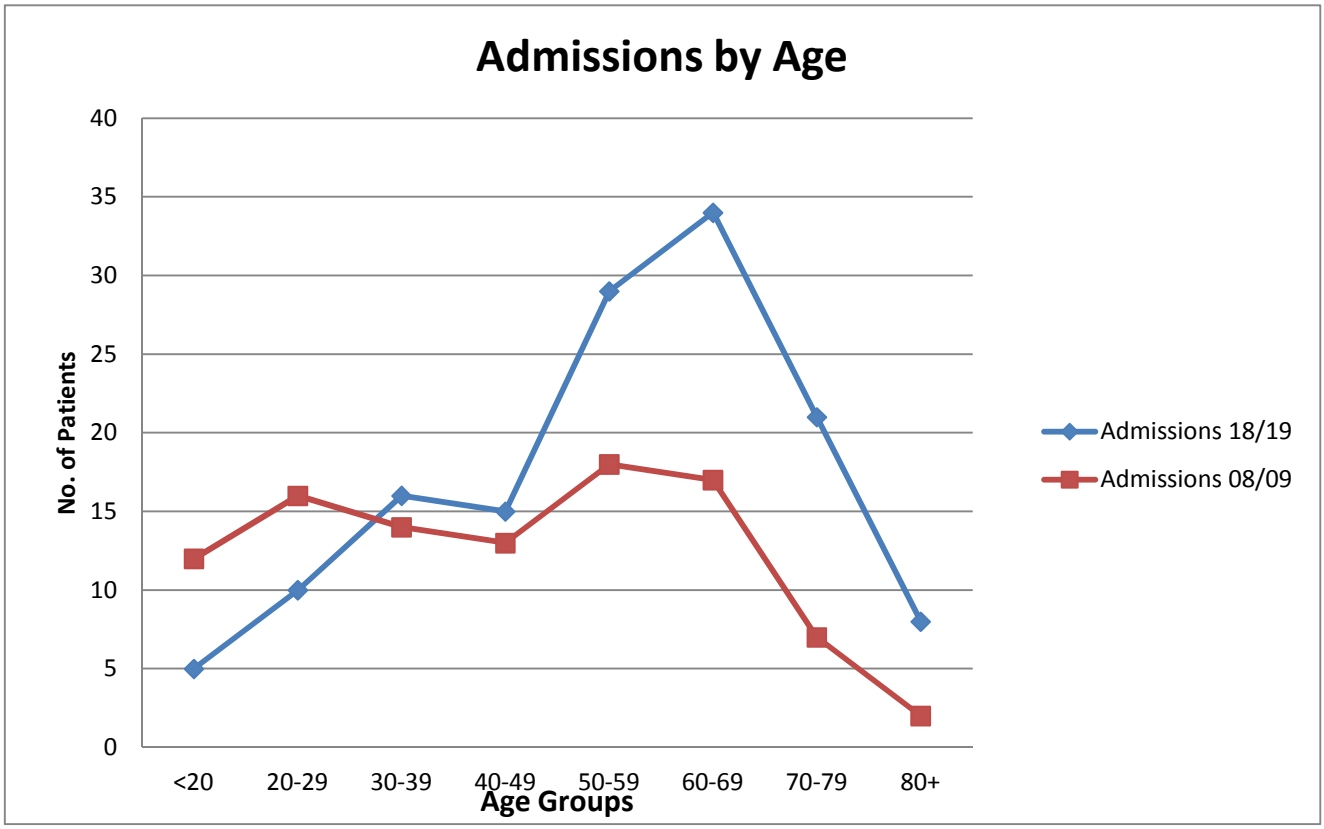
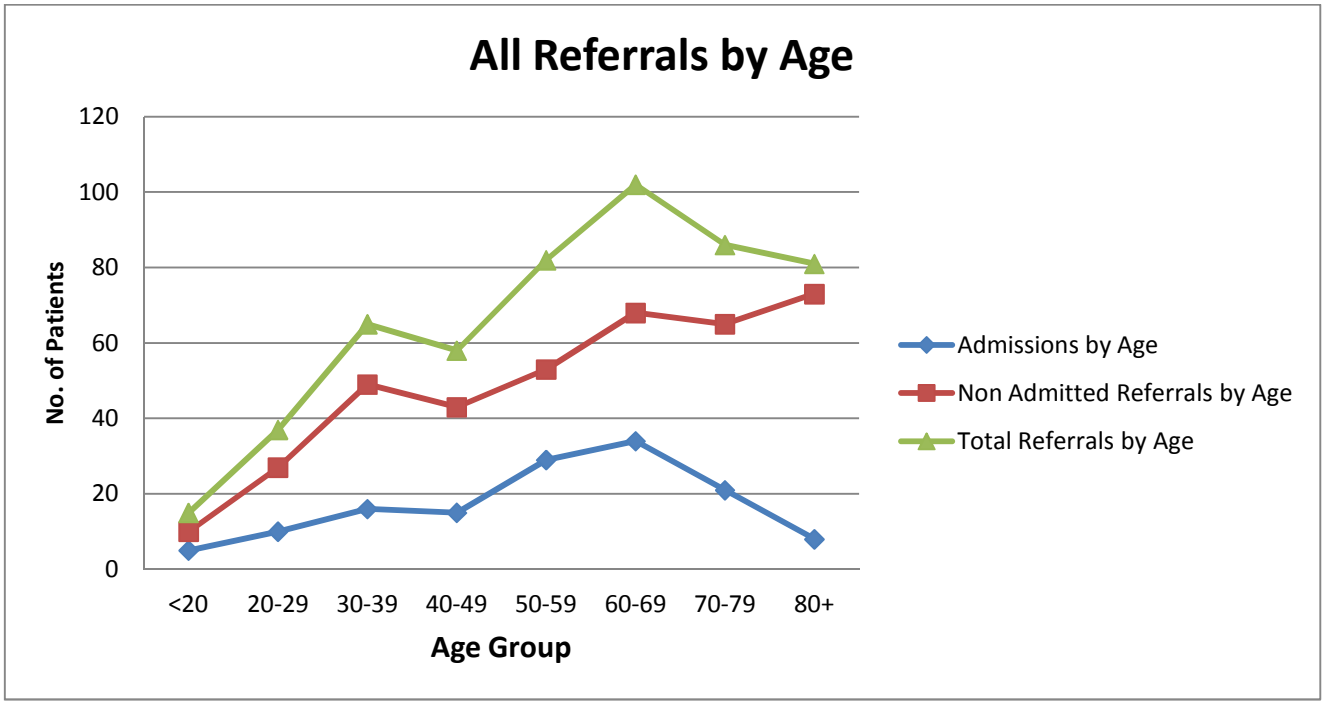


Figure 4 shows the age admission profile in more detail overlaid with the historic profile from 2008/2009. The increase in 50-80+ age groups can be seen. This older group have a large amount of co-morbidity which affects their capacity for rehabilitation. They make large demands on general medical care far beyond the original medical capacity envisaged when the Unit was created. Unit staff are investigating this further by comparing the historical and current general medical burden.

Fig Five All Referrals by Age



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.

After many years of growth the total number of referrals has fallen back a little to 526. The national referral/admission ratio (RAR) is 26% and remains low at only 18% in Lanarkshire and 19% in Glasgow, meaning that fewer than a fifth of referrals fulfil criteria for admission. 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. Overall numbers of referrals and admissions from WoS have fallen and this may be due to a slow move to absorb non-paralysed patients within local pathways.

There are a large 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 Four - Health Board Referrals and Outcome

Referring Board	Total Referrals	Admissions	Not Admitted	% Admitted	Complex Advice Given
Greater Glasgow & Clyde	198	37	161	19%	39
Lanarkshire	87	16	71	18%	21
Ayrshire & Arran	53	20	33	38%	10
Dumfries	37	8	29	22%	7
Borders	10	4	6	40%	1
Highland	30	14	16	47%	2
Grampian	13	4	9	31%	7
Forth Valley	26	4	22	15%	5
Tayside	19	9	10	47%	3
Fife	13	5	8	38%	2
Lothian	26	14	12	54%	5
Western Isles	8	2	6	25%	1
ECR	6	1	5	17%	3
Overseas	0	0	0	0	0
Total	**526**	**138**	**388**	**26%**	**106**

The number of patients not admitted but requiring complex advice has increased (106 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.

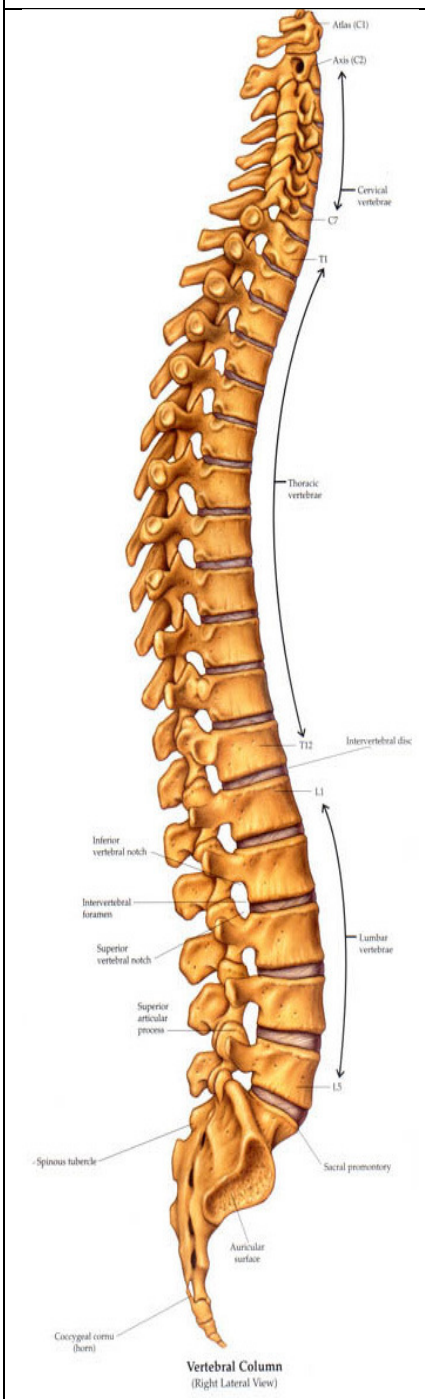
Table Five - Health Board Referrals and Referring Speciality: Non Admissions

Non Admitted referrals

Referring Board	Level of Injury		Referring Specialty				Total
	Cervical	Thor/Lum	Ortho	Neuro	A&E	Other	
Greater Glasgow & Clyde	**75**	**86**	**60**	**7**	**31**	**63**	**161**
Lanarkshire	**31**	**40**	**25**	**0**	**22**	**24**	**71**
Ayrshire & Arran	**13**	**20**	**15**	**0**	**7**	**11**	**33**
Dumfries	**9**	**20**	**16**	**0**	**6**	**7**	**29**
Borders	**0**	**6**	**3**	**0**	**1**	**2**	**6**
Highland	**5**	**11**	**1**	**0**	**5**	**10**	**16**
Grampian	**5**	**4**	**1**	**6**	**0**	**2**	**9**
Forth Valley	**6**	**16**	**10**	**0**	**3**	**9**	**22**
Tayside	**5**	**5**	**2**	**6**	**1**	**1**	**10**
Fife	**2**	**6**	**4**	**0**	**2**	**2**	**8**
Lothian	**5**	**7**	**4**	**2**	**1**	**5**	**12**
Western Isles	**2**	**4**	**0**	**0**	**0**	**6**	**6**
ECR	**3**	**2**	**1**	**0**	**0**	**4**	**5**
Overseas							
Total	**161**	**227**	**142**	**21**	**79**	**146**	**388**

The number of GGC referrals continues to decline after many years of rising and this may represent the bedding-in of the specialised (non-paralysed) spinal service in QEUH. Orthopaedics (37%) remains the principle user of the service. Accident and Emergency (20%) Neurosurgery (5%) provide smaller numbers and "Others" (38%) 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.

Table Six - Admissions by Anatomical Level and Severity



Level	Complete	Incomplete	No Neurology	Total
C 1	0	2	1	3
2	0	3	3	6
3	3	7	0	10
4	4	13	1	18
5	4	20	2	26
6	3	9	1	13
7	0	3	2	5
8	0	0	0	0
Sub-total	14	57	10	81
T 1	1	2	0	3
2	1	0	0	1
3	0	1	0	1
4	2	1	1	4
5	0	1	0	1
6	1	0	1	2
7	1	0	0	1
8	0	0	0	0
9	1	1	0	2
10	3	0	2	5
11	1	1	1	3
12	3	6	5	14
Sub-total	14	13	10	37
L 1	2	2	7	11
2	0	1	2	3
3	0	3	2	5
4	0	1	0	1
5	0	0	0	0
Sub-total	2	7	11	20
S1-5	0	0	0	0
Sub-total	0	0	0	0
TOTAL	30	77	31	138

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

Cervical (neck) injuries continue to predominate. This is an established pattern and a change from the early days of the Unit when the split was 50:50 cervical:thoracolumbar. The overall preponderance of tetraplegic patients continues to put increasing demands on nursing and therapy time.

Table Seven - Mechanism of Injury

	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019
Fall	95	74	89	89	**85***
RTA	**40**	**35**	**33**	**40**	**18**
Motor vehicle	18	18	17	21	4
Motorcyclist	7	8	9	7	8
Bicyclist	14	9	6	9	5
Pedestrian	1	0	1	3	1
Medical	11	24	23	29	**17**
Industrial Injury	4	5	7	5	**4**
Assault	1	1	0	0	**2**
Penetrating Injuries	0	0	0	1	**1**
Sporting Injury	8	7	4	5	**5**
Domestic Injury	0	0	0	0	**0**
Self Harm	5	4	2	3	**6**
Other	0	0	3	2	**0**
Total	**164**	**150**	**161**	**174**	**138**

** includes diving injuries*

Falls remain the most common cause of injuries. The reduction in motor vehicle occupant injuries is striking and unexplained. The incidence of other road injuries is unchanged. There was a reduction in medical causes of paralysis including strokes and infections. There were two deaths in the Unit. These cases were reviewed at Mortality Meetings. Both patients were elderly with, respectively, a C3 and C4 tetraplegia. Paralysis in this group may sometimes not be survivable but whenever clinically realistic the Unit will accept such patients for assessment and treatment.

Table Eight A - Out-patient Activity

	14/15	15/16	16/17	17/18	18/19
Return	2378	2112	1943	1704	**1743**
New	290	170	91	50	**54**

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 and Neurosurgery supplement the nurse led Annual Review Clinics for those patients with a neurological deficit. Increasingly efficient clinical management limits annual increases in return patients. There was a drop in overall out-patient numbers due to cessation of urology clinics but the workload has now stabilised.

Table Eight B - Out-patient DNA Activity

	14/15	15/16	16/17	17/18	18/19	%
Return	2378	2112	1943	1704	**1743**	**N/A**
DNA Return	610	613	540	383	**369**	**21%**
New	290	170	91	50	**54**	**N/A**
DNA New	58	43	24	14	**11**	**20%**

The DNA rate continues to improve which we suspect is due to the text reminder service for appointments.

Table Nine - Out-patient Activity by Centre

	14/15	15/16	16/17	17/18	18/19	CHANGE YEAR	TOTAL 1992-2019
New QENSIU	290	170	91	50	**54**	8%	**3399**
Return QENSIU	1995	1728	1565	1345	**1362**	1.3%	**41946**
Edinburgh	157	155	148	142	**153**	7.7%	**4246**
Inverness	63	63	59	63	**64**	1.6%	**1223**
Aberdeen	76	71	77	60	**71**	18.3%	**1237**
Dumfries & Galloway	19	24	11	28	**36**	28.6%	**380**
Borders	25	29	42	22	**13**	(40.9%)	**364**
Arbroath	27	26	24	26	**32**	23.1%	**382**
Huntly	16	16	17	18	**12**	(33.3%)	**153**
Total	**2668**	**2282**	**2034**	**1754**	**1797**	**2.5%**	**53330**

There is expected year to year variation in out-patient attendances. The apparent large change in the smaller outreach clinic is due to timing of bi-annual clinics which may not fall neatly within the reporting period.

Table Ten - Attendance and Location Outreach Clinics

Location	% Attendance 17-18	% Attendance 18-19	Number of Clinics	Number of Patients
Aberdeen	92%	**91%**	**5**	**71**
Inverness	94%	**91%**	**4**	**64**
Dumfries	96%	**97%**	**3**	**36**
Arbroath	87%	**97%**	**3**	**32**
Borders	100%	**94%**	**1**	**13**
Huntly	95%	**75%**	**1**	**12**
Edinburgh	92%	**93%**	**11**	**153**
Ave Rate	93%	**91%**	**28**	**381**

Table Eleven - Out-patient Activity by Specialty at QENSIU

	14/15	15/16	16/17	17/18	18/19
Orthopaedics*	85	0	0	0	0
Thoracolumbar*	18	29	5	0	0
Neurosurgery	148	187	204	171	214
Urology+	490	399	235	63	0
Skin Care	75	44	32	36	23
Pain / Spasm	20	13	9	7	25
Neuroprosthetics	25	22	48	26	26
Sexual Dysfunction	22	12	11	6	9
Respiratory	15	13	18	17	25
Fertility	4	3	4	5	0
Spinal Injury Annual Review	1093	1006	999	985	1040
Total	1995	1728	1565	1316	1362

**included for historical comparison after retiral of Orthopaedic Surgeon. The orthopaedic and thoracolumbar clinic workloads have been entirely transferred to the neurosurgical clinics.*
+included for historical comparison after retiral of Urological Surgeon.

The Spinal Injury Annual Review clinics remain the core component of the outpatient activity and numbers remain stable. These are nurse led with only 55% 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. Neuro-prosthetics includes assessment and surgery for upper limb problems principally in tetraplegic people.

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. It is suspected that Sexual Dysfunction attendance is under-recorded due to difficult nature of consultations which take place outwith the standard clinic environment.

Day Case activity remains limited by geographical constraints and there is a natural trend 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.

Table Twelve - Day Case Attendances by Reason

	14/15	15/16	16/17	17/18	18/19
Urology/Urodynamics	54	52	62	53	**32**
Halo Fixation	175	138	143	135	**232**
Skin	8	4	11	13	**7**
Orthopaedic/Neurosurgery	0	0	0	0	**2**
Acupuncture / Pain / Spasm	413	474	442	450	**450**
Sexual Dysfunction	3	4	3	6	**10**
Fertility	19	18	20	20	**16**
Other	5	4	4	4	**8**
Total	**677**	**694**	**685**	**681**	**757**

Attendances are stable.

Table Thirteen - Day Case Attendances by Health Board

Day Case Attendances by Health Board					
	14/15	15/16	16/17	17/18	18/19
Ayrshire & Arran	52	66	56	35	**51**
Borders	6	5	6	10	**1**
Dumfries & Galloway	21	7	11	1	**1**
Fife	22	19	20	21	**13**
Forth Valley	45	48	35	40	**33**
Grampian	3	5	8	1	**6**
Greater Glasgow & Clyde	370	358	335	359	**432**
Highland	12	28	22	15	**11**
Lanarkshire	84	102	125	136	**173**
Lothian	49	41	52	51	**35**
Shetland	0	0	0	0	**0**
Tayside	12	9	5	8	**1**
Orkney	0	5	5	1	**0**
Western Isles	0	1	0	1	**0**
ECR	1	0	5	1	**0**
Unknown	0	0	0	0	**0**
Total	**677**	**694**	**685**	**680**	**757**

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

Table Fourteen - Supporting Surgical Services

Service	Clinics	Patients	Acute Spinal Operations	Elective Operations
Thoracolumbar 2 x Month	0	0	Thoracolumbar fixations 31	4
Neurosurgery LA, CM, CB 4 x Month	43	266	Cervical fixations 9	0
Skin Care/Other	29	28	0	4

Numbers of procedures have fallen. It seems likely that the orthopaedic spinal service at QEUH are operating appropriately on more of the neurologically intact patients 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 neurosurgeons performed the spinal fixation. Thanks are due to the surgical team for maintaining the thoracolumbar fixation service in the QEUH.

Table Fifteen - 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
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
17/18	**Edenhall**	15	26	395
	RCU	2	21	41
18/19	**Edenhall**	**10**	**21**	**213**
	RCU	**3**	**2**	**6**

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 has reduced over the last few years. This may be in keeping with natural fluctuation. The need for long-term ventilation fortunately remains rare and numbers are expected to vary widely year to year.

3. Performance and Clinical Outcomes

3.1 Equitable

Geographical Access

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 outreach 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. We are delighted to welcome volunteers from SIS who also see and advise patients and carers. There is a continued demand for nurse specialists to provide important inpatient 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.

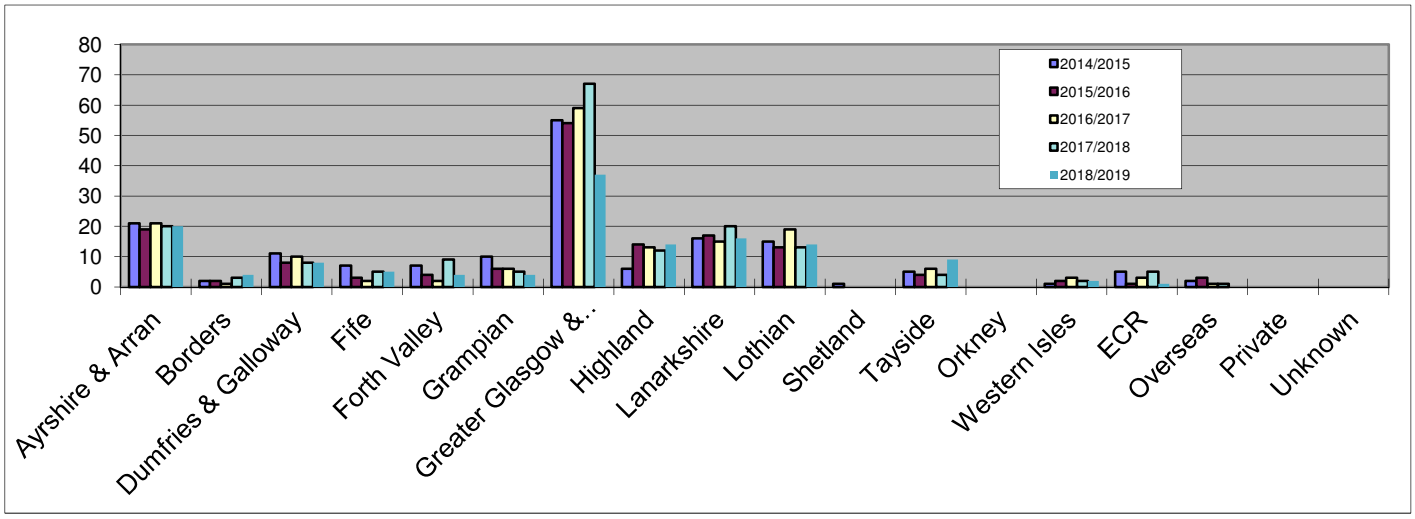
Table Sixteen - New Admissions by ASIA Impairment Level & Health Board

2018/2019	A	B	C	D	E	Total
Ayrshire & Arran	6	1	2	7	4	20
Borders	1	0	2	1	0	4
Dumfries & Galloway	0	1	1	4	2	8
Fife	1	0	1	1	2	5
Forth Valley	1	1	0	1	1	4
Grampian	2	0	2	0	0	4
Greater Glasgow Clyde	6	1	6	15	9	37
Highland	3	0	5	4	2	14
Lanarkshire	1	1	1	8	5	16
Lothian	8	1	1	3	1	14
Overseas	0	0	0	0	0	0
Shetland	0	0	0	0	0	0
Tayside	1	2	0	3	3	9
Orkney	0	0	0	0	0	0
Western Isles	1	0	0	0	1	2
ECR	1	0	0	0	0	1
Unknown	0	0	0	0	0	0
TOTAL	32	8	21	47	30	138

Ayrshire & Arran had a significantly increased number of paralysed patients in relation to population size. No obvious pattern or cause is identified.

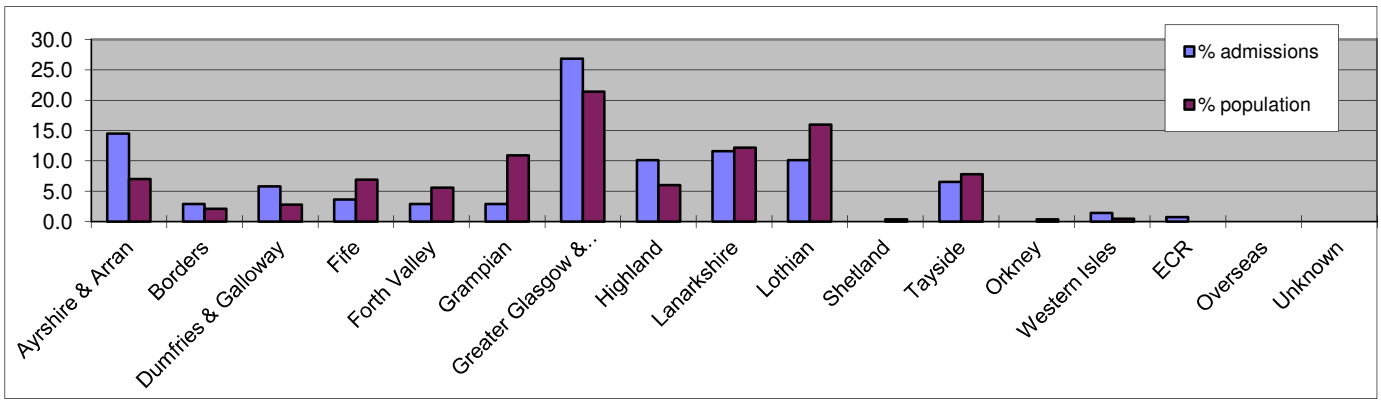
The Unit continues to admit patients from all areas of Scotland. The distribution of admission of paralysed patients and the annual variation since the Unit opened justifies the clinical and economic benefits of a national service.

Fig Six New Admissions by Health Board of Residence 2014-2019



There has been a significant drop in admissions from GGC due to reduction in admissions of non-paralysed patients. One non-Scottish patient was admitted. (ECR & Overseas) A small number of such patients is to be expected. The Unit did not admit any private patients.

Fig Seven Admissions by Health Board compared with Population Size



The distribution of per-capita admissions within Health Boards is unchanged. Ayrshire and Arran continues to have admission numbers in excess of population size which was due almost entirely to a large increase in paralysed patients (See Table 4 for related data).

Table Seventeen - New Out-patient Activity by Health Board

	14/15	15/16	16/17	17/18	18/19
Ayrshire & Arran	26	6	7	6	**5**
Borders	1	1	0	0	**0**
Dumfries & Galloway	5	2	3	3	**0**
Fife	4	1	0	0	**0**
Forth Valley	9	1	3	1	**3**
Grampian	0	2	1	0	**0**
Greater Glasgow & Clyde	197	123	59	24	**36**
Highland	7	5	3	6	**3**
Lanarkshire	33	25	12	8	**6**
Lothian	6	3	2	2	**0**
Shetland	0	0	0	0	**0**
Tayside	1	0	1	0	**1**
Orkney	0	0	0	0	**0**
Western Isles	1	1	0	0	**0**
ECR	0	0	0	0	**0**
Unknown	0	0	0	0	**0**
Total	**290**	**170**	**91**	**50**	**54**

3.2 Efficient

Table Eighteen - Length of Stay by Level of Spinal Cord Injury
Discharged Patients 18-19

Case Mix	No. of Patients	Mean L.O.S.	Range of L.O.S.
I	**16**	**164**	**11 – 316**
II	**18**	**140**	**4 – 317**
III	**30**	**132**	**9 – 377**
IV	**75**	**23**	**1 – 118**
All	**139**	**78**	**1 – 377**

Groups 1 & 2 are the oldest group 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.

Table Nineteen - Bed Utilisation

National Spinal Injuries Unit Edenhall HDU = 12 Beds Philipshill = 36 Beds		
Bed Complement	**Actual Occupied Bed Days**	**% Occupied**
48	**13861**	**80%**

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

3.3 Timely

Waiting Times: Acute and Out-patient Clinics

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-seven years. There were no delays in transfer due to lack of beds. All patients were transferred as soon as they were fit and transport was available. The most highly dependent patients (Groups 1 & 2) made extra demands on resources but time to admission was unaffected.

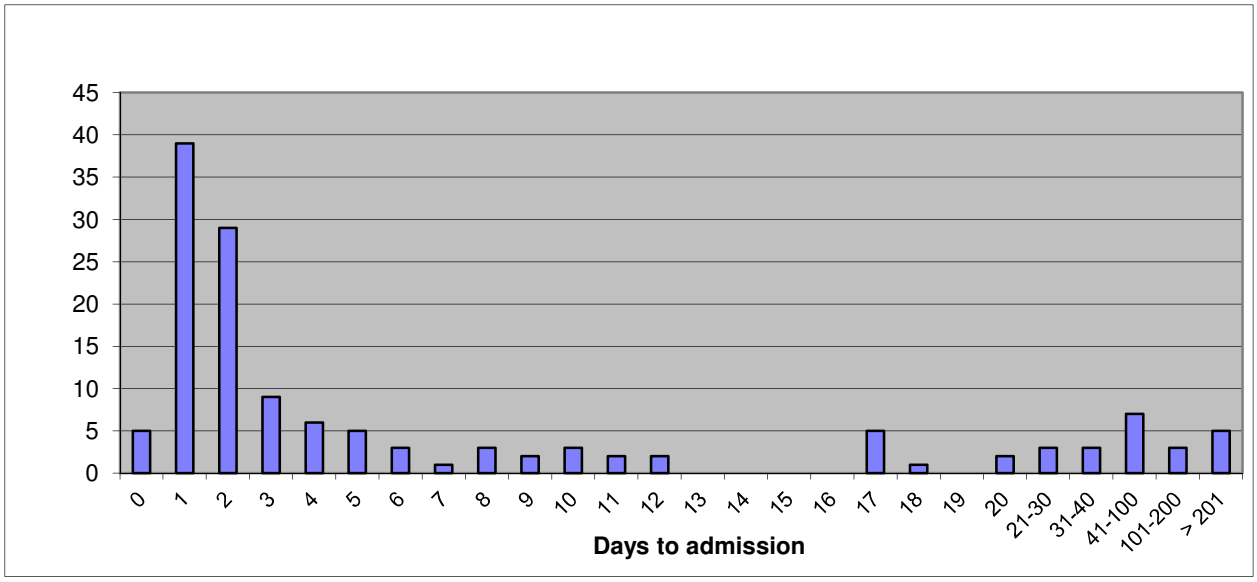
There is an open door policy to the Nurse Led Clinics. Medical advice is always available. A small number of patients with established paralysis move to Scotland every year and the maximum waiting time for these new elective outpatient appointments remains at four weeks.

Time from injury to Admission

The policy is of immediate admission for neurological injury with occasional non-neurological injury admitted if beds become available. Most patients are referred within twenty-four hours of injury. Early referral is encouraged. In 2018-19 32% of patients were admitted within twenty-four hours of injury and 53% were admitted within forty-eight hours. 71% were admitted within one week. The patients with non-traumatic injuries tend to skew admission times to the right because the initial spinal damage is often not so obvious and their diagnosis and treatment of these patients is undertaken in neurological and medical units outwith the trauma system. They are referred and admitted much later than the trauma patients. Of the eighty-two patients admitted within three days of injury all had traumatic injuries.

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 Eight Time from injury to admission



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 continue to be successful in facilitating and auditing the process. They have been internationally recognised and copied and are 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).

Table Twenty - Days to Admission by Range

	No. of Patients	Mean Time (Days)	Range of Time
2014-2015	**164**	**11**	**0 – 206**
2015-2016	**150**	**35**	**0 – 2117**
2016-2017	**161**	**38**	**0 – 2278**
2017-2018	**174**	**231**	**0 – 10688**
2018-2019	**138**	**218**	**0 – 10274**

Table 20 shows mean time to admission for all first-time admissions. This includes some patients who were initially managed outside QENSIU and admitted years, sometimes decades, 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 and transparency. In 18-19 the median time to admission for all injuries was 2 days.

Table Twenty-one - Delayed Discharge

	No. of Patients Discharged	No. of Patients Delayed	Mean Delay (days)	Range of Delay (days)	NO DELAY
2014/2015	164	5	38	10 - 104	97%
2015/2016	144	7	26	6 – 61	95%
2016/2017	160	9	27	7 – 76	94%
2017/2018	165	7	66	10 - 274	96%
2018/2019	**139**	**10**	**62**	**16 - 171**	**93%**

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 continue 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.
We hope that, where appropriate, the Major Trauma Centre system will facilitate the return of patients to their base hospital pending final discharge.

3.4 Effectiveness

Clinical Outcomes/complication rates / external benchmarking

The Unit has provided outcome and activity figures since 1998 in this Annual Report and in specialised 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 www.gla.ac.uk/research/az/scisci

External benchmarking remains difficult. We are not aware of any other publicly funded spinal service which provides care from injury to lifelong follow-up to such a geographically

distinct population. We believe that the acuity and level of care provided in Glasgow, and the detail in the twenty-seven year old database remain unique worldwide.
As part of the recent major review the Lead Clinician contacted many spinal centres in the UK, Europe and Australia to look for benchmarking figures. Unfortunately, due to the different models of emergency and rehabilitation care across the world, it was not possible to find a similar unit providing comprehensive care to a defined population. We would welcome comparison were they available.

Some comparisons with English units can be made using data from their national commissioning database. The average time to admission for most English units is two months, in Scotland it is two days. Every study of acute spinal injury confirms that a spinal unit is the best place for newly-injured people and the Unit continues to perform very highly in this respect.

Key Performance Indicators Summary

	15-16	16-17	17-18	18-19
New Admissions	150	161	174	**138**
New Outpatients	170	91	50	**139**
Key Performance Indicators				
Referrals				
All patients referred	564	598	594	**526**
Telephone advice	414	437	420	**388**
Complex advice with support/visit	84	153	85	**106**
New patient activity				
All patients admitted with neurological injury	114	122	128	**107**
All patients admitted with non-neurological injury	36	39	46	**31**
Surgical stabilisations:				
- Thoracolumbar fixations	45	32	24	**31**
- Elective removal of metalwork	5	9	9	**4**
- Cervical fixations	17	23	23	**9**
- Halo immobilizations	24	28	23	**27**
Spinal injury specific surgery:				
-Other	18	8	5	**4**
Implant spasm and pain control:				
- New pumps implanted	1	0	0	**0**
- Revision pumps	1	1	0	**0**
- Operational pumps	12	12	11	**11**
- Pump Refill QENSIU	8	8	7	**7**
- Pump Refill Local	4	4	14	**4**
Step down unit:				
- Episodes of care	47	51	35	**27**
- Number of families/people	32	51	103	**99**
- Number of days (nights)	108	135	160	**62**
- Relatives Room				
- Episodes of care	33	44	49	**42**
- Number of families / people	27	44	61	**57**

- Number of days (nights)	133	315	286	**128**
New inpatient occupied bed days				
Total Available (new & return)	17428	16764	17012	**17223**
Actual	14765	14834	13157	**13861**
Bed Occupancy %	85%	87%	77%	**80%**
Mean length of stay				
I	131	145	125	**164**
II	125	113	114	**140**
III	124	102	113	**132**
IV	25	24	23	**23**
All	87	82	73	**78**
Range of length of stay	1 - 497	1 - 339	1 - 434	**1 - 377**
Delays in discharge (actual v's intended)				
Number of patients discharged	144	160	165	**139**
Number of patients with delayed discharged	7	9	7	**10**
Length of delay (mean/mode)	26	27	66	**62**
% with no delay	95%	94%	96%	**93%**
Day case				
by NHS Board of Residence	See Fig 9	See Fig 9	See Fig 9	See table 13
by reason for admission	See Table 12	See Table 12	See Table 12	See Table 12
Outpatient activity				
New Patient no's QENSIU	See Table 7B	See Table 7B	See Table 7B	See Table 8A
Return Patient no's QENSIU	See Table 7B	See Table 7B	See Table 7B	See Table 8A
New Patient QENSIU (DNAs/ % attendance)	25%	26%	28%	**20%**
Return Patient QENSIU (DNAs/ % attendance)	29%	28%	22%	**21%**
New Outreach Clinics by Centre	See Table 9	See Table 9	See Table 9	See Table 9
Return Outreach Clinics by Centre	See Table 10	See Table 10	See Table 10	See Table 9
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 Table 7C	See Table 7C	See Table 7C	See Table 8B
Return Patient (DNAs/ % attendance)	See Table 7C	See Table 7C	See Table 7C	See Table 8B

3.5 Safe

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 52 readmissions to the Unit during the year, a significant shortfall on the contract estimate of two hundred readmissions, most often due to skin problems, elective surgery or top up rehabilitation to optimise independence.

Safety Risk Register

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

Scottish Patient Safety Programme (SPSP)

SIU have been participating in this programme for 5 years. SIU have improved outcome measures in a number of topics. Data collection to the SPSP programme is no longer required in the following areas as sustained reliability has been achieved:

SPSP Bundle	Outcome
Sepsis 6	The sepsis 6 sticker developed by nursing staff is now embedded into every day practice, with all elements being implemented within first hour.
Deteriorating patient	As a result of a patient's spinal cord injury they may have a higher NEWS score as part of their altered physiology rather than due to an acute deterioration. Therefore the Spinal Unit developed a local SOP for NEWS completion and frequency of observations which was approved through Clinical Governance.
VTE	VTE prophylaxis part of routine Spinal protocol. Any VTE to be recorded on datix. No VTEs recorded this financial year.
VAP	Due to low numbers, it was agreed to discontinue data collection. Edenhall continue to monitor compliance locally. No areas of concern highlighted.
CAUTI	Although this tool was aimed at urethral catheterisation the Unit also uses this tool to monitor supra pubic catheter CAUTI and reports locally its findings.

SIU continue to submit data and conduct tests of change in the following areas:

SPSP Bundle	Outcome
Tissue viability and pressure ulcers	All category 2-4 pressure ulcers are recorded on datix. These are recorded as inherited or Hospital Acquired. All Hospital Acquired are investigated by Tissue Viability and coded as avoidable or unavoidable **Edenhall** 2 inherited. One grade 2 and one grade 3. 2 hospital acquired. One grade 2 and one ungradeable. 151 days since last record pressure ulcer. 362 days since last avoidable pressure ulcer. **Philipshill** 3 hospital acquired. .Two grade 2 and one ungradeable. 22 days since last recorded pressure ulcer. 158 days since last avoidable pressure ulcer. Each ward has a dedicated Tissue Viability link nurse. .This link nurse is responsible for ensuring all staff complete an annual competency assessment.
Falls	All slips, trips and falls are recorded on datix and results displayed on CAIR dashboard. Edenhall — Philipshill Days since last fall — 39 — 4 Days since last fall with harm. — 452 — 111
SAB surveillance	The Spinal Unit is part of an NHSGGC wide SAB Surveillance programme. Reports are distributed monthly. The Spinal Unit had 2 confirmed SABS this year.

Local Audit

Audit	Outcome
Malnutrition Universal Screening Tool	As a result of these audits both wards highlight through safety brief any patients with swallowing difficulties / textured diets / RAG system for assistance. Edenhall has enlarged the BMI scoring chart as staff were miscalculating BMI scores. This has significantly improved since the change, improving score from 80% to 90%. Philiphill has a rolling programme of when patients should be weighed. Identified lack of weighing scales therefore when hoist condemned further hoist with capacity to weigh was purchased. This has improved score from 74% to 80%
Bladder management in new injuries	As a result of this study Edenhall nursing staff have changed their practice in frequency of urethral catheter change in new injuries from weekly to monthly. This change has resulted in fewer CAUTIs, reduced number of invasive procedures for the patient, released nursing time and cost savings from less catheter usage.
Medication errors	Following an increase in medication errors in Philipshill the ward has introduced a medicines coordinator. This role involves carrying out a post medication round sweep and meet with FY2 at an agreed time to review medications. This has resulted in a reduction of medication errors from 17 in 2017 to 8 in 2018.

3.6 Person Centred

Patient Carer/Public Involvement

Unit staff provide weekly lectures and tutorials to educate patients, relatives and carers. They work with representatives from major spinal support charities to improve the education program. Horatio's Garden has provided a new focus for both therapy and relaxation and has introduced new volunteers to the spinal injured population.

Family Unit / Step-Down Unit

Usage of this essential resource is stable. The step-down facilities continue to support acute admissions, long stay and pre-discharge patients. 99 patients and their families have used the family suite on 27 occasions for a total of 62 nights. 57 families of acute admissions on 42 occasions have taken the opportunity to use the relatives' rooms in the first few days of admission totalling 128 days. Families have appreciated being so close during the early stages of injury.

4. Quality and Service Improvement

The service is subject to continual review. Following the introduction of the Carers Act 2016 the Spinal Unit in conjunction with the Patient and Carer Experience Team conducted a survey with patients' families and friends to ask their experience of the service. As a result of the feedback the Unit has set up Carer support group sessions which offer support to families on a variety of topics. Initial evaluation of these sessions has been very positive.

5. Governance and Regulation: Critical Incidence Reporting

5.1 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. The Unit continues to adopt National Management Guidelines as appropriate.

5.2 Risks and Issues & 5.3 Adverse Events

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-two

Category	Number
Pressure ulcer care	7
Medication incident	11
Contact with object	9
Medical device & equipment	6
Communication	2
Slips, trips & falls	53
Other	11
Security	4
Moving & handling	10
Violence & aggression	22
Challenging behaviour	4
Fire alarm actuation	3
Needlestick injury	5
Infection control issue	1
2222	4
Self harm	2
Staffing levels	1
Radiology incident	1
Treatment issue	1
Patient abscondment	1
IT security	1
Patient observation	1
Total	**160**

Table Twenty-three

Slips, Trips and Falls	
Fall from bed	7
Fall from chair	34
Fall from level	6
Slip/trip on level	1
Suspected fall	
Unwitnessed	4
Controlled	1

All category 4/5 clinical incidents are investigated according to NHSGGC policy. During the year there were three category 4 incidents.

1. Fall with harm – patient sustained fracture of tibial head and malleolus.
2. Moving and handling – staff member sustained shoulder injury resulting in long term absence.

3. 2222 – from the 1st November 2018 cardiac arrests (true arrests and peri arrests) within NHSGGC are recorded as clinical incidents on the Datix Incident Management system, with a new category of incident being created for "2222 call/cardiac arrest".

Table Twenty-four

Overall	
1 - Negligible	60
2 - Minor	84
3 - Moderate	13
4 - Major	3
5 - Extreme	
Total	**160**

Table Twenty-five - Pressure Area Care

Inherited QENSIU = 2			Hospital Acquired QENSIU = 5		
Grade 2 = 1	Grade 3 = 1	Grade 4 = 0	Grade 2 = 5	Grade 3 = 0	Grade 4 = 0

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" system of Unit nursing and medical staff review every sore developing on the ward and make recommendations on any necessary changes in care.

The Unit continues to monitor levels of Hospital Acquired Infection in line with NHSGGC policy. The rise in isolation patients is due to the national policy of initially isolating patients transferred from non-Scottish hospitals. It is anticipated that this number will stabilise or even rise. It is not a marker of increased infections.

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.

Table Twenty-six A - Hospital Acquired Infection

	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019
Total patients req. Isolation	6	4	1	5	15
Salmonella	0	0	0	0	0
Clostridium Difficile	2	0	2	1	0
MRSA	5	4	0	2	6
Streptococcus pyogenes	0	0	0	1	0
Scabies/ TB /Varicella Zoster	0	0	0	1	0
MDR Acinetobacter	1	0	0	0	0
Patients treated in isolation	4	3	1	4	10
Patients not treated in isolation	4	1	0	1	5
Patients not suitable for isolation	3	1	0	0	3
No single room available	1	0	0	1	2

Table Twenty-six B

2018-2019	MRSA	C.Diff	MDR Acinetobacter
Edenhall	0	0	0
Philipshill	6	0	0

The rise in the total number of patients requiring isolation was due to enforcement of Health Board regulations requiring isolation of patients arriving from hospitals outwith Scotland. Overall hospital acquired infection numbers remained low.

5.4 Complaints / Compliments

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 one formal complaint which was withdrawn. Consultants and senior nursing staff continue to provide advice to the CLO regarding complaints involving management of patients outwith the Unit.

Compliments

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

5.5 Equality

A new equality, diversity and human rights e-learning module is now live on Learnpro. All staff are required to complete as part of their statutory and mandatory training. All wards now have a corporate Welcome to the ward poster at the entrance to the ward. This poster details the variety of methods which patients and their families can leave feedback. NHSGGC carry out regular Equality Impact Assessment Tools (EQIA) for clinical areas. The Spinal Unit EQIA was conducted in 2014. A new telephone interpreting service is available to all services users.

6. Financial Reporting and workforce 2018-19

	AfC Banding		Contract Value 2018/19	Contract Value YTD	Actual YTD	Variance YTD
		WTE	**£**	**£**	**£**	**£**
Dedicated Staff Costs						
Consultant		5.71	872,713	872,713	806,723	65,990
Specialty Doctor		1.00	82,118	82,118	94,467	-12,349
Senior Medical		*6.71*	*954,831*	*954,831*	*901,190*	*53,641*
Junior Medical		*2.48*	147,182	147,182	147,182	0
		9.19	*1,102,013*	*1,102,013*	*1,048,372*	*53,641*
Administrative	4	6.50	168,260	168,260	166,123	2,137
Administrative	3	0.14	3,427	3,427	0	3,427
Administrative	*2*	2.49	60,076	60,076	58,801	1,275
		9.13	*231,763*	*231,763*	*224,925*	*6,838*
Senior Manager		0.50	37,457	37,457	31,896	5,561
Nursing	7	7.80	363,716	363,716	363,605	111
Nursing	6	9.36	453,816	453,816	441,874	11,942
Nursing	5	54.30	1,965,463	1,965,463	2,045,777	-80,314
Nursing	2	23.88	581,513	581,513	663,815	-82,302
Housekeepers	2	2.00	59,766	59,766	25,099	34,667
Phlebotomist	2	0.53	12,257	12,257	21,381	-9,124
		98.37	*3,473,988*	*3,473,988*	*3,593,448*	*-119,460*
Psychologist	8B	1.00	68,016	68,016	76,346	-8,330
Orthotist	7	0.20	9,885	9,885	9,885	0
AHP	7	12.26	574,566	574,566	612,150	-37,584
		13.46	*652,467*	*652,467*	*698,381*	*-45,914*
Total Staff		**130.15**	**£5,460,231**	**£5,460,231**	**£5,565,125**	**-£104,894**
Supplies Costs						
Drugs			169,289	169,289	126,805	42,484
Surgical Sundries			500,085	500,085	465,604	34,481
CSSD/Diagnostic Supplies			4,649	4,649	4,062	587
Other Therapeutic Supplies			115,460	115,460	75,015	40,445
Equipment/Other admin supplies			57,585	57,585	79,431	-21,846
Hotel Services			42,167	42,167	45,041	-2,874
Direct Supplies			**£889,235**	**£889,235**	**£795,958**	**£93,277**
Charges from other Health Boards						
Lothian Spinal Clinic			5,382	5,382	285	5,097
Charges from other Health Boards			**£5,382**	**£5,382**	**£285**	**£5,097**
Allocated Costs						
Medical Records			109,884	109,884	112,125	-2,241
Building Costs			214,592	214,592	210,291	4,301
Domestic Services			72,564	72,564	73,311	-747
Catering			197,672	197,672	201,707	-4,035
Laundry			71,366	71,366	69,245	2,121
Neuroradiology			83,135	83,135	83,973	-838
Laboratories			83,610	83,610	84,471	-861
Anaesthetics			39,689	39,689	40,089	-400
Portering			77,287	77,287	78,082	-795
Phones			50,362	50,362	50,833	-471
Scottish Ambulance Service			9,538	9,538	9,438	100
General Services			29,127	29,127	30,313	-1,186
Allocated Costs			**£1,038,826**	**£1,038,826**	**£1,043,879**	**-£5,053**
Total Supplies			**£1,933,443**	**£1,933,443**	**£1,840,123**	**£93,320**
Overhead Costs						
Fixed Costs						
Rates			61,218	61,218	61,218	0
Capital Charge			435,774	435,774	435,774	0
Overheads			156,102	156,102	156,102	0
Total Overheads			**£653,094**	**£653,094**	**£653,094**	**£0**
Total Expenditure		**130.15**	**£8,046,768**	**£8,046,768**	**£8,058,342**	**-£11,574**
Post Graduate Dean Funding			-125,580	-125,580	-125,580	0
Total Expenditure net of PGDF			**£7,921,188**	**£7,921,188**	**£7,932,762**	**-£11,574**
Income from non-Scottish resident patients					-9,469	9,469
Total Net Expenditure		**130.15**	**£7,921,188**	**£7,921,188**	**£7,923,293**	**-£2,105**

7. Audit & Clinical Research / publications

Clinical Audit Program

Audit meetings are held monthly in the National Spinal Injuries Unit. In the last year there were 7 primary audits performed with at least monthly re-audits. Audits were performed by medical staff, nursing staff, physiotherapists and occupational therapists reflecting the team's desire to monitor and improve the overall service provided to patient. Examples of audits performed include:-

- Antibiotic prescription and documentation within QENSIU
- Frequency of indwelling urethral catheter changes within patients in the Unit
- Long term functional walking outcomes
- Audit of discharge dates

Staff participate in National and Regional audits and have presented quality improvement resulting from audit at the corporate level.

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 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.

The Unit recruits to the multicentre European database of cord-injured patients (EMSCI) and is poised to recruit to a prospective randomised trial of a neuroprotective agent (anti no-go) in acute cord injury (NISCI). We are grateful to NSD for help to analyse spinal cord demographics in Scotland using the national eDRIS data held by ISD.

The Unit hosted the annual conference of the International Spinal Research Trust in July 2018 attended by research teams from throughout the world. This confirmed Glasgow's position as one of the few centres in the world capable of recruiting in acute spinal cord injury neuro-protective trials.

Papers and Authorship

See Appendix for Research Profile

8. Looking Ahead

There was an increase in the acuity of admissions such that for the first time in its history the Unit admitted more than half of patients within two days of injury. We believe this is unmatched by any other spinal paralysis unit in the world and reflects both the hard work and organisation of the Unit staff, and may also be a result of the gradual influence of the Major Trauma Centres around the country. Every international study of paralysed spinal patients has shown that they are safer in dedicated spinal units. It will be difficult to improve this further because the Unit must balance the spinal benefits of fast transfer against the risks of early transport of potentially unstable patients.

The Queen Elizabeth University Hospital continues to attract the most seriously ill and injured patients. As expected the transformation to a Major Trauma Centre makes more demands on the acute spinal service and we remain in discussion with the trauma teams about the best way to look after such patients. We continue to explore a combined rota with orthopaedics and neurosurgery which may make this feasible.

We have welcomed the appointment of a replacement consultant who will develop the spasm and surgical service.
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. We continue to have problems identifying a suitable candidate in such a highly specialised field. The medical team is not alone in seeking replacements. Many senior staff, who have worked at the Unit since inception are approaching normal retirement age and succession plans will be reviewed.

We await with excitement new plans to expand the garden room for Horatio's Garden.

The Unit will continue to facilitate high quality research with universities in both the West of Scotland and across the world. We hosted the International Spinal Research Trust annual meeting in June 2018. Current projects include collaborative work with the University of New South Wales and prospective trials of neuro-protective agents in acute and chronic spinal cord injury.

The model proposed by Mr Edmond, the first Medical Director, remains robust. The Unit continues to look after the majority of newly paralysed patients from the first two days of injury through to lifelong care. Time from injury to admission matches or is better than any other Spinal Unit in the world and we believe that this model of prompt admission and treatment continues to provide the best possible long-term outcomes for patients.

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