Queen Elizabeth National Spinal Injuries Unit

Annual Report
2021/22

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 referrals for patients who are injured or domiciled in Scotland and are referred with a non-progressive (usually traumatic) spinal cord injury. In addition, to avoid patient harm the Unit will admit a small number of patients where it is not clear at the point of referral whether they are neurologically intact. Patients for whom SCI has been ruled out, are out of scope of the nationally funded pathway. 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 over 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 trials centre for investigations in both acute and long-term spinal injury.

The national pathway to admission, designed thirty 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. [The effects of early or direct admission to a specialised spinal injury unit on outcomes after acute traumatic spinal cord injury | Spinal Cord (nature.com)]

Key activity

During the reporting period, April 2021 to March 2022 the Unit admitted **137** new patients, and treated **543** day cases and **2,241** out-patients, including **368** patients in outreach clinics across the country. Surgeons performed **48** spinal operations.

Further details can be found on the 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 from secondary care to home or a care establishment is achieved.

Table 1
Out-patient Clinic Location and Frequency

FREQUENCY	LOCATION
DAILY	GLASGOW: DROP IN CLINIC
WEEKLY	GLASGOW: NEW, RETURNS, HALO, URODYNAMICS, SPASM, PUMP, GENERAL SPINAL REVIEW, SKIN, ATTEND ANYWHERE (VIRTUAL)
BI WEEKLY	GLASGOW: AHP – ORTHOTIST, ACCUPUNCTURE
BI MONTHLY	GLASGOW: FERTILITY, SEXUALITY, RESPIRATORY
MONTHLY	EDINBURGH (OUTREACH), GLASGOW NEUROPROSTHETICS, NEUROSURGERY
THREE MONTHLY	ABERDEEN, INVERNESS (OUTREACH)
SIX MONTHLY	DUMFRIES, BORDERS, ARBROATH (OUTREACH)
ANNUALLY	HUNTLY (OUTREACH)

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 and nursing staff attend the clinics accompanied by partner organisations 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 2021/22 20% of patients were admitted within one day of injury, 35% within two days, and 70% within one week. The time to admission from injury is difficult to decrease further because some polytrauma patients 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 most other UK spinal units are two to three months. Patients paralysed by infarct or infection increase the mean time to admission because these patients usually have a much more complicated pathway to diagnosis than the trauma group.

All 126 patients referred with a neurological injury were admitted as soon as clinically stable. Numbers of paralysed patients are stable having returned to pre COVID levels and the national figure remains at around 120/year, a crude incidence rate of 2.3/100,000.

Figure 1
New Admissions: total and neurologically injured

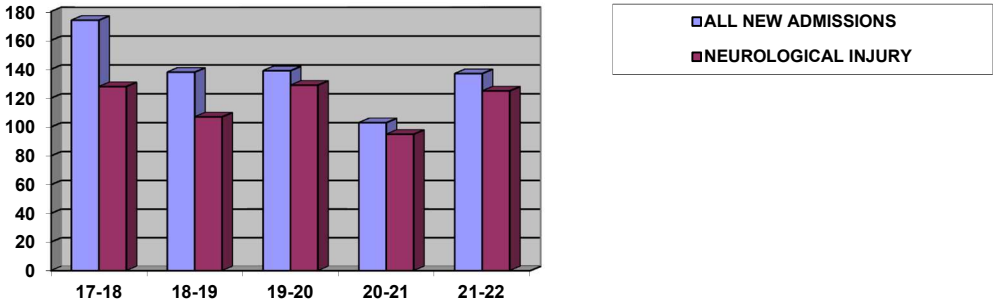


Table 2A
New Admissions: total and neurologically injured

	17/18	18/19	19/20	20/21	21/22	92-22
ALL NEW ADMISSIONS	174	138	139	103	**137**	**4,657**
Neurological	128	107	129	95	**126**	**2,671**
Non-neurological	46	31	10	8	**11**	**1,891**

Table 2B
Intact patients

In 21/22 11 patients were admitted to the Unit who after full assessment had not suffered a spinal cord injury, 1 major trauma patient was known at referral to be intact neurologically but his injuries exceeded the capacity of the local hospital. There was uncertainty of paralysis in all others following spine trauma e.g. 2 had nerve root injuries only causing neurological deficit

Health Board	No of Patients	Ave LOS (days)	Total Bed Days
Ayrshire & Arran	1	21	21
Dumfries & Galloway	1	17	17
Grampian	1	30	30
Greater Glasgow & Clyde	3	5	15
Highland	3	14	42
Lanarkshire	2	33	66
Total	**11**	**120**	**191**

Numbers of neurologically intact patients remains low. This is in keeping with national and health board policy to treat such patients locally whenever possible. There is likely to be a long-term small number of patients without cord injury because of uncertainty of paralysis at time of referral. There are also a small number of patients with complex fractures but no neurology whose injuries exceed the capacity of the local hospital.

Two hundred and twenty nine patients were referred but not admitted as they fell outside the scope of the service. They were managed in the referral hospital with appropriate advice and support from consultant medical staff.

Some patients were seen by consultant staff in ITU/HDU, the neurosurgical and orthopaedic wards of the Queen Elizabeth University Hospital (QEUH) and other hospitals. The QEUH, now a MTC, attracts increasing numbers of trauma from a very wide area and this has led to 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.

Figure 2
New Admissions by Case-Mix Complexity: five year

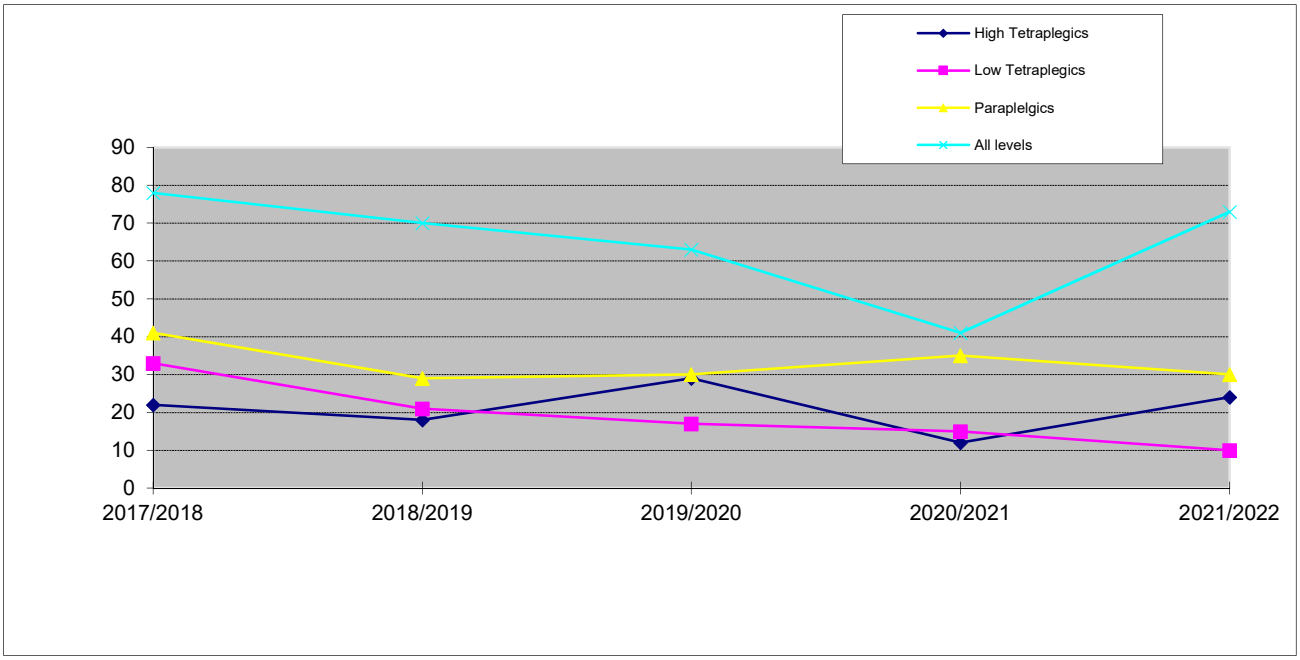


Table 3
New Admissions by case-mix complexity 2015/2022

GROUP	17/18	18/19	19/20	20/21	21/22	92/22
I	22	18	29	12	24	456
II	33	21	17	15	10	729
III	41	29	30	35	30	1,024
IV	78	70	63	41	73	2,448
Total	174	138	139	103	137	4,657

Figure 3
Historical trends in case-mix complexity

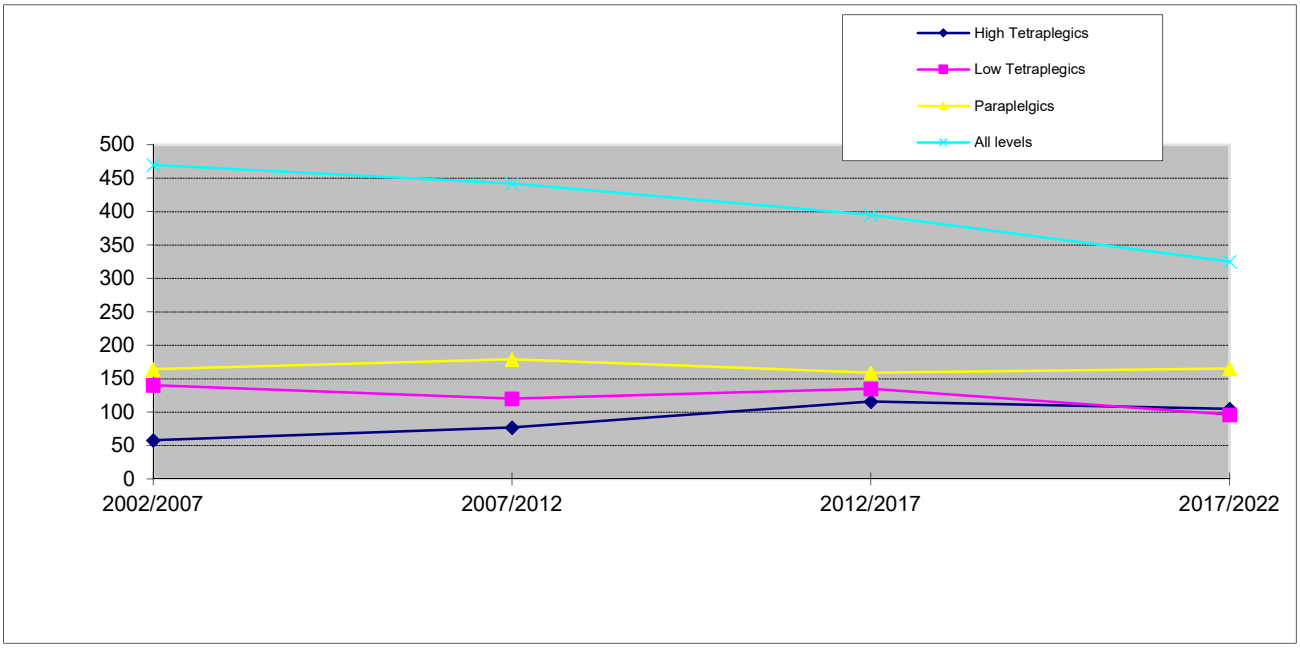
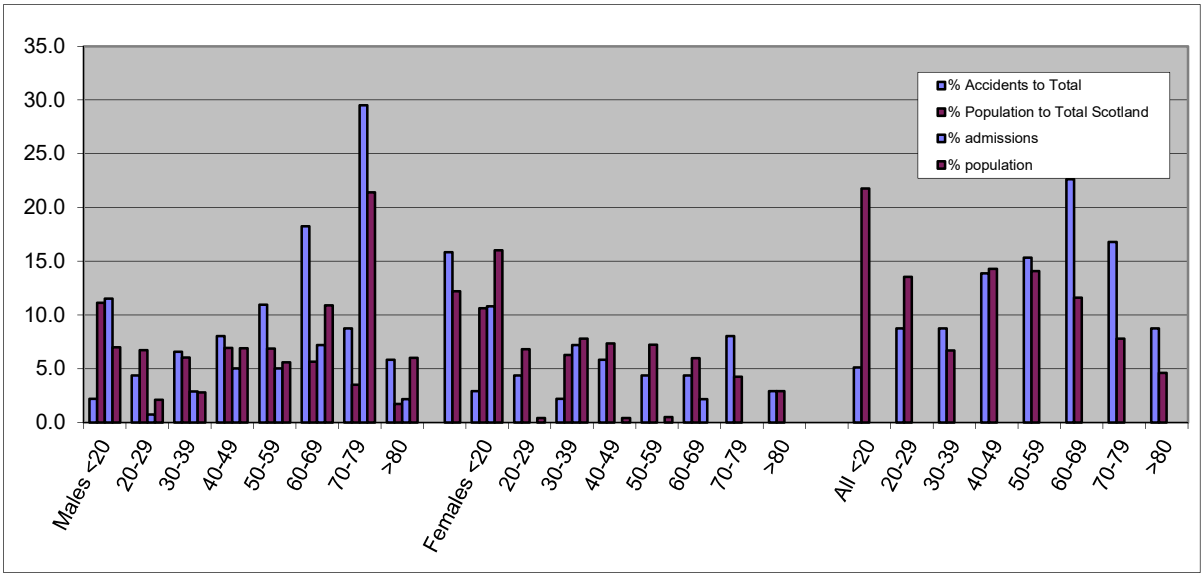
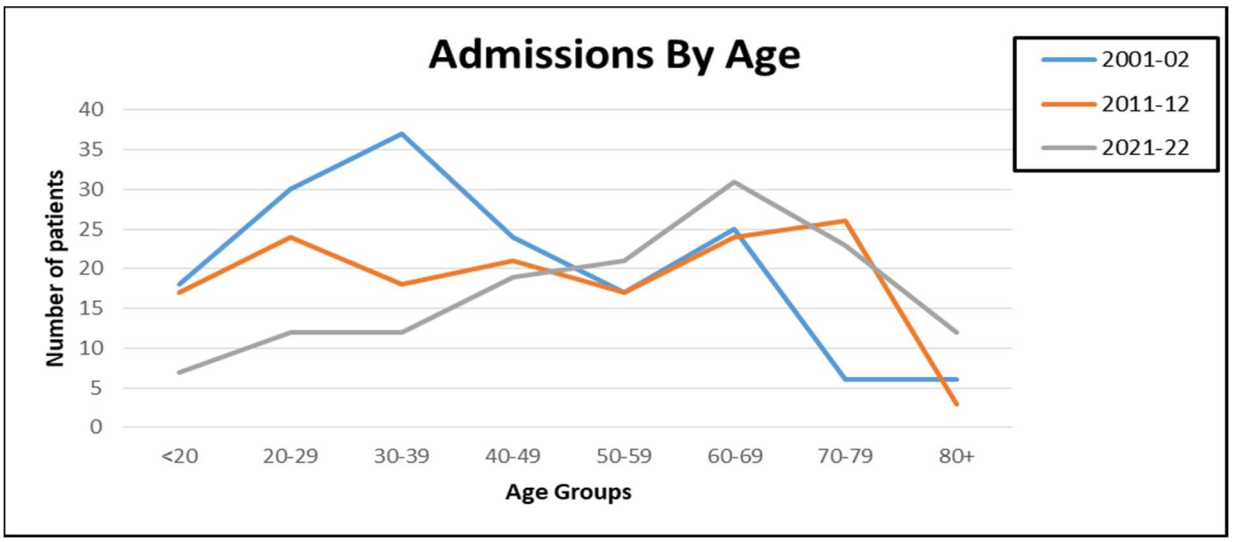


Figure 3 includes all admissions since 2002 and shows a steady rise in high tetraplegic patients and reduction in numbers of lesser injured patients (Group D and intact). The high tetraplegic patients are the most demanding of acute care and have the highest dependency.

Figure 4
New Admissions by Age Group



There is a sustained rise in older patients who are far frailer and find it much more challenging to actively participate in therapy. The number of injuries in those under twenty is at an all-time low.



Referrals by Age

Overall the admission age profile is little changed from the last few years with the peak age cohort now well established as the 60-69 year old patients. 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.

Details of Referral and Admission by Region

The service is commissioned to admit all patients with cord injury but there continue to be a large number of referrals for patients out with 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 increased to 421. The national referral/admission ratio (RAR) remains stable at 37% (34% in 20/21) meaning that just over one-third of referred patients are admitted. (The RAR in the early 2000's was around 70%).

An increasing number of patients are referred from primary and secondary care often electronically via TrakCare, largely inappropriate referrals requesting rehabilitation for patients with very minor trauma, degenerative disease of the spine or back pain.

Table 4

Referring Board	Total Referrals	Admissions	Not Admitted	% Admitted	Complex Advice Given	Semi Elective Referrals
Greater Glasgow & Clyde	211	49	115	30	42	47
Lanarkshire	54	18	34	35	13	2
Ayrshire & Arran	34	16	16	50	6	2
Dumfries & Galloway	21	5	15	25	6	1
Borders	3	1	2	33	3	0
Highland	21	13	7	65	3	1
Grampian	15	6	9	40	6	0
Forth Valley	10	3	7	30	4	0
Tayside	13	8	5	62	3	0
Fife	8	5	2	71	2	1
Lothian	25	10	14	42	10	1
Shetland	0	0	0	0	0	0
Western Isles	3	0	3	0	2	0
ECR	3	3	0	100	0	0
Overseas	0	0	0	0	0	0
Total	**421**	**137**	**229**	**37**	**100**	**55**

The number of patients not admitted but requiring complex advice has increased to 100. In these cases the referring team will have contacted the 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 teams. 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 5

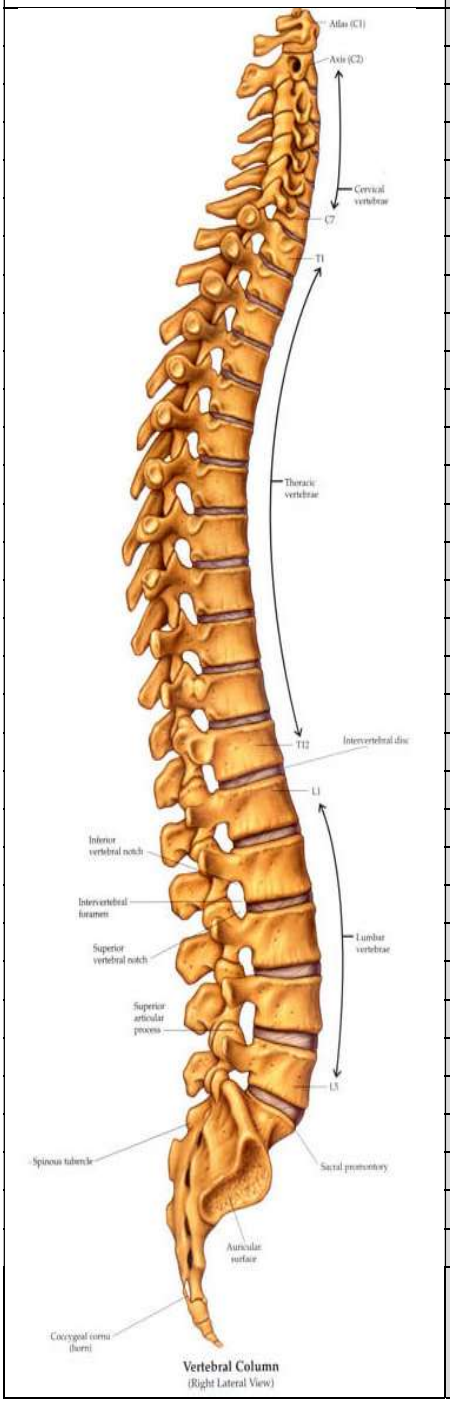
Health Board Referrals and Referring Speciality: Non Admissions

Non Admitted referrals

Referring Board	Level of Injury		Referring Specialty				Total
	Cervical	Thor/Lum	Ortho	Neuro	A&E	Other	
Greater Glasgow & Clyde	**57**	**58**	**33**	**15**	**17**	**50**	**115**
Lanarkshire	**16**	**18**	**12**	**0**	**10**	**12**	**34**
Ayrshire & Arran	**8**	**8**	**8**	**0**	**2**	**6**	**16**
Dumfries & Galloway	**6**	**9**	**6**	**0**	**3**	**6**	**15**
Borders	**2**	**0**	**2**	**0**	**0**	**0**	**2**
Highland	**2**	**5**	**4**	**0**	**3**	**0**	**7**
Grampian	**6**	**3**	**1**	**5**	**0**	**3**	**9**
Forth Valley	**3**	**4**	**0**	**0**	**5**	**2**	**7**
Tayside	**2**	**3**	**0**	**4**	**0**	**1**	**5**
Fife	**2**	**0**	**0**	**0**	**0**	**2**	**2**
Lothian	**2**	**12**	**1**	**7**	**1**	**5**	**14**
Shetland	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western Isles	**2**	**1**	**0**	**0**	**3**	**0**	**3**
ECR	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Overseas	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total	**108**	**121**	**67**	**31**	**44**	**87**	**229**

There is a historic over-referral pattern from some Health Boards but this has changed significantly over the last couple of years with the opening of all MTC's in Scotland, most recently South East Scotland and West of Scotland in the last year. The pattern of referral is likely to change further over the coming year as these Centres become more established. Numbers referred from GGC remain inappropriately high (only 30% of referrals admitted) which may suggest inadequate support or training for the orthopaedic services. This lies out with the remit of the National Service. Referrals for non-traumatic and progressive conditions are redirected appropriately.

***Table 6* Admissions by Anatomical Level and Severity**

	Level	Complete	Incomplete	No Neurology	Total
	C 1	1	6	0	7
	2	1	12	2	15
	3	1	11	1	13
	4	2	29	0	31
	5	1	11	1	13
	6	0	4	1	5
	7	0	0	2	2
	8	0	0	0	0
	Sub-total	6	73	7	86
	T 1	1	1	0	2
	2	1	2	0	3
	3	2	0	0	2
	4	5	0	0	5
	5	3	1	1	5
	6	1	1	0	2
	7	0	1	0	1
	8	2	1	0	3
	9	2	2	0	4
	10	1	0	0	1
	11	2	4	0	6
	12	1	4	1	6
	Sub-total	21	17	2	40
	L 1	0	6	2	8
	2	0	3	0	3
	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
	Sub-total	0	9	2	11
	S1-5	0	0	0	0
	Sub-total	0	0	0	0
	TOTAL	27	99	11	137

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

Cervical (neck) injuries continue to predominate. This is now 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 7
Mechanism of Injury

	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022
Fall*	**89**	**85**	**68**	**55**	**78**
RTA	**40**	**18**	**30**	**20**	**22**
Motor vehicle	21	4	13	8	8
Motorcyclist	7	8	6	3	9
Bicyclist	9	5	9	7	5
Pedestrian	3	1	2	2	0
Medical	29	17	27	20	**20**
Industrial Injury	5	4	2	1	**2**
Assault	0	2	0	0	**1**
Penetrating Injuries	1	1	1	2	**0**
Sporting Injury	5	5	5	4	**4**
Domestic Injury	0	0	0	0	**0**
Self Harm	3	6	5	0	**9**
Other	2	0	1	1	**1**
Total	**174**	**138**	**139**	**103**	**137**

** includes diving injuries*

Falls remain the most common cause of injuries. There was an increase in road traffic injuries, particularly motorcyclists. Medical causes have remained static probably within normal variation. There has been a significant increase in serious self harm attempts resulting in spinal injury possible as a result of COVID's mental-health toll.

Table 8A
Out-patient Activity

	17/18	18/19	19/20	20/21	21/22
Return	1704	1743	1914	2210	**2196**
New	50	54	70	21	**45**

Out-patient activity remains stable, probably due to the increased convenience of telephone consultations. Out-patient activity of the Unit is focused on the post discharge management of acute injuries and lifelong 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.

Table 8B
Out-patient DNA Activity

	17/18	18/19	19/20	20/21	21/22
Return	1,704	1,743	1,914	2,230	**2,196**
DNA Return	383	369	348	207	**272**
New	50	54	70	21	**45**
DNA New	14	11	7	3	**4**

The DNA rate has risen slightly from 20/21 to 21/22, probably due to clinics opening up to more face to face consultations, it remains well below the pre COVID rate.

Table 9
Out-patient Activity by Centre

	17/18	18/19	19/20	20/21	21/22	CHANGE YEAR	TOTAL 1992-2022
New QENSIU	50	54	70	21	**45**	114%	**3,535**
Return QENSIU	1,345	1,362	1,551	1,809	**1,828**	2%	**47,134**
Edinburgh	142	153	139	145	**151**	4%	**4,681**
Inverness	63	64	67	74	**60**	(19%)	**1,424**
Aberdeen	60	71	76	100	**73**	(27%)	**1,486**
Dumfries & Galloway	28	36	21	24	**17**	(29%)	**442**
Borders	22	13	21	23	**18**	(22%)	**426**
Arbroath	26	32	26	35	**34**	(1%)	**477**
Huntly	18	12	13	20	**15**	(25%)	**201**
Total	**1,754**	**1,797**	**1,984**	**2,251**	**2,241**	**(0.4%)**	**59,806**

Table 10
Attendance and Location Outreach Clinics

Location	% Attendance 20-21	% Attendance 21/22	Number of Clinics	Number of Patients
Aberdeen	99%	**87%**	**5**	**73**
Inverness	100%	**100%**	**4**	**60**
Dumfries	100%	**81%**	**2**	**17**
Arbroath	83%	**89%**	**3**	**34**
Borders	100%	**100%**	**2**	**18**
Huntly	100%	**100%**	**1**	**15**
Edinburgh	88%	**87%**	**11**	**151**
Ave Rate	94%	**90%**	**28**	**368**

All Outreach clinics were re-established face to face in July 2021 apart for the Lothian Clinic which remains virtual. The Spinal Injuries Lothian Outreach Clinic was displaced due to clinic capacity pressures in Lothian. At this time no appropriate alternative location for this clinic has been identified.

Table 11
Out-patient Activity by Specialty at QENSIU

	17/18	18/19	19/20	20/21	21/22
Neurosurgery	171	214	219	215	216
Urology+	63	0	0	0	0
Skin Care	36	23	26	0	2
Pain / Spasm	7	25	53	108	89
Neuroprosthetics	26	26	21	11	23
Orthotics	N/A	N/A	226	142	181
Sexual Dysfunction	6	9	7	4	8
Respiratory	17	25	17	23	21
Fertility	5	0	3	0	4
Spinal Injury Annual Review	985	1,040	979	1,306	1,284
Total	1,316	1,362	1,551	1,809	1,828

+included for historical comparison after retiral of Urological Surgeon.
#Increase of outpatient activity is due to Orthotics clinics which were sourced externally in previous years however this is now an "in-house" service provided by GGC and recorded on Trak system.
^ All patients attending the fertility clinic had a procedure performed and are included in the day case activity table 12

The Spinal Injury Annual Review clinics remain the core component of the outpatient activity and numbers remain stable. These are nurse led with only 50% 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 increased. 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 the nature of consultations which take place out with 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 numbers are expected to vary considerably each year.

Table 12
Day Case Attendances by Reason

	17/18	18/19	19/20	20/21	21/22
Urology/Urodynamics	53	32	33	45	**64**
Halo Fixation	135	232	91	85	**159**
Skin	13	7	10	1	**2**
Orthopaedic/Neurosurgery	0	2	0	0	**0**
Acupuncture / Pain / Spasm	450	450	481	278	**309**
Sexual Dysfunction	6	10	5	4	**1**
Fertility	20	16	25	21	**33**
Other	4	8	0	0	**0**
Total	**681**	**757**	**645**	**434**	**543**

Table 13
Day Case Attendances by Health Board

Day Case Attendances by Health Board					
	17/18	18/19	19/20	20/21	21/22
Ayrshire and Arran	35	51	56	31	**63**
Borders	10	1	0	3	**2**
Dumfries and Galloway	1	1	10	1	**4**
Fife	21	13	9	8	**9**
Forth Valley	40	33	66	25	**22**
Grampian	1	6	2	5	**2**
Greater Glasgow and Clyde	359	432	298	214	**283**
Highland	15	11	19	25	**39**
Lanarkshire	136	173	131	81	**78**
Lothian	51	35	43	35	**36**
Shetland	0	0	0	0	**0**
Tayside	8	1	11	6	**5**
Orkney	1	0	0	0	**0**
Western Isles	1	0	0	0	**0**
ECR	1	0	0	0	**0**
Unknown	0	0	0	0	**0**
Total	**681**	**757**	**645**	**434**	**543**

Table 14
Supporting Surgical Services
Multi-disciplinary rehabilitation is the keystone of the workload in this patient population. Surgical support is required from orthopaedics, neurosurgery and plastic surgery. Approximately twenty per cent of the patients have additional limb injuries.

Service	Clinics	Patients	Acute Spinal Operations	Elective Operations
			Thoracolumbar fixations 26	0
Neurosurgery 4 x Month	39	232	Cervical fixations 21	1
Skin Care/Other/Pump	55	99	6	1

The number of surgical procedures increased. All referrals and new admissions are discussed at the weekly MDT meeting involving spinal, surgical and radiology consultants along with juniors. This ensures a consensus approach to management for the benefit of the patients and mutual support of consultant staff for difficult clinical decisions. Patient scans are reviewed at this weekly MDT, this MS Teams meeting is led by a neuroradiologist. All spinal fixation surgery is performed by spinal neurosurgeons. Thanks are due to the surgical team for maintaining the thoracolumbar fixation service in the QEUH.

Table 15
Ventilated Bed Days

High-level spinal cord injury often requires temporary or permanent ventilator support. The Respiratory Care Team consists of a Consultant in Spinal Injuries 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
17/18	**Edenhall**	15	26	395
	RCU	2	21	41
18/19	**Edenhall**	10	21	213
	RCU	3	2	6
19/20	**Edenhall**	15	25	376
	RCU	4	94	377
20/21	**Edenhall**	12	22	258
	RCU	2	39	78
21/22	**Edenhall**	**9**	**20**	**179**
	RCU	**1**	**7**	**7**

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 need for long-term ventilation fortunately remains rare and numbers are expected to vary widely year to year.

The introduction of the Respiratory Bundle for newly injured vulnerable tetraplegic patients has resulted in less patients requiring invasive ventilation over the last 2 years. The respiratory bundle developed by the wider team involves aggressive respiratory prophylactic techniques such as the elective use of non- invasive ventilation, high flow nasal oxygen, nebulised bronchodilators, mucolytics and manual techniques to maintain respiratory hygiene.

3. Performance and Clinical Outcomes

3.1 Equitable

Geographical Access for nationwide services

New Admissions by ASIA Impairment Level & Health Board

The ASIA grading system is recognised internationally as a measure of spinal cord dysfunction and can be used to classify improvements over time.

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

Table 16

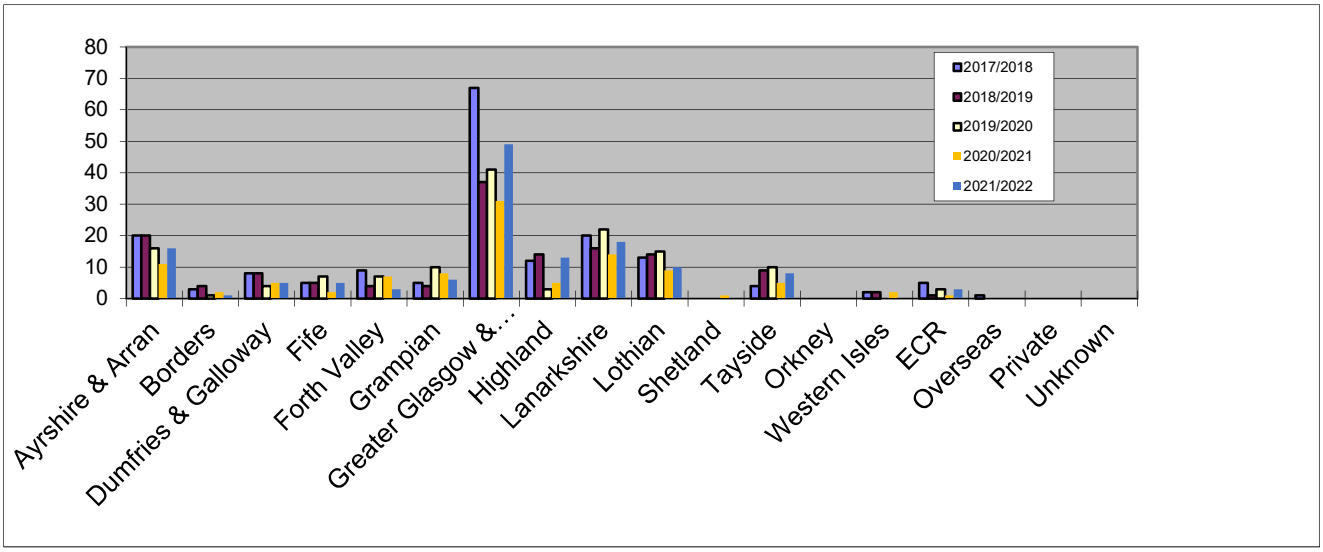
2021/22	A	B	C	D	E	Total
Ayrshire and Arran	5	1	4	5	1	16
Borders	0	0	0	1	0	1
Dumfries and Galloway	1	0	0	3	1	5
Fife	0	0	2	3	0	5
Forth Valley	0	0	2	1	0	3
Grampian	1	0	1	3	1	6
Greater Glasgow and Clyde	7	6	10	23	3	49
Highland	3	0	1	6	3	13
Lanarkshire	2	1	4	9	2	18
Lothian	2	2	1	5	0	10
Overseas	0	0	0	0	0	0
Shetland	0	0	0	0	0	0
Tayside	4	0	2	2	0	8
Orkney	0	0	0	0	0	0
Western Isles	0	0	0	0	0	0
ECR	3	0	0	0	0	3
Unknown	0	0	0	0	0	0
TOTAL	28	10	27	61	11	137

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.

As a national service it is important to provide outpatient and domiciliary services throughout Scotland.

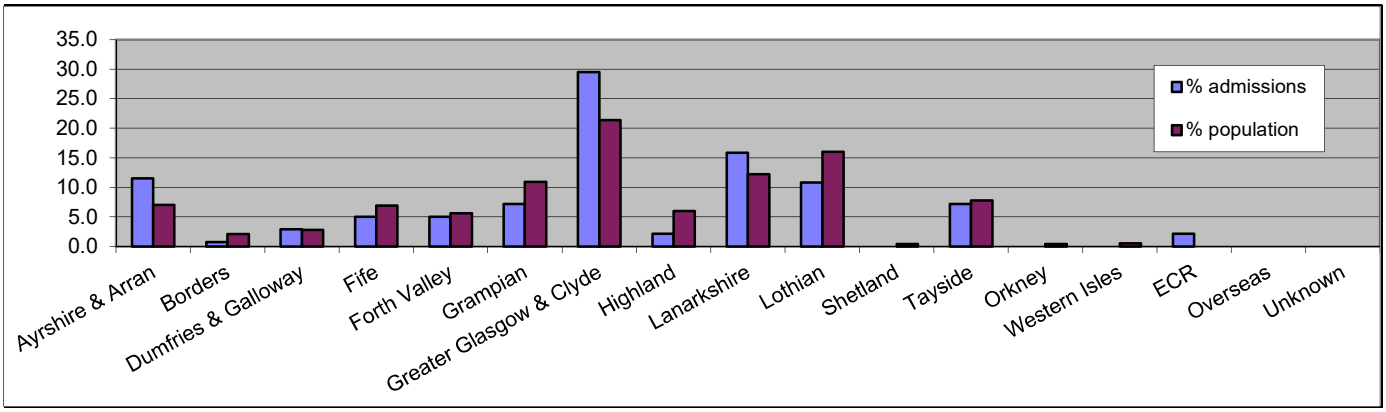
This resulted in the development of the Liaison Sister Service and outreach clinics in areas identified on our database as having a concentration of patients. All outreach clinics are Medical Consultant led with Nursing staff attending. We are delighted to welcome volunteers from SIS who also see and 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 two Discharge Planners. They all provide assistance to the Lead Nurse.

Figure 5
New Admissions by Health Board of Residence 2017-2022



Three non-Scottish patients were admitted (ECR & Overseas). A small number of such patients is to be expected. The Unit did not admit any private patients.

Figure 6
Admissions by Health Board compared with Population Size



The distribution of per-capita admissions within Health Boards is unchanged. Now that the numbers of neurologically intact patients have reduced it would appear that there is a genuine higher incidence of spinal cord injury in the West of Scotland Health Boards. Further research would be required to establish the reason.

Table 17
New Out-patient Activity by Health Board

	17/18	18/19	19/20	20/21	21/22
Ayrshire and Arran	6	5	7	1	**10**
Borders	0	0	0	0	**0**
Dumfries and Galloway	3	0	3	0	**0**
Fife	0	0	1	0	**0**
Forth Valley	1	3	9	0	**2**
Grampian	0	0	0	0	**0**
Greater Glasgow and Clyde	24	36	30	10	**22**
Highland	6	3	8	1	**0**
Lanarkshire	8	6	12	7	**9**
Lothian	2	0	0	1	**0**
Shetland	0	0	0	0	**0**
Tayside	0	1	0	1	**0**
Orkney	0	0	0	0	**0**
Western Isles	0	0	0	0	**1**
ECR	0	0	0	0	**1**
Unknown	0	0	0	0	**0**
Total	**50**	**54**	**70**	**21**	**45**

3.2 Efficient

Table 18
Length of Stay by Level of Spinal Cord Injury
Discharged Patients 21/22

Case Mix	No. of Patients	Mean L.O.S.	Range of L.O.S.
I	16	166	42 - 251
II	6	99	16 -194
III	34	110	31 - 325
IV	65	40	1 - 158
All	121	79	1 - 325

Groups 1 & 2 are the most paralysed 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 may be limited in this group.

Table 19
Bed Utilisation

National Spinal Injuries Unit Edenhall HDU = 12 Beds Philipshill = 36 Beds		
Bed Complement	**Actual Occupied Bed Days**	**% Occupied**
48	11776	76%

Occupancy figures for spinal cord injury patients have increased 10% from last year. Due to the COVID pandemic and other staffing and bed pressures, the Unit accommodated over 100 non-spinal patients who are not counted in the above figures. The position will be reviewed at the next report.

3.3 Timely

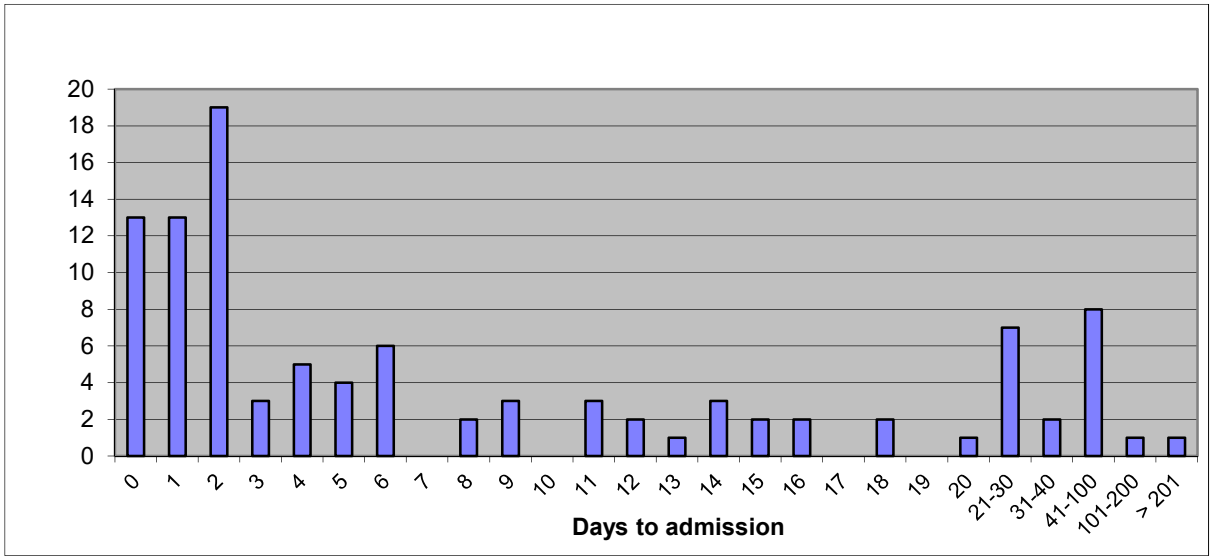
Waiting Times: Acute and Out-patient Clinics

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-nine years. There were no delays in transfer due to lack of beds. Time to admission has increased in 21/22, likely due to significant COVID related staff absence and delayed admission from recently opened MTCs, fewer patients are referred from the Emergency Departments directly but from ITUs or major trauma wards once stabilised. This will be kept under review as the MTCs bed in.

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

***Figure* 7**
Time from injury to admission



The policy is of immediate admission for all patients once they are clinically stable. Most patients are referred within twenty-four hours of injury. Early referral is encouraged. In 2021/22; 20% of patients were admitted within twenty-four hours of injury and 35% were admitted within forty-eight hours. 70% were admitted within one week. 41% of trauma patients were admitted within forty-eight hours.

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 diagnosis and treatment of these patients is undertaken in neurological and medical units out with the trauma system. They are referred and admitted much later than the trauma patients.

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.

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, Oral and Maxillofacial Surgery, Renal, etc).

***Table* 20**
Days to Admission by Range

	No. of Patients	Mean Time (Days)	Range of Time
2017-2018	**174**	**231**	**0 - 10688**
2018-2019	**138**	**218**	**0 - 10274**
2019-2020	**138**	**15**	**0 - 230**
2020-2021	**103**	**19**	**0 - 375**
2021-2022	**137**	**116**	**0 - 12615**

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 21/22 the median time to admission for all injuries was 4 days.

Table 21
Delayed Discharge

	No. of Patients Discharged	No. of Patients Delayed	Mean Delay (days)	Range of Delay (days)	No Delay
2017/2018	165	7	66	10 - 274	96%
2018/2019	139	10	62	16 - 171	93%
2019/2020	141	23	53	1 - 303	84%
2020/2021	102	9	65	7 - 322	91%
2021/2022	**121**	**25**	**31**	**1 - 108**	**79%**

How delays to patient discharge from the Unit are calculated and recorded has changed in the last year, we now follow the same delayed discharge recording method as GGC. Despite discharge planning weeks or months ahead a number of patients continue to have delays in discharge, previously generally due to lack of suitable accommodation. If accommodation or necessary carers were unavailable patients were transferred back to the referring hospital once they had completed their rehabilitation. Since the establishment of all MTC's in Scotland repatriation to the referring hospital e.g. MTC or local Trauma Unit has proved challenging. Across Scotland carer COVID absence and challenges recruiting carers has led to significant delay to discharge. Staff at the Unit continue to work with local health and social care partnerships and housing organisations to minimise delays in return home. Delayed discharge makes increasing demands on nursing and occupational therapy time in particular.

3.4 Effectiveness

Clinical Outcomes/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 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 thirty year old database remain unique worldwide.

Some comparisons with English units can be made using data from their national commissioning database. The average time from trauma to admission for most English units is two months, in Scotland it is much shorter. Every study of acute spinal injury confirms that a specialist 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

	18-19	19-20	20-21	**21/22**
New Admissions	138	139	110	**137**
New Outpatients	54	70	21	**45**
Key Performance Indicators				
Referrals				
All patients referred	526	427	303	**421**
Telephone advice	388	288	200	**366**
Complex advice with support/visit	106	89	31	**100**
New patient activity				
All patients admitted with neurological injury	107	129	95	**126**
All patients admitted with non-neurological injury	31	10	8	**11**
Surgical stabilisations:				
- Thoracolumbar fixations	31	36	14	**26**
- Elective removal of metalwork	4	3	0	**1**
- Cervical fixations	9	21	18	**21**
- Halo immobilizations	27	18	11	**22**
Spinal injury specific surgery:				
-Other	4	4	12	**6**
Implant spasm and pain control:				
- New pumps implanted	0	2	0	**1**
Removal of pump		1	0	**1**
- Revision pumps	0	0	0	**0**
- Operational pumps	11	7	6	**6**
- Pump Refill QENSIU	7	7	6	**6**
- Pump Refill Local	4	N/A	N/A	**N/A**
Step down unit:				
- Episodes of care	27	38	0	**6**

- Number of families/people	99	108	0	**11**
- Number of days (nights)	62	139	0	**93**
- Relatives Room				
- Episodes of care	42	35	0	**1**
- Number of families / people	57	49	0	**1**
- Number of days (nights)	286	332	0	**16**
New inpatient occupied bed days				
Total Available (new & return)	17,223	17,097	15,534	**15,497**
Actual	13,861	13,816	10,299	**11,776**
Bed Occupancy %	80%	81%	66%	**76%**
Mean length of stay				
I	164	171	163	**166**
II	140	176	94	**99**
III	132	130	109	**110**
IV	23	38	38	**40**
All	78	105	87	**79**
Range of length of stay	1 - 377	5 - 600	**1-432**	**1-325**
Delays in discharge (actual v's intended)				
Number of patients discharged	139	141	102	**121**
Number of patients with delayed discharged	10	23	9	**25**
Length of delay (mean/mode)	62	53	65	**31**
% with no delay	93%	84%	91%	**79%**
Day case				
by NHS Board of Residence	See Fig 9	See table 13	See table 13	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 8A	See Table 8A	See Table 8A
Return Patient no's QENSIU	See Table 7B	See Table 7B	See Table 8A	See Table 8A
New Patient QENSIU (DNAs/ % attendance)	20%	7%	14%	**9%**
Return Patient QENSIU (DNAs/ % attendance)	21%	18%	9%	**12%**
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 9	See Table 9	See Table 9
Number of patients discharged from the service	Life Long Care	Life Long Care	Life Long Care	Life Long Care
Allied Health Professionals activity	N/A	N/A	N/A	N/A
New Patient (DNAs/ % attendance)	See Table 7C	See Table 8B	See Table 8B	See Table 8B
Return Patient (DNAs/ % attendance)	See Table 7C	See Table 8B	See Table 8B	See Table 8B

3.5 Safe

Re-admissions to the Unit

Most neurologically injured patients discharged from the Unit never require readmission. They attend annually at the Outpatient Department 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 33 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)

Deteriorating Patient
The combination of all bundles have resulted in:-

- Early detection and prompt treatment of infection utilising the sepsis bundle to ensure all elements within one hour
- Reduction in the rate of re-admission to HDU from rehabilitation
- Timely escalation of unwell rehabilitation patients results in quick resolution and return to rehabilitation activities
- Early bladder management using CAUTI bundle
- HDU no longer routinely catheterise intact injuries
- Cost savings related to reduced catheter associated UTI prevalence
- Reduction of stress and anxiety for patient and loved ones associated with deterioration.

This package of initiatives are continually improving the outcomes for spinal patients to assure they receive Safe, Effective, Person Centred Evidence Based care.

We continually review outcomes and share these with the Interdisciplinary Team at Audit and Governance meetings.

3.6 Person Centred

Person-Centred Visiting

Person centred visiting was introduced to QENSIU in October 2019 unfortunately this was suspended due to COVID, as restrictions have eased we have aligned with GGC guidelines currently offering 2 interchangeable visits daily. Our psychology and nursing teams continue to support patients through this difficult time. The use of IT such as Zoom and FaceTime has been encouraged by staff offering support for patients to communicate with their loved ones throughout their rehabilitation. We have utilised MS Teams/Attend Anywhere and other digital communication platforms to involve family with goal plan meetings/teaching carers and support for families.

Sustaining a spinal injury can completely change the life of a person and their family, facilitating flexible visiting reduces stress and anxiety and gives patients the connection to the people that matter most to them.

Patient Education/Workshop Spinal Education

Education is a fundamental aspect of the rehabilitation journey for spinal patients, their families and loved ones. Patients are adapting to a new normal, learning how their body now functions. They require the knowledge and understanding to effectively manage their own lifelong care, with the ability to troubleshoot their way through problems and potentially direct others who may need to support them. Our successful patient education programme runs over 16 weeks, with 32 sessions, delivered by the multi-disciplinary team and peer support staff. Despite the ongoing challenges of COVID restrictions we have managed to have a blended approach to patient education with both face to face and remote sessions. Using remote access for delivering patient education means we can include patients, who for a variety of reasons could not attend the sessions in person. There is now no reason why a patient who wants to attend the sessions can't, this has been a positive outcome from COVID.

Relatives Day and monthly relatives support evenings were put on hold during COVID but over the last year we have managed to reintroduce a hybrid Relative's Day both in person and via remote access over MS Teams. The feedback from this day was excellent and has become the test bed for delivering content relating to the care and management of a patient following spinal injury to an audience from across Scotland. Technology has aided our ability to deliver education to care teams, district nurses and professionals from other health boards prior to discharge and following discharge. This ensures accurate advice is delivered to the right people at the right time without the need for unnecessary travel and thus reducing the carbon footprint. Despite all these challenges attendance has remained consistently good.

Education sessions for students and new members of staff continue both face to face with social distancing, and remotely via MS Teams. Remote sessions are also delivered to student nurses from the University of Glasgow and Glasgow Caledonian University. Feedback from students in both Philipshill and Edenhall wards is consistently positive, and many return to us as registered nurses. There has been a focus on enhancing the clinical skills of our Healthcare Support Workers (HCSW) they are valuable members of staff with many years' experience. As we move into the living with COVID period it is anticipated that activities of our patients and their families will return to a new normal. The patients' experience has become very insular over the 2 years with reduced opportunity to venture out into the world outside the Unit, this of course is an important aspect of rehabilitation both physically and emotionally.

Family Unit / Step-Down Unit

Due to COVID the Step-down Unit has not been used fully for its original purpose. We have used the activity area for in person socially distanced teaching and for timetabled essential visiting. The Family Unit has been used for 6 episodes by 11 people for a total of 93 days. We hope to be able to use the facilities to their full potential as restrictions allow.

4. Quality and Service Improvement

Medicine Management

Following completion of an eLearning package by staff, QENSIU has now fully implemented HEPMA, an electronic prescribing and administration of medications system in line with GGC. Each shift a medicine co-ordinator ensures that any prescriptions or alterations are amended and HEPMA updated, medications for discharge are ordered efficiently. Pharmacy have also been consulted on this process to facilitate and address any issues. Nurses have protected time following the drug round to review all electronic prescriptions to ensure no omissions.

As part of the Value Management Collaborative, Philipshill continue to review medication stock levels. Staff regularly review expensive stock or prescribed items considering if a less expensive appropriate alternative is available.

Huddle/Communication

Effective communication between healthcare professionals is vital. Senior staff members from Philipshill and Edenhall have continued to attend daily huddles with all disciplines within the Unit. This has been essential to allow the progress and circulation of continually changing information to be disseminated between staff and cascaded to all areas. The Unit continues to participate in the electronic Institute of Neurological Sciences Huddle (INS) allowing senior nursing staff to highlight concerns and ensure safe staffing levels.

Philipshill continue to perform afternoon huddles with all staff members in the ward and medical staff. This has proven to be crucial in the handover of information when changes in staffing occur e.g. facilitating discussion of deteriorating patients and work load with all staff.

Each patient has in-depth and informative person centred care plan completed by the healthcare professionals who are assigned to work with them daily.

Value Management Collaborative 2021/2022

Philipshill continue to be a successful ward with the roll out of the "Value Management Collaborative" and have recently received an award for success. The aim is to test and spread quality improvement methods combining cost and quality data at a team level to deliver improved patient outcomes, experience and value.

One element adapted is “Joy at Work”, it is high priority to maintain morale and wellbeing of staff. Philipshill collated data and measured feedback on “How was your Day”. Themes collated are reviewed and actioned, staff feel listened to and changes are made to improve staff and therefore patient outcomes.

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, specifically as part of the INS Medical Specialties/Spinal Injuries Clinical Governance Meeting. Standing items include Significant Adverse Event Reviews

(SAER), Mortality Review, Risk Register and putting audit into practice. The Unit continues to adopt National Management Guidelines, as appropriate. Journal Club now re-established allows discussion around evidence based practice.

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 utilises the DATIX Incident Reporting system and these incidents are reviewed within defined timeframes. The Unit is included in the Regional Services Directorate for reporting purposes. Test of Change is underway for implementation of GRATIX will be to recognise the good news stories and celebrate success.

Table 22

Category	Number
Pressure ulcer care	35
Medication incident	10
Contact with object	6
Medical device & equipment	10
Communication	0
Slips, trips & falls	64
Other	17
Security	5
Moving & handling	2
Violence & aggression	17
Challenging behaviour	10
Fire alarm actuation	6
Needlestick injury	3
Infection control issue	2
2222	2
Self harm	6
Staffing levels	8
Radiology incident	0
Treatment issue	1
Patient abscondment	10
IT security	0
Patient observation	0
Total	**214**

Table 23

Slips, Trips and Falls	
Fall from bed	0
Fall from chair	11
Fall from level	5
Slip/trip on level	1
Suspected fall	0
Unwitnessed	42
Controlled	5

All category 4/5 clinical incidents are investigated according to NHSGGC policy. During the year there has been 1 category 4 incident.

1. Fall with harm – an independent patient sustained a hip dislocation during a wheelchair transfer. Reviewed by the Falls Coordinator deemed the event unavoidable, all care given was appropriate and did not contribute to the incident.

Table 24

Overall	
1 - Negligible	99
2 - Minor	106
3 - Moderate	8
4 - Major	1
5 - Extreme	0
Total	**214**

Table 25
Pressure Area Care

Hospital Acquired QENSIU =			
Grade 1 = 31	Grade 2 = 34	Grade 3 = 1	Grade 4 = 0

All pressure sores must be considered to be a failure of care to some extent. The best way of preventing sores out with 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 continues. This system has allowed us to identify pressure sores at an early stage and to make appropriate changes in patient care to prevent further deterioration. This year 31 Grade 1 (early warning) pressure sores were identified which has prevented further deterioration and subsequent delays in patient rehabilitation.

We work closely with Tissue Viability to review and ensure the correct properties are applied to damaged or broken skin to accelerate wound healing and prevent bed rest. All Grade 2 pressure sores and above are referred to Tissue Viability and DATIX accordingly.

Table 26
Hospital Acquired Infection

	17/18	18/19	19/20	20/21	21/22
COVID	0	0	0	unknown	6
Salmonella	0	0	0	0	0
Clostridium Difficile	1	0	1	0	0
MRSA	2	6	2	0	3
Streptococcus pyogenes	1	0	0	0	0
Scabies/ TB /Varicella Zoster	1	0	0	0	0
MDR Acinetobacter	0	0	0	1	0

In 21/22, 9 patients were diagnosed with COVID on admission or within a few days of admission on screening, a further 6 patients screened positive for COVID at some point during their stay. Most patients remained asymptomatic, a few experienced minor viral symptoms. With the support of the GGC Infection Control Team, all patients were isolated or cohorted appropriately within the Unit to limit the spread of infection keeping other patients and staff safe. Edenhall Ward receives patients in the early stages 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.

Morbidity and Mortality

All deaths are presented at regular morbidity and mortality meetings (M&M). There were 5 deaths in the Unit in 21/22, 4 were expected deaths in elderly tetraplegic patients with significant comorbidity. One death was unexpected, a patient died while undergoing spine surgery. Results of this patient's post mortem are awaited.

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 partially upheld. Consultants and senior nursing staff continue to provide advice to the Clinical Service Manager regarding complaints involving management of patients out with the Unit.

The Unit also receives feedback via Care Opinion.

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. Robust systems have been put in place to monitor compliance with all LearnPro modules for all staff. The Welcome to the Ward posters at the entrance to the wards continue to detail the variety of methods that patients and their families can leave feedback. A review of the signage within the Unit has been undertaken and work is in progress to replace and upgrade to ensure ease of navigation of the Unit. NHSGGC carry out regular Equality Impact Assessment Tools (EQIA) for clinical areas. The Unit EQIA was conducted in 2014. A telephone interpreting service is available to all services users.

6. Financial Reporting and workforce 2021/22

NHS Greater Glasgow & Clyde
Acute Services Division
Regional Services Directorate
Spinal Injuries Unit

Financial Report for the twelve months to 31st March 2022

	AfC Banding	WTE	Contract Value	Contract Value YTD	Actual YTD	Variance YTD	Year End Forecast	Year End Forecast Variance
			£	£	£	£	£	£
Dedicated Staff Costs								
Consultant		5.71	969,713	969,713	937,487	32,226	937,487	32,226
Specialty Doctor		1.00	91,245	91,245	107,406	-16,161	107,406	-16,161
Senior Medical		*6.71*	*1,060,958*	*1,060,958*	*1,044,893*	*16,065*	*1,044,893*	*16,065*
Junior Medical		2.48	163,541	163,541	163,541	0	163,541	0
		9.19	*1,224,499*	*1,224,499*	*1,208,434*	*16,065*	*1,208,434*	*16,065*
Administrative	4	6.50	193,938	193,938	193,938	0	193,938	0
Administrative	3	0.14	3,950	3,950	3,950	0	3,950	0
Administrative	2	2.49	69,244	69,244	69,244	0	69,244	0
		9.13	*267,132*	*267,132*	*267,132*	*0*	*267,132*	*0*
Senior Manager	8a	0.50	43,173	43,173	43,173	0	43,173	0
Nursing	7	7.80	419,224	419,224	444,910	-25,686	444,910	-25,686
Nursing	6	9.36	523,074	523,074	602,461	-79,387	602,461	-79,387
Nursing	5	54.30	2,265,414	2,265,414	2,193,512	71,902	2,193,512	71,902
Nursing	2	23.88	670,258	670,258	949,309	-279,051	949,309	-279,051
Housekeepers	2	2.00	68,887	68,887	27,745	41,143	27,745	41,143
Phlebotomist	2	0.53	13,524	13,524	0	13,524	0	13,524
		98.37	*4,003,554*	*4,003,554*	*4,261,109*	*-257,555*	*4,261,109*	*-257,555*
Psychologist	8B	1.00	76,888	76,888	87,466	-10,578	87,466	-10,578
Orthotist	7	0.20	11,394	11,394	11,394	0	11,394	0
AHP	7	12.26	650,859	650,859	735,664	-84,805	735,664	-84,805
		13.46	*739,141*	*739,141*	*834,523*	*-95,383*	*834,523*	*-95,383*
Total Staff		**130.15**	**£ 6,234,326**	**£ 6,234,326**	**£ 6,571,198**	**- £ 336,873**	**£ 6,571,198**	**- £ 336,873**
Supplies Costs								
Drugs			176,359	176,359	165,013	11,346	165,013	11,346
Surgical Sundries			520,965	520,965	394,770	126,195	394,770	126,195
CSSD/Diagnostic Supplies			4,843	4,843	5,087	-244	5,087	-244
Other Therapeutic Supplies			120,281	120,281	43,378	76,903	43,378	76,903
Equipment/Other admin supplies			59,989	59,989	54,732	5,257	54,732	5,257
Hotel Services			43,928	43,928	55,912	-11,984	55,912	-11,984
Direct Supplies			**£ 926,365**	**£ 926,365**	**£ 718,892**	**£ 207,473**	**£ 718,892**	**£ 207,473**
Charges from other Health Boards								
Lothian Spinal Clinic			6,144	6,144	3,290	2,854	3,290	2,854
Charges from other Health Boards			**£ 6,144**	**£ 6,144**	**£ 3,290**	**£ 2,854**	**£ 3,290**	**£ 2,854**
Allocated Costs								
Medical Records			125,435	125,435	125,435	0	125,435	0
Building Costs			221,094	221,094	221,094	0	221,094	0
Domestic Services			82,834	82,834	82,834	0	82,834	0
Catering			225,649	225,649	225,649	0	225,649	0
Laundry			81,466	81,466	81,466	0	81,466	0
Neuroradiology			94,900	94,900	94,900	0	94,900	0
Laboratories			95,912	95,912	95,912	0	95,912	0
Anaesthetics			45,306	45,306	45,306	0	45,306	0
Portering			88,225	88,225	88,225	0	88,225	0
Phones			58,131	58,131	58,131	0	58,131	0
Scottish Ambulance Service			10,887	10,887	10,887	0	10,887	0
General Services			33,250	33,250	33,250	0	33,250	0
Allocated Costs			**£ 1,163,089**	**£ 1,163,089**	**£ 1,163,089**	**£ 0**	**£ 1,163,089**	**£ 0**
Total Supplies			**£ 2,095,598**	**£ 2,095,598**	**£ 1,885,271**	**£ 210,327**	**£ 1,885,271**	**£ 210,327**
Overhead Costs								
Fixed costs								
Rates			63,073	63,073	63,073	0	63,073	0
Capital Charge			435,774	435,774	435,774	0	435,774	0
Overheads			160,832	160,832	160,832	0	160,832	0
Total Overheads			**£ 659,679**	**£ 659,679**	**£ 659,679**	**£ 0**	**£ 659,679**	**£ 0**
Total Expenditure		**130.15**	**£ 8,989,603**	**£ 8,989,603**	**£ 9,116,148**	**- £ 126,546**	**£ 9,116,148**	**- £ 126,546**
Postgraduate Dean Funding			-139,540	-139,540	-139,540	0	-139,540	0
Total Expenditure net of Postgraduate Dean Funding			**£ 8,850,063**	**£ 8,850,063**	**£ 8,976,608**	**- £ 126,546**	**£ 8,976,608**	**- £ 126,546**
Income from non-Scottish resident patients					-52,650	52,650	-52,650	52,650
Total Net Expenditure		**130.15**	**£ 8,850,063**	**£ 8,850,063**	**£ 8,923,958**	**- £ 73,896**	**£ 8,923,958**	**- £ 73,896**

7. Audit & Clinical Research / publications

Clinical Audit Program

The clinical audit meetings are held once a month in a hybrid format. The invitation has been extended to include other rehabilitation teams to promote learning and improve networking. All members of the Multidisciplinary Team have been involved in carrying out and presenting these audits. Examples of some of the projects done include:

- Proton Pump Inhibitor prescribing in the HDU of the Unit
- Clinical outcomes at discharge from QENSIU: Comparison, review and analysis of patients discharged during COVID and matched patients pre-COVID
- Incidence of pressure sores on NEXUS spinal beds
- Factors contributing to missed therapy sessions on the rehabilitation ward

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

Research

The Scottish Centre for Innovation in Spinal Cord Injury (SCISCI) is an umbrella group to support translational research in a clinical setting. QENSIU acts as an embedded research micro site within the NHS to promote research and to provide access and stimulation for clinicians, patients and researchers to work together. The group conducts research in all areas of spinal cord injury from clinical review and outcome through understanding and promoting neural repair and regeneration to active intervention assessment and treatment strategies all based on basic science. The research is patient orientated and extends from harvesting and growing olfactory stem cells to robotic walking and brain computer interfacing. Psychological studies and the impact of disability are equally important. The aim is to scientifically assess the extent, natural history and recovery pattern of SCI and harness agents that promote and optimise the functioning and health of those living with disability.

2021/2022 was a challenging year for research globally, with the COVID pandemic leading to the suspension or early termination of a great number of research studies. Despite this, our researchers have continued to undertake world leading research across a range of areas of SCI. The last year saw people with a SCI take part in eight different clinical studies, with more research studies approved to take place in 2022/2023.

Current areas of focus include:
A European-wide data collection study investigating the changes in the body following a spinal cord injury (EMSCI).
Using electrical stimulation of the abdominal muscles to reduce respiratory complications in the first six weeks of injury.

Clinical assessment of upper extremity performance in individuals with spinal cord injury using the LIFT System to deliver non-invasive electrical stimulation (Onward)
Nanovibration to slow/prevent osteoporosis disease progression and avoid fragility fractures
· Electroencephalograph predictors of central neuropathic pain in subacute spinal cord injury
· Mechanisms of neuropathic pain after spinal cord injury
· Motor conditioning to enhance the effect of physical therapy
· Neurofeedback to improve spasticity after incomplete spinal cord injury
· Heparin mimetics to promote central nervous system repair

Research Spotlight

Onward
Our team of researchers partnered with Onward Medical to test the safety and effectiveness of a spinal cord stimulation device. The goal of the study was to identify if the non-invasive electrical spinal stimulation therapy, also known as ARC Therapy, help individuals with paralysis caused by SCI to improve strength and function of their arms and hands. Five very keen and willing volunteers took part in this study in Glasgow, the only UK site recruiting to this international study, providing key data might help researchers to better understand how to treat paralysis or come up with new tests to help others in the future. More information about the work of Onward Medical can be found at https://www.onwd.com

E-Walk
Our research team are excited to be partnering with researchers in Sydney, Chicago and Toledo in a pioneering study investigating whether electrical stimulation applied over the skin above the spinal cord can improve function. We will assess the benefits of spinal stimulation combined with step and walking training. We will use a randomised controlled trial design including a sham intervention. Spinal stimulation will be delivered for up to one hour, three times per week for 12 weeks with a subsequent follow up. Fifty participants will be recruited to determine convincingly whether function is improved. The main outcome is improvement in walking, but we will also assess neurological function, spasticity, quality of life and potential mechanisms underlying any improvements.

Intensive Motor Training
The most promising and readily implementable intervention that could make a lasting difference to the lives of people with SCI is early and intensive motor training directed at recovery below the level of the injury. The aim therefore of The Early & Intensive SCI-MT Trial is to determine the effectiveness of early and intensive motor training on neurological recovery and function in people with SCI. The QENSIU will be one of two UK sites in a multi-centred international study that will compare the effect of getting an extra 12 hours of physiotherapy per week for 10 weeks with usual care for people with a recent SCI. The primary endpoint will be motor recovery after this 10 weeks of training.

Publications
Our researchers published 22 articles and one book chapter in the field on SCI in 2021/2022. More information about these articles can be found in our research report, or on the SCISCI website: www.scisci.org.uk

Connect with us
Our dedicated research website was updated in 2021. Further information about our research activities can be found at scisci.org.uk. We can now also be found on Twitter @ScisciScotland

Research database
We are now compiling a database of people living with a SCI who would be interested in taking part in research. This will enable our researchers to conduct their research more efficiently, and enable people with a SCI to have access to world leading research. All ethical and governance approvals are in place.

Papers and Authorship
Research Profile available on request/or https://www.gla.ac.uk/research/az/scisci

8. Looking Ahead

The comprehensive review of the service in 2017 noted that the Unit's therapy departments were considerably understaffed compared to peer units in the UK and further investigation confirmed that the Unit was also understaffed in comparison to rehabilitation services of Major Trauma Centres (MTCs). The MTCs are an important benchmark because over 50% of Unit patients suffer Major Trauma and the Unit takes 20% of all major trauma admitted to GGC hospitals so it would be appropriate to staff it accordingly. As noted in previous reports the increase in older and sicker patients also puts increasing demands on all departments. A formal staffing review was undertaken and a case will be submitted to the national commissioners for a significant increase in therapy staffing.

Until the onset of the pandemic the Unit had advanced plans to host the Guttmann Meeting in June 2020. This is the premier annual UK scientific meeting for spinal cord injury but was cancelled due to the COVID pandemic and cancelled again in 2021. We are planning to finally host this virtually in 2022.

ZeroG

It is anticipated that by September 2022, the QENSIU gym will have a ZeroG, dynamic body weight support system installed. This is a robotic trolley, installed on an overhead track system which the patient is then attached to via a harness. This allows for real time dynamic body weight support during a number of therapeutic tasks, including transfers, balance and gait. To have access to such a device at the QENSIU would allow for more frequent and longer training sessions with less dependence on therapists while increasing patient and staff safety through a falls prevention mechanism. The ZeroG will also increase the opportunity for gait training of those with incomplete tetraplegic SCI, who now make up over half of our admissions and find it difficult to use the more basic forms of gait training, such as parallel bars and walking frames, due to poor upper limb function. In addition to increasing our clinical treatment options, the ZeroG will provide an invaluable tool in expanding our programme of therapy research.

To our knowledge, this will be the first ZeroG system installed in the UK and one of only a handful of dynamic body weight support devices in use elsewhere in the UK. There have been a number of contributors that have helped us to raise the funds required to purchase the device which we are very grateful for. We look forward to finally use the ZeroG after a year of meticulous investigation into which rehabilitation technology to invest in.

We successfully applied for endowment funds to refurbish the dayroom, this should be completed later this year. Funds are also recently available to convert a staff area to a large comfortable staff room.

Due to COVID pressures the Unit has lost its clinic space in the Astley Ainslie Hospital for Lothian patients and we are exploring alternative venues in Edinburgh and East Lothian to host the clinic. All other clinics remain intact.

The Horatio's Garden team have completed the garden room. This is an extensive glazed area in which patients can enjoy the garden from indoors.

The Unit first received patients in 1992 and the original concept, admission and treatment pathways remain robust since conception. 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 from the first few days 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.

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