Queen Elizabeth National Spinal Injuries Unit

Annual Report
2022/23

NHS Greater Glasgow and Clyde

Queen Elizabeth National Spinal Injuries Unit
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Table of Contents

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 2022 to March 2023 the Unit admitted **130** new patients, treated **488** day cases and **2,215** out-patients, including **402** patients in outreach clinics across the country. Surgeons performed **54** 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 local Health and Social Care Partnerships 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, NEUROSURGERY
MONTHLY	EDINBURGH (OUTREACH), GLASGOW NEUROPROSTHETICS
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 2022/23 21% of patients were admitted within one day of injury, 39% within two days, and 66% 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 centres 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 125 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

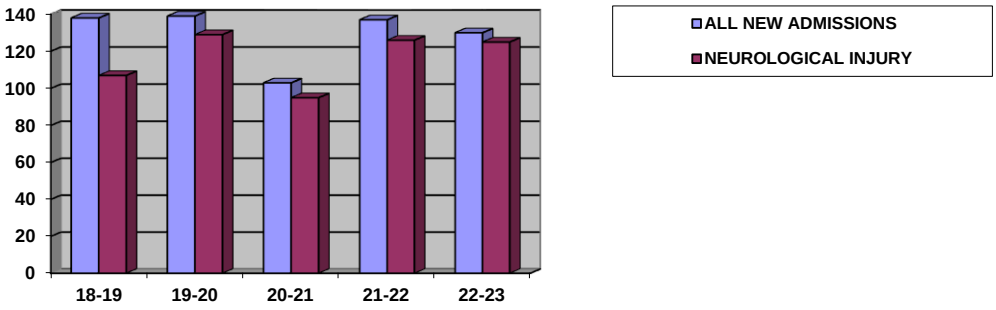


Table 2A
New Admissions: total and neurologically injured

	18/19	19/20	20/21	21/22	22/23	92-23
ALL NEW ADMISSIONS	138	139	103	137	**130**	**4,787**
Neurological	107	129	95	126	**125**	**2,796**
Non-neurological	31	10	8	11	**5**	**1,896**

Table 2B
Intact patients

In 22/23 5 patients were admitted to the Unit who after full assessment had not suffered a spinal cord injury.

Health Board	No of Patients	Ave LOS (days)	Total Bed Days
Ayrshire & Arran	1	4	4
Greater Glasgow & Clyde	2	37	73
ECR	1	15	15
Lanarkshire	1	4	4
Total	**5**	**19**	**96**

Numbers of neurologically intact patients are at an all-time 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.

One hundred and forty six patients with acute spine trauma 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

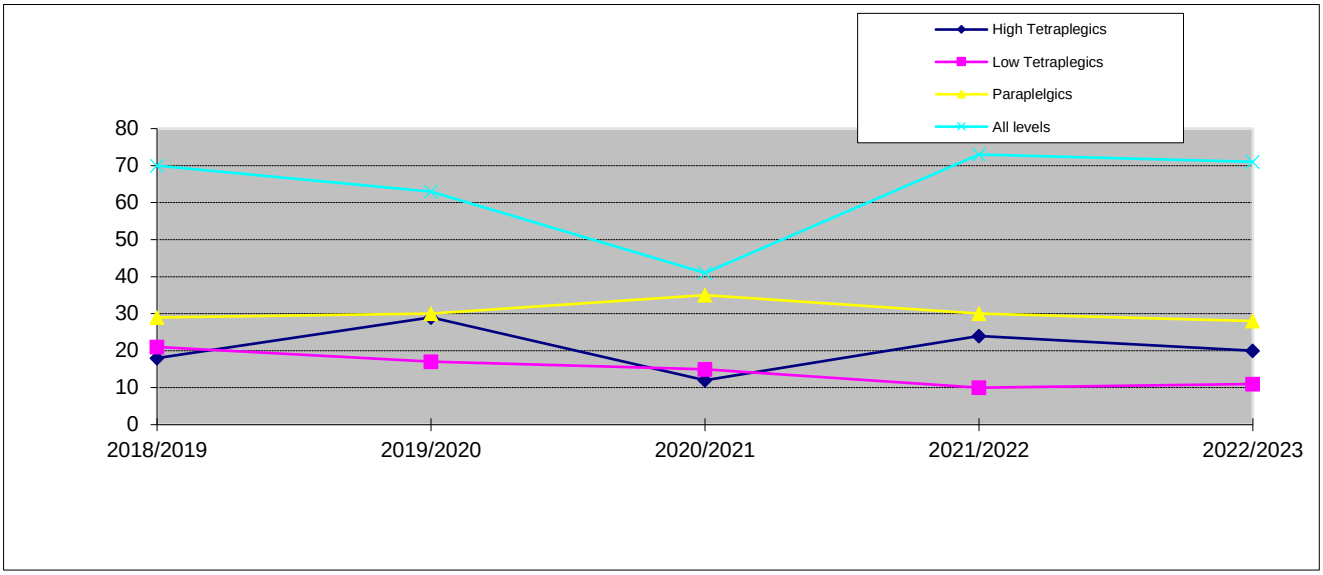


Table 3
New Admissions by case-mix complexity 2015/2023

GROUP	18/19	19/20	20/21	21/22	22/23	92/23
I	18	29	12	24	20	**476**
II	21	17	15	10	11	**740**
III	29	30	35	30	28	**1,052**
IV	70	63	41	73	71	**2,519**
Total	138	139	103	137	130	**4,787**

Figure 3
Historical trends in case-mix complexity

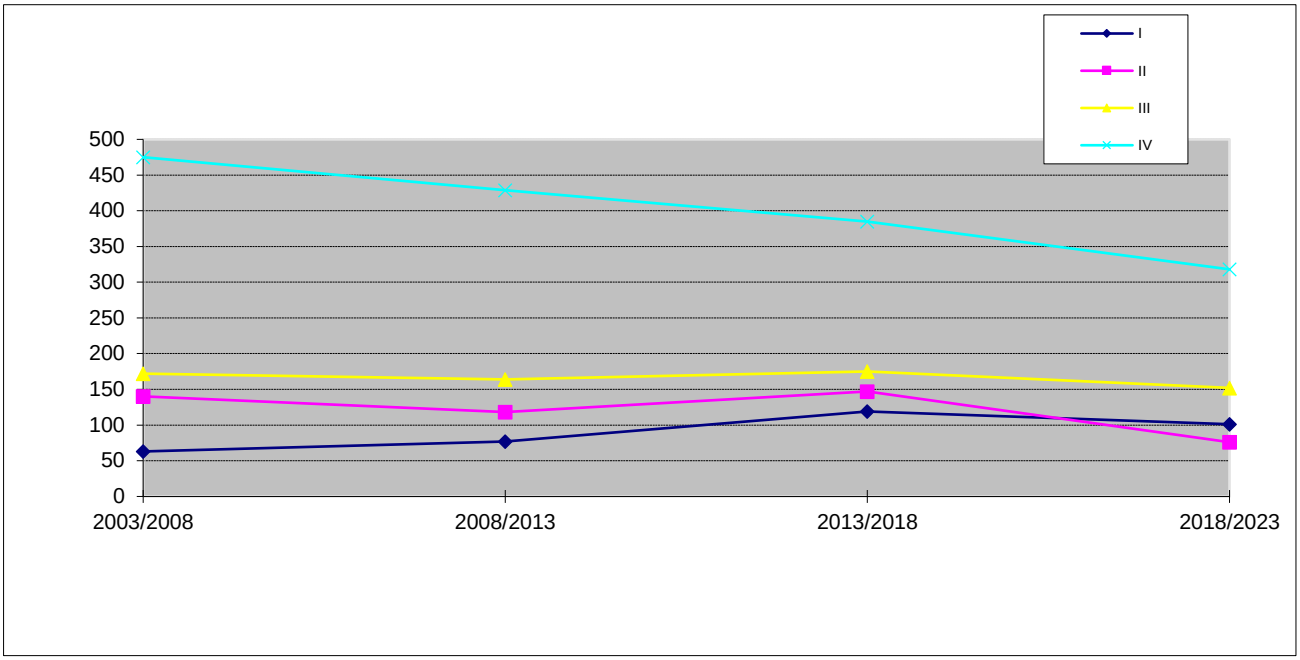
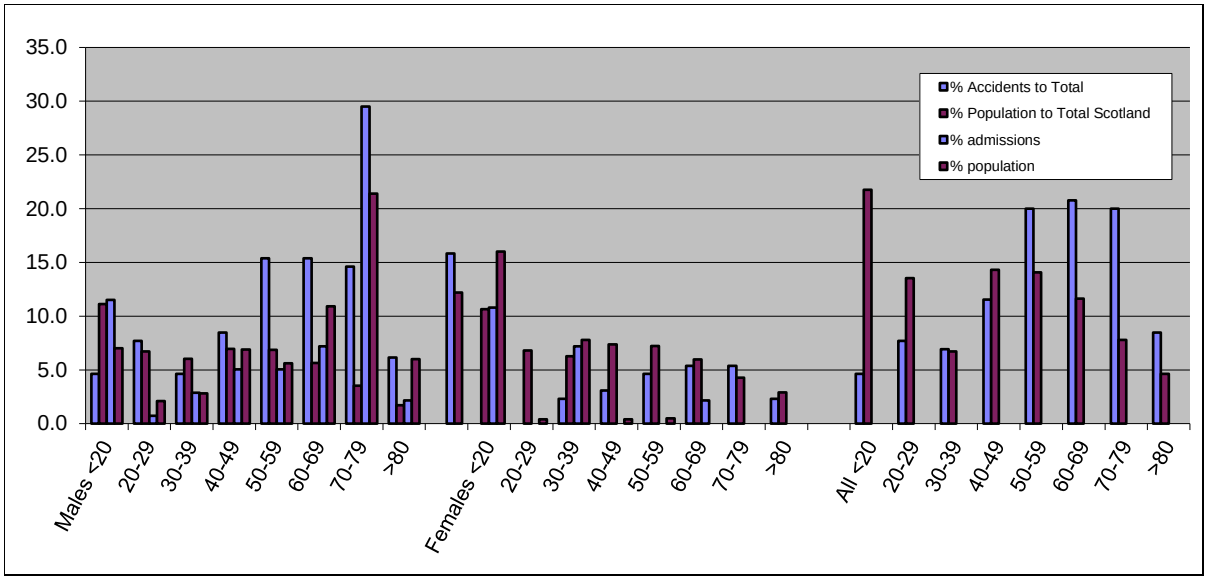


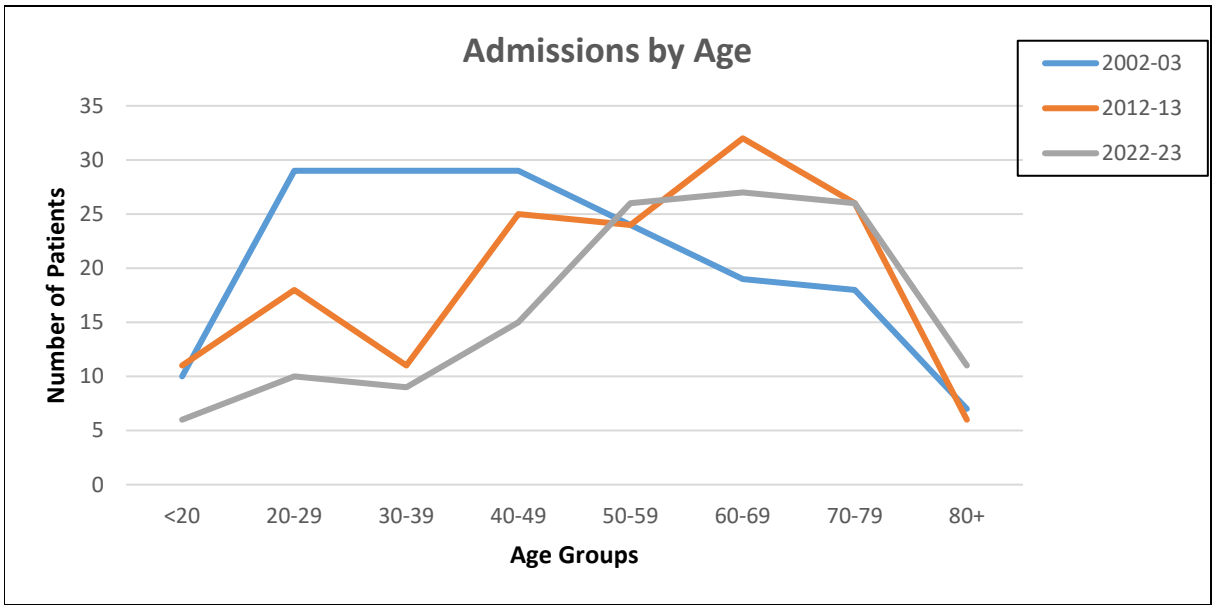
Figure 3 includes all admissions since 2003 and shows a steady rise in high tetraplegic patients and reduction in numbers of lesser injured patients (Group D and intact). The high tetraplegic patients are the most demanding of acute care and have the highest dependency.

Figure 4A
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.

Figure 4B



Referrals by Age

Overall the admission age profile is little changed over the last few years with the peak age cohort now well established as the 50-79 year old patients. This older group have a large amount of co-morbidity affecting 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 non-progressive cord injury but there continues 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 decreased to 342. The national referral/admission ratio (RAR) remains stable at 38% (37% in 21/22) 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	Acute Injuries Not Admitted	Semi Elective Referrals Not Admitted	% Admitted	Complex Advice Given
Greater Glasgow & Clyde	190	56	87	47	29	31
Lanarkshire	40	18	14	8	56	8
Ayrshire & Arran	27	6	17	4	45	7
Dumfries & Galloway	9	3	5	1	33	1
Borders	2	1	0	1	50	0
Highland	16	8	7	1	50	3
Grampian	10	7	2	1	70	0
Forth Valley	5	2	3	0	40	1
Tayside	9	9	0	0	100	0
Fife	4	2	2	0	50	2
Lothian	21	11	7	3	52	6
Shetland	1	1	0	0	100	0
Western Isles	3	1	2	0	33	1
ECR	4	4	0	0	100	0
Overseas	1	1	0	0	100	0
Total	**342**	**130**	**146**	**66**	**38**	**60**

The number of patients not admitted but requiring complex advice has decreased to 60. 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

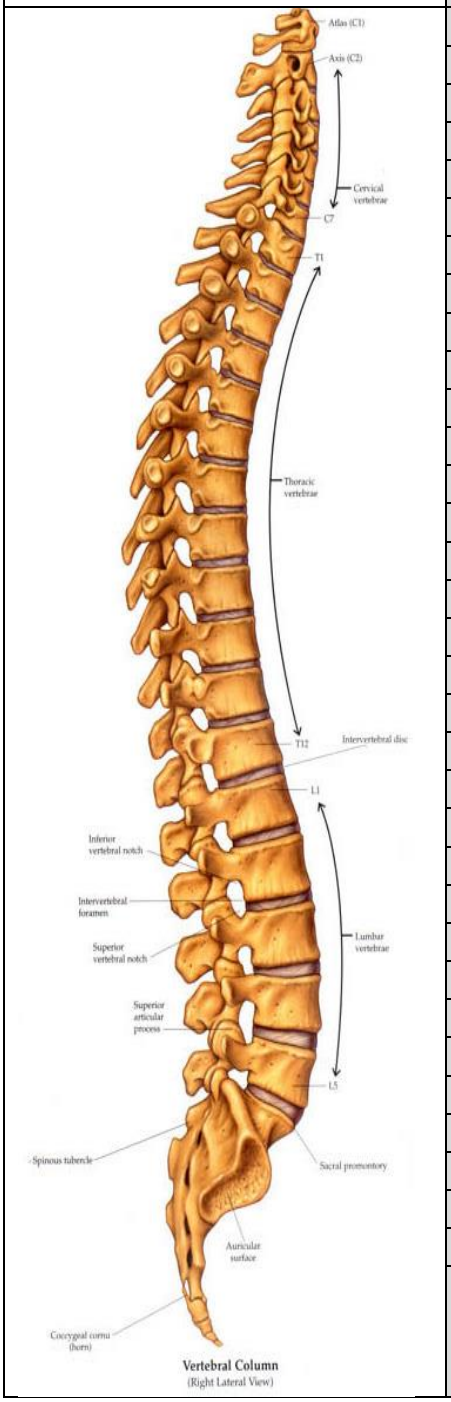
Non Admitted Acute Referrals

Referring Board	Level of Injury		Referring Specialty				Total
	Cervical	Thor/Lum	Trauma & Ortho	Neuro	A&E	Other	
Greater Glasgow & Clyde	47	40	42	6	13	26	87
Lanarkshire	5	9	5	0	2	7	14
Ayrshire & Arran	6	11	8	0	3	6	17
Dumfries & Galloway	4	1	3	0	2	0	5
Borders	0	0	0	0	0	0	0
Highland	3	4	1	0	4	2	7
Grampian	0	2	1	1	0	0	2
Forth Valley	0	3	2	0	0	1	3
Tayside	0	0	0	0	0	0	0
Fife	0	2	0	1	0	1	2
Lothian	2	5	1	3	1	2	7
Shetland	0	0	0	0	0	0	0
Western Isles	2	0	0	0	1	1	2
ECR	0	0	0	0	0	0	0
Overseas	0	0	0	0	0	0	0
Total	**69**	**77**	**63**	**11**	**26**	**46**	**146**

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 two years. 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 29% of referrals admitted), however this includes semi elective referrals, 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. 39% of acute injury referrals from GGC were admitted. 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	0	7	2	9
	2	3	7	0	10
	3	1	18	0	19
	4	7	13	0	20
	5	4	14	0	18
	6	2	3	1	6
	7	0	1	0	1
	8	0	0	0	0
	Sub-total	17	63	3	83
	T 1	0	3	0	3
	2	0	0	0	0
	3	2	2	0	4
	4	3	1	0	4
	5	0	3	0	3
	6	2	1	0	3
	7	0	0	0	0
	8	0	1	0	1
	9	2	1	0	3
	10	2	3	0	5
	11	1	1	0	2
	12	3	5	0	8
	Sub-total	15	21	0	36
	L 1	0	3	0	4
	2	0	3	1	3
	3	1	2	1	4
	4	0	0	0	0
	5	0	0	0	0
	Sub-total	1	8	2	11
	S1-5	0	0	0	0
	Sub-total	0	0	0	0
	TOTAL	33	92	5	130

(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. This year saw a significant increase in complete tetraplegics at 17, with 8 of these patients suffering a high complete tetraplegia, as a result the number of acute ventilated bed days was at an all-time high at 742.

Table 7
Mechanism of Injury

	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
Fall*	**85**	**68**	**55**	**78**	**78**
RTA	**18**	**30**	**20**	**22**	**24**
Motor vehicle	4	13	8	8	10
Motorcyclist	8	6	3	9	7
Bicyclist	5	9	7	5	7
Pedestrian	1	2	2	0	0
Medical	17	27	20	20	13
Industrial Injury	4	2	1	2	0
Assault	2	0	0	1	1
Penetrating Injuries	1	1	2	0	2
Sporting Injury	5	5	4	4	5
Domestic Injury	0	0	0	0	1
Self Harm	6	5	0	9	5
Other	0	1	1	1	1
Total	**138**	**139**	**103**	**137**	**130**

** includes diving injuries*

Falls remain the most common cause of injuries. There was a slight increase in road traffic injuries due to an increase in motor vehicles and bicyclist accidents. Medical causes have reduced. Self-harm has reduced to pre-pandemic levels.

Table 8A
Out-patient Activity

	18/19	19/20	20/21	21/22	22/23
Return	1,743	1,914	2,210	2,196	**2,170**
New	54	70	21	45	**45**

Out-patient activity remains stable. Out-patient activity of the Unit is focused on the post discharge management of spinal cord 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

	18/19	19/20	20/21	21/22	22/23
Return	1,743	1,914	2,230	2,196	**2,170**
DNA Return	369	348	207	272	**464**
New	54	70	21	45	**45**
DNA New	11	7	3	4	**4**

The DNA rate has risen significantly from 21/22 to 22/23, all clinic appointments within the Unit and at Outreach are offered face to face apart from NHS Lothian Outreach Clinic which remains displaced. At patient requests a small proportion of appointments are by telephone or Near Me for patient convenience.

Table 9
Out-patient Activity by Centre

	18/19	19/20	20/21	21/22	22/23	CHANGE YEAR	TOTAL 1992-2023
New QENSIU	54	70	21	45	**45**	No change	**3,580**
Return QENSIU	1,362	1,551	1,809	1,828	**1,768**	(3%)	**48,902**
Edinburgh	153	139	145	151	**158**	5%	**4,839**
Inverness	64	67	74	60	**69**	15%	**1,493**
Aberdeen	71	76	100	73	**81**	11%	**1,567**
Dumfries & Galloway	36	21	24	17	**22**	29%	**464**
Borders	13	21	23	18	**17**	(6%)	**443**
Arbroath	32	26	35	34	**34**	No change	**511**
Huntly	12	13	20	15	**21**	40%	**222**
Total	**1,797**	**1,984**	**2,251**	**2,241**	**2,215**	(2.3%)	**62,021**

Table 10
Attendance and Location Outreach Clinics

Location	% Attendance 21/22	% Attendance 22/23	Number of Clinics	Number of Patients
Aberdeen	87%	**87%**	**5**	**81**
Inverness	100%	**100%**	**4**	**69**
Dumfries	81%	**85%**	**2**	**22**
Arbroath	89%	**87%**	**3**	**34**
Borders	100%	**94%**	**2**	**17**
Huntly	100%	**91%**	**1**	**21**
Edinburgh	87%	**95%**	**11**	**158**
Ave Rate	90%	**93%**	**28**	**402**

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

	18/19	19/20	20/21	21/22	22/23
Neurosurgery	214	219	215	216	238
Urology+	0	0	0	0	0
Skin Care	23	26	0	2	1
Pain / Spasm	25	53	108	89	81
Neuroprosthetics	26	21	11	23	18
Orthotics	N/A	226	142	181	210
Sexual Dysfunction	9	7	4	8	9
Respiratory	25	17	23	21	19
Fertility	0	3	0	4	4
Spinal Injury Annual Review	1,040	979	1,306	1,284	1,188
Total	1,362	1,551	1,809	1,828	1,768

+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 37% 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 have reduced a little due to a reduction in Halo fixations at the Unit. 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. Patients who live out with the West of Scotland attend local halo, pain and spasticity clinics.

Table 12
Day Case Attendances by Reason

	18/19	19/20	20/21	21/22	22/23
Urology/Urodynamics	32	33	45	64	**55**
Halo Fixation	232	91	85	159	**101**
Skin	7	10	1	2	**0**
Orthopaedic/Neurosurgery	2	0	0	0	**0**
Acupuncture / Pain / Spasm	450	481	278	309	**287**
Sexual Dysfunction	10	5	4	1	**4**
Fertility	16	25	21	33	**41**
Other	8	0	0	0	**0**
Total	**757**	**645**	**434**	**543**	**488**

Table 13
Day Case Attendances by Health Board

Day Case Attendances by Health Board					
	18/19	**19/20**	**20/21**	**21/22**	**22/23**
Ayrshire and Arran	51	56	31	63	**53**
Borders	1	0	3	2	**0**
Dumfries and Galloway	1	10	1	4	**14**
Fife	13	9	8	9	**17**
Forth Valley	33	66	25	22	**22**
Grampian	6	2	5	2	**7**
Greater Glasgow and Clyde	432	298	214	283	**229**
Highland	11	19	25	39	**22**
Lanarkshire	173	131	81	78	**88**
Lothian	35	43	35	36	**29**
Shetland	0	0	0	0	**0**
Tayside	1	11	6	5	**7**
Orkney	0	0	0	0	**0**
Western Isles	0	0	0	0	**0**
ECR	0	0	0	0	**0**
Total	**757**	**645**	**434**	**543**	**488**

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
Neurosurgery			Thoracolumbar fixations 22	4
			Cervical fixations 27	1
Neurosurgery 4 x Month	37	272		
Skin Care/Other/Pump	57	70	28	3

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, a MS Teams meeting 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 Consultants 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
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
22/23	**Edenhall**	**23**	**32**	**742**
	RCU	0	0	0

Each patient is counted only once but may be responsible for multiple episodes of care or inter ward transfers if their condition varies. Edenhall our HDU ward provided care for more

acutely ventilated patients over more total ventilated days than any other year on record. Acutely ventilated patients require 1:1 nursing 24/7, the Edenhall nursing team supported by medical and physiotherapy colleagues have therefore been under significant additional pressures caring for this group. Only 1 of these 23 patients requires long term ventilation. 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 in previous 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

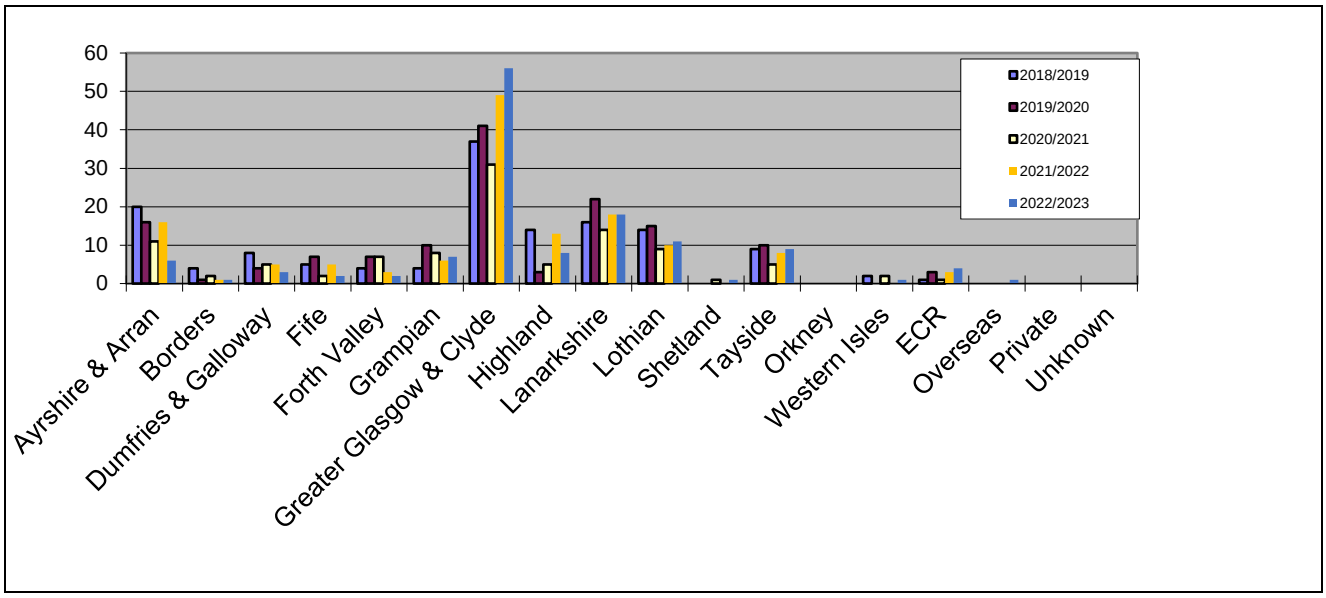
2022/23	A	B	C	D	E	Total
Ayrshire and Arran	3	0	0	2	1	6
Borders	0	1	0	0	0	1
Dumfries and Galloway	2	0	0	1	0	3
Fife	1	0	0	1	0	2
Forth Valley	1	0	0	1	0	2
Grampian	1	1	1	4	0	7
Greater Glasgow and Clyde	11	6	4	33	2	56
Highland	2	1	2	3	0	8
Lanarkshire	3	0	2	12	1	18
Lothian	4	0	4	3	0	11
Overseas	0	0	1	0	0	1
Shetland	0	0	1	0	0	1
Tayside	5	0	2	2	0	9
Orkney	0	0	0	0	0	0
Western Isles	0	0	0	1	0	1
ECR	0	0	2	1	1	4
TOTAL	33	9	19	64	5	130

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.

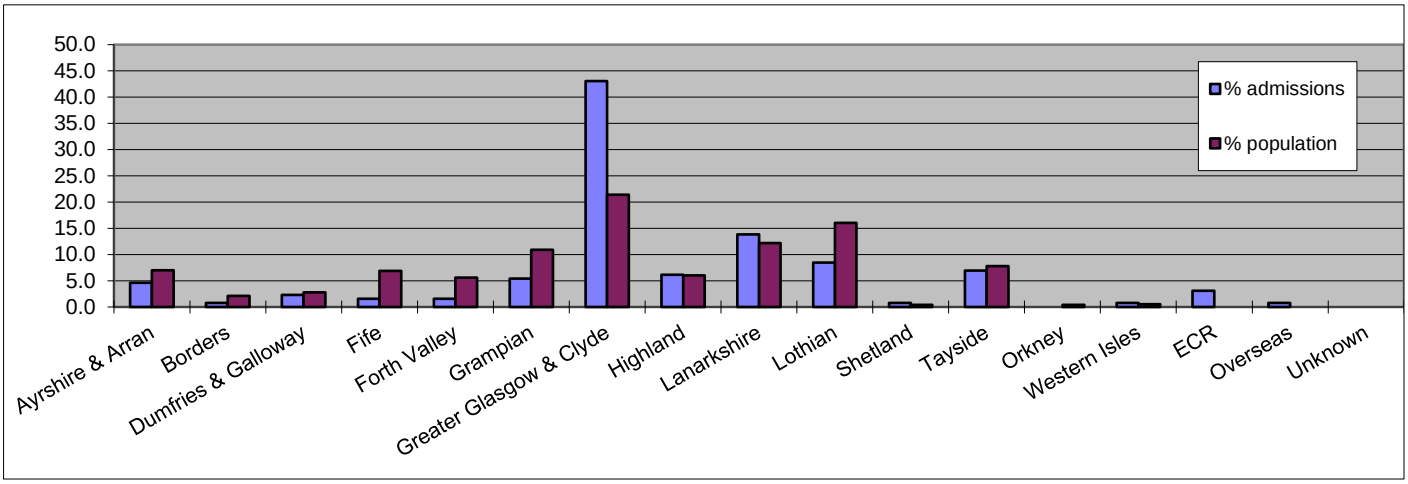
This resulted in the development of the Liaison Sister Service and outreach clinics in areas identified from our database as having a concentration of patients. All outreach clinics are Medical Consultant led with Nursing staff attending. We are delighted to welcome volunteers from SIS who also see and 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 2018-2023



Five 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 review would be required to establish the reason.

Table 17
New Out-patient Activity by Health Board

	18/19	19/20	20/21	21/22	22/23
Ayrshire and Arran	5	7	1	10	**4**
Borders	0	0	0	0	**1**
Dumfries and Galloway	0	3	0	0	**0**
Fife	0	1	0	0	**1**
Forth Valley	3	9	0	2	**2**
Grampian	0	0	0	0	**1**
Greater Glasgow and Clyde	36	30	10	22	**23**
Highland	3	8	1	0	**3**
Lanarkshire	6	12	7	9	**9**
Lothian	0	0	1	0	**0**
Shetland	0	0	0	0	**0**
Tayside	1	0	1	0	**1**
Orkney	0	0	0	0	**0**
Western Isles	0	0	0	1	**0**
ECR	0	0	0	1	**0**
Total	**54**	**70**	**21**	**45**	**45**

3.2 Efficient

Table 18
Length of Stay by Level of Spinal Cord Injury
Discharged Patients 22/23

Case Mix	No. of Patients	Mean L.O.S.	Range of L.O.S.
I	**24**	**186**	**14 - 392**
II	**7**	**160**	**64 - 280**
III	**22**	**136**	**69 - 247**
IV	**65**	**60**	**3 - 201**
All	**118**	**106**	**3 - 392**

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
% of Utilised Bed Days by ASIA Scale
Discharged Patients 22/23

ASIA scale on admission	No. of patients	Mean length of stay (days)	Range	Utilised bed days %
A	20	168	64 - 346	25
B	9	148	69 - 193	10
C	24	162	14 - 392	29
D	60	63	3 - 201	28
E	5	19	4 - 59	1

Length of stay in the tables above is the actual length of stay per case mix and per ASIA scale in total, it does not take into account that 26% of patients had a delayed discharge, occupying 1,458 bed days, thereby extending the reported length of stay. An increased number of high complete tetraplegics this year resulted in a significant increase in ventilated bed days, 742 in total, with this patient group also having a longer length of stay.

Table 20
Bed Utilisation

National Spinal Injuries Unit **Edenhall HDU = 12 Beds**		**Philipshill = 36 Beds**
Bed Complement	**Actual Occupied Bed Days**	**% Occupied**
48	**13,569**	**86%**

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 129 non-spinal patients who are not counted in the above figures. Last year's figure for non-spinal patients was over 100. The position will be reviewed at the next report.

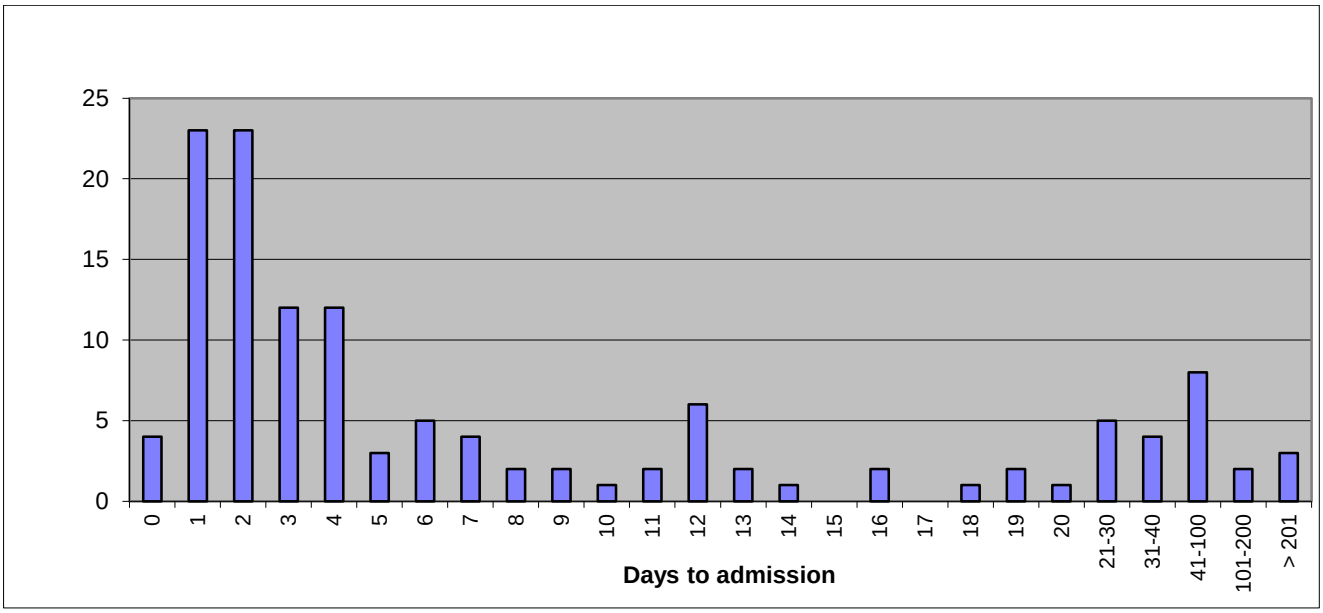
3.3 Timely

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 thirty years. There were no delays in transfer due to lack of beds. Time to admission remains the same in 22/23, with ongoing delayed referral 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.

Figure 7
Time from injury to admission



The policy is of immediate admission for all patients once they are clinically stable. Early referral is encouraged. In 2022/23; 21% of patients were admitted within twenty-four hours of injury and 39% were admitted within forty-eight hours. 66% were admitted within one week. 41% of trauma patients were admitted within forty-eight hours of trauma.
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. 90% of patients with non-traumatic conditions were assessed within 2 weeks of referral.

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 21
Days to Admission by Range

	No. of Patients	Mean Time (Days)	Range of Time
2018-2019	**138**	**218**	**0 - 10274**
2019-2020	**138**	**15**	**0 - 230**
2020-2021	**103**	**19**	**0 - 375**
2021-2022	**137**	**116**	**0 - 12615**
2022-2023	**130**	**21**	**0 - 643**

Table 21 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 22/23 the median time to admission for all injuries was 4 days.

Table 22
Delayed Discharge

	No. of Patients Discharged	No. of Patients Delayed	Mean Delay (days)	Range of Delay (days)	No Delay
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%
2022/2023	**118**	**31**	**47**	**1 - 218**	**74%**

How delays to patient discharge from the Unit are calculated and recorded, has changed in the last couple of years, 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.

Table 23
Delayed Discharge by Health Board

Health Board	Total days delayed
Ayrshire and Arran	185
Forth Valley	158
Grampian	54
Greater Glasgow & Clyde	523
Highland	39
Lanarkshire	167
Lothian	29
Tayside	303
Total	**1,458**

1,458 bed days were occupied by delayed discharged patients making increasing demands on nursing and occupational therapy time in particular.

3.4 Effectiveness

Additional measures agreed in the 2022 Service Level Agreement.

Table 24
Method of Mobilising by Level on Discharge

Level	Walking	Mobilising by wheelchair
C1 – C4	60%	40%
C5 – C8	65%	35%
T1 – T12	38%	62%
L1 and below	83%	17%

24% of patients had their first Goal Planning Meeting within 3 weeks of mobilising.

92% of patients had their Spinal Cord Independence Measure recorded on admission, at the start of rehabilitation and on discharge.

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	**22/23**
New Admissions	138	139	110	137	**130**
New Outpatients	54	70	21	45	**45**
Key Performance Indicators					
Referrals					
All patients referred	526	427	303	421	**342**
Telephone advice	388	288	200	366	**212**
Complex advice with support/visit	106	89	31	100	**60**
New patient activity					
All patients admitted with neurological injury	107	129	95	126	**125**
All patients admitted with non-neurological injury	31	10	8	11	**5**
Surgical stabilisations:					
- Thoracolumbar fixations	31	36	14	26	**22**
- Elective removal of metalwork	4	3	0	1	**4**
- Cervical fixations	9	21	18	21	**28**
- Halo immobilizations	27	18	11	22	**18**
Spinal injury specific surgery:					
-Other	4	4	12	6	**28**
Implant spasm and pain control:					
- New pumps implanted	0	2	0	1	**0**
Removal of pump		1	0	1	**0**
- Revision pumps	0	0	0	0	**0**
- Operational pumps	11	7	6	6	**5**
- Pump Refill QENSIU	7	7	6	6	**5**
- Pump Refill Local	4	N/A	N/A	N/A	**N/A**
Step down unit:					
- Episodes of care	27	38	0	6	**24**
- Number of families/people	99	108	0	11	**35**
- Number of days (nights)	62	139	0	93	**182**
- Relatives Room					
- Episodes of care	42	35	0	1	**3**
- Number of families / people	57	49	0	1	**10**
- Number of days (nights)	286	332	0	16	**192**
New inpatient occupied bed days					
Total Available (new & return)	17,223	17,097	15,534	15,497	**15,853**
Actual	13,861	13,816	10,299	11,776	**13,569**
Bed Occupancy %	80%	81%	66%	76%	**86%**
Mean length of stay					
I	164	171	163	166	**186**

II	140	176	94	99	**160**
III	132	130	109	110	**136**
IV	23	38	38	40	**60**
All	78	105	87	79	**106**
Range of length of stay	1 - 377	5 - 600	1-432	1-325	**3-392**
Delays in discharge (actual v's intended)					
Number of patients discharged	139	141	102	121	**118**
Number of patients with delayed discharged	10	23	9	25	**31**
Length of delay (mean/mode)	62	53	65	31	**47**
% with no delay	93%	84%	91%	79%	**74%**
% of utilised bed days by ASIA scale	N/A	N/A	N/A	N/A	**See table 19**
Delayed discharge by Health Board	N/A	N/A	N/A	N/A	**See table 23**
Patient Recorded Outcome Measures					
Method of mobilising by level on discharge	N/A	N/A	N/A	N/A	**See table 24**
% of patients who had their first Goal Planning Meeting within 3 weeks of mobilising	N/A	N/A	N/A	N/A	**24%**
% of patients who had Spinal Cord Independence Measure recorded	N/A	N/A	N/A	N/A	**92%**
Day case					
by NHS Board of Residence	See Fig 9	See table 13	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	**See table 12**
Outpatient activity					
New Patient no's QENSIU	See table 7B	See table 8A	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	**See table 8A**
New Patient QENSIU (DNAs/ % attendance)	20%	7%	14%	9%	**9%**
Return Patient QENSIU (DNAs/ % attendance)	21%	18%	9%	12%	**21%**
New Outreach Clinics by Centre	See table 9	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	**See table 9**
Number of patients discharged from the service	Life Long Care	Life Long Care	Life Long Care	Life Long Care	**Life Long Care**
Allied Health Professionals activity	N/A	N/A	N/A	N/A	**N/A**
New Patient (DNAs/ % attendance)	See table 7C	See table 8B	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	**See table 8B**

3.5 Safe

Re-admissions

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 12 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.

During the year, of the 118 patients discharged following primary rehabilitation 2 patients were admitted to their local hospitals acutely within 30 days of discharge from this Unit.

One patient required a short stay to treat a urinary tract infection, a complication of SCI, the other patient required admission unrelated to SCI.

Assurance of Care CCAAT

Care Assurance audits are carried out at both local and organisational level, they are always unannounced. These give an opportunity to celebrate success and make improvements when required. Philipshill Ward recently celebrated a Gold award.

Figure 8A

Date Of Visit	Ward	Corporate, Sector Or Peer Visit	Combined Care Assurance Compliance
/03/2022	Philipshill	Sector	Green
24/08/2022	Philipshill	Corporate	Green
26/10/2022	Philipshill	Peer	Amber
19/01/2023	Philipshill	Peer	Green
24/03/2023	Philipshill	Sector	Gold

Figure 8B

Date Of Visit	Ward	Corporate, Sector Or Peer Visit	Combined Care Assurance Compliance
22/07/2022	Edenhall	Peer	Green
07/11/2022	Edenhall	Peer	Green
26/01/2023	Edenhall	Peer	Green

3.6 Person Centred

Patient Recorded Outcomes 2022/23

Across the last year, the Queen Elizabeth National Spinal Injuries Unit recommenced interviews with patients at the point of discharge to gain an understanding of their experience and their appraisal of their stay. These patient reported outcomes are then used by the Team to acknowledge successes and highlight areas in need of ongoing improvement.

Consisting of 40 minute semi-structured interviews conducted by the Units' assistant psychologist, the current evaluation was formed from a sample of 12 patients during 2022/23. The results show overall care was seen as good across all aspects of the service. Therapies and therapists were rated positively, consultants were perceived as being informative, and patients felt that they were listened to. The education program within the Unit was rated highly and patients felt informed regarding their progress and upcoming discharge. Patients believed that they made the most of their rehabilitation and by and large achieved their rehabilitation goals. Nursing care was reported to be of a good standard but patients had become aware that they appeared understaffed which was perceived at times to impact upon their rehabilitation. Rehabilitation staff were praised but patients reported wanting the opportunity to try more varied activities or equipment. Some patients requested to know more about their prescribed medications. Goal setting meetings, while a useful means of communicating and sharing information, did not always leave patients feeling that they were the active party in the goal setting process.

While the vast majority of feedback was positive, some areas for development were noted. Patients also commented on the fact they were awaiting re-housing or adaptions to be completed to allow them to return home.

The Unit is committed to addressing those areas of performance that can be improved. While some of the feedback highlight areas of ongoing development, the general themes are that the Unit is held in high regard among patients, the quality of care is good, and overall levels of patient satisfaction are high. Relative to the last audit a few years prior, there has been a positive trend in patients' ratings of the service they receive in the Unit. Some quotes have included:

- *"A lot was done for me here and I fully understand this is the only place you can be if you have a spinal injury as you will get the most specialist help and I feel I have got the most I can get from recovery".*
- *"Having this place has been a God send for the care that we get. I especially love the garden as I love the outdoors."*
- *"I found that there was plenty of literature and information given by staff. The spinal charities were also a great source of info and lived experience on spinal injuries."*
- *"The prognosis information was plain and simple to understand and they didn't beat around the bush (in a good way)"*
- *"Did loads of helpful stuff with the OT's like cooking, making tea, going to shops. I loved doing it and its helped me regain independence."*
- *"Overall I felt all the nurses were great."*

Person-Centred Visiting

Person centred visiting is a vital aspect of rehabilitation, families and friends are actively encouraged to take part in the rehabilitation journey. We work closely with friends and family throughout the patient stay**.** If required the Step Down Unit offers a safe space where families can learn to live together again with the reassurance that the support of staff is only a phone call away.

Family Unit / Step-Down Unit

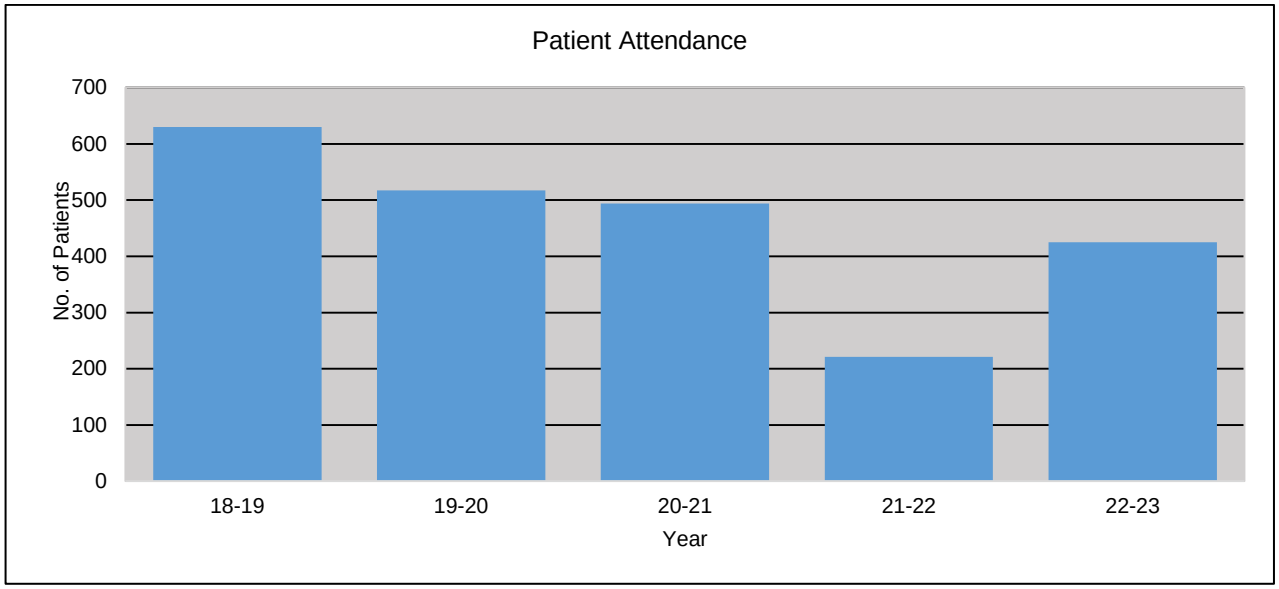
In 2020, 2021 and early 2022 due to COVID, the Step-Down Unit was not been used fully for its original purpose however the use has now returned to pre-pandemic levels. We used the activity area for in person socially distanced teaching and for timetabled essential visiting earlier in the year before all COVID related restrictions were removed. The Family Unit has been used for 24 episodes by 35 people for a total of 182 days. The relatives' rooms were occupied for 192 days.

Patient Education/Workshop Spinal Education

Education is fundamental, patients are required to learn new skills, to manage their care independently or direct others to do this for them.

The multi-disciplinary approach to education allows it to be an ongoing process throughout the patient stay. To compliment daily informal education we have a rolling 16 week programme supported by the MDT and peer support staff from a number of spinal charities, patient attendance was 425 last year, recovering to pre pandemic levels.

Figure 9



Friends and Families benefit from a dedicated day where they have the opportunity to learn about spinal injuries and the opportunity to gain support from the team and peer support staff. These sessions are also offered virtually.

Education and training is offered across Scotland, face to face or remotely, this is particularly useful prior to discharge, ensuring transition from hospital to community runs smoothly.

4. Quality and Service Improvement

We are continually monitoring service and making improvements. Improvement ideas are actively encouraged from staff and patients. Many staff have now undertaken recognised Quality Improvement courses:-

- SCLIP
- SIFS
- Value Management Collaborative

A culture of improvement is embedded in the unit to benefit patients, families and staff.

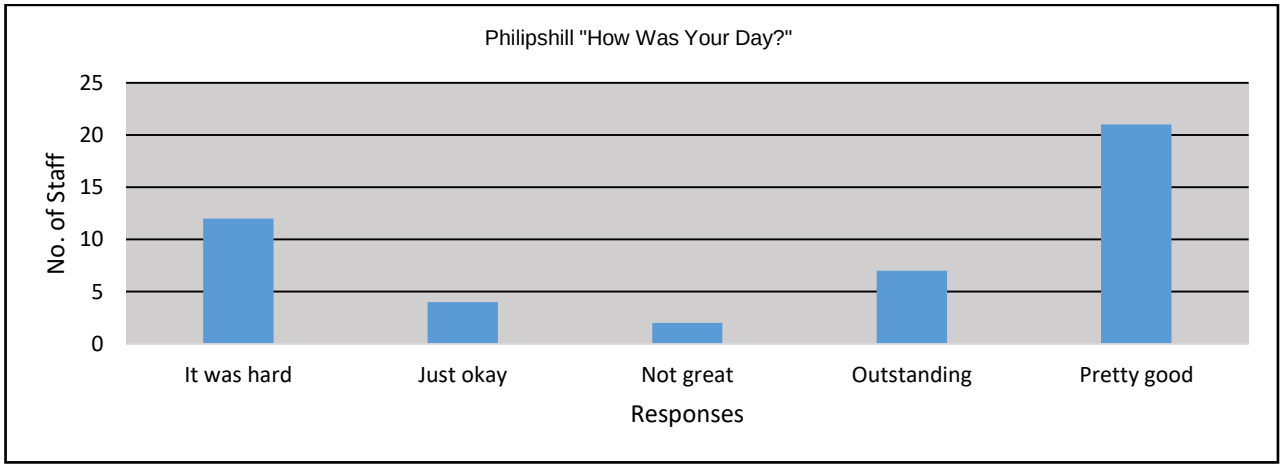
Value Management Collaborative 2022/2023

Value Management is a collaborative approach, that supports clinical care and finance teams, to apply quality improvement methods, with combined cost and quality data at team level, to deliver improved patient outcomes, experience and value.

Staff Wellbeing

Staff wellbeing is fundamental to ensuring the highest standards of care are delivered to patients. Coming out of the pandemic placed greater emphasis on this. In an attempt to support staff Joy at Work was introduced which allowed staff to let go of how they were feeling at the end of the day in a safe space. Staff scan a QR code which takes them to a form where they anonymously leave feedback in a safe and secure space. The bar chart below demonstrates how staff felt overall this year. This tool allowed for comments to be made which led to supportive conversations.

Figure 10



ZeroG

In September 2022, the QENSIU gym had 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. ZeroG allows real time dynamic body weight support during a number of therapeutic tasks, including transfers, balance and gait. As part of gait training, patients have more frequent and longer training sessions with less dependence on therapists while increasing staff safety through a falls prevention mechanism. In addition to increasing our clinical treatment options, the ZeroG is an invaluable tool in expanding our programme of therapy research.

This is the first ZeroG system installed 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.

Zero Hero's and Pressure Ulcer Prevention Focus Board

Improvement in pressure ulcer prevention include Zero Hero's a pocket sized aid memoire developed by our CAS link nurses. This tool allows staff to quickly check that all processes have been followed and cause has been considered. This tool is supplementing the existing red flag process. Zero Hero's has been shared with the Tissue Viability team in NHSGGC and approved by Infection control for use at ward level. Effectiveness will be audited and results shared at local and national events.

To complement this each ward has a Pressure Ulcer Prevention (PUP) focus board. This is where best practice information is displayed and Tissue Tuesday Flyers can be reviewed by staff. Tissue Tuesday is used by NHSGGC to focus attention on Tuesdays on Tissue Viability.

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 dangerous event 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. There were 28 (14%) fewer recorded adverse events this year, improvements in particular were made in pressure area care although there was an increased number of slips trips and falls.

Table 25
Recorded Adverse Events

Category	**Number**
Pressure ulcer care	12
Medication incident	4
Contact with object	5
Medical device & equipment	5
Communication	1
Slips, trips & falls	83
Security	2
Moving & handling	2
Violence & aggression	23
Challenging behaviour	8
Fire alarm actuation	5
Needlestick injury	3
Infection control issue	1
2222	10
Self harm	0
Staffing levels	13
Radiology incident	1
Treatment issue	1
Patient abscondment	2
IT security	2
Patient observation	1
Total	**184**

Table 26

Overall	
1 - Negligible	**98**
2 - Minor	**70**
3 - Moderate	**13**
4 - Major	**2**
5 - Extreme	**1**
Total	**184**

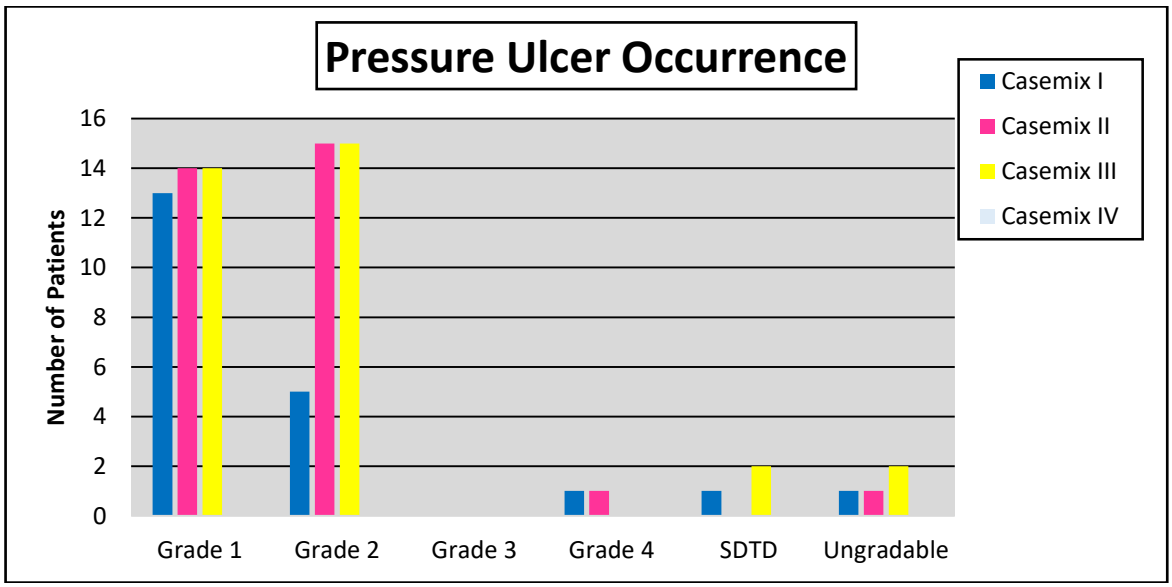
The category 4 and 5 events have been appropriately investigated with only 1 learning point resulting from investigation.
2 patients deteriorated clinically requiring urgent medical assistance with 1 positive outcome, 1 patient dislocated a hip during a challenging toilet manoeuvre.

Table 27
Focus on Slips, Trips and Falls

Slips, Trips and Falls	
Fall from bed	8
Fall from chair	38
Fall from height	10
Slip/trip on level	16
Suspected fall/unwitnessed	5
Controlled fall	6

A falls working group including the falls link nurses and falls coordinator will review current practice and factors contributing to falls, where appropriate improvement/changes will be implemented.

Red Flags per Case Mix
Figure 11



The Red Flag process allows early detection of PU development with early implementation of steps to prevent further deterioration and promote healing. Patient's education and participation in good pressure care aims to reduce PU development lifelong.
We locally record all PU (both avoidable and unavoidable) of Grade 1 and moisture related damage. All avoidable hospital acquired PU of grade 2 or above are reported on Datix. We have had 2 grade 4 PU, in both cases there was a delay from injury to admission to the Unit. Learning has been taken from both these and improvements made.

In addition to the investigation of all grades of pressure ulcers through our Red Flag system, GGC Hospital Policy, SAER and Duty of Candour requirements are followed in the event of grade 3 and 4 PU.

Table 28

Hospital Acquired Infection

	18/19	19/20	20/21	21/22	22/23
COVID	0	0	unknown	6	6
Salmonella	0	0	0	0	0
Clostridium Difficile	0	1	0	0	0
MRSA	6	2	0	3	2
Streptococcus pyogenes	0	0	0	0	0
Scabies/ TB /Varicella Zoster	0	0	0	0	1
MDR Acinetobacter	0	0	1	0	0

Currently, Infection Control does not capture VAP or HAP data, the Unit plans to develop a short lived working group to adapt a local process for capturing this data.

With the support of the GGC Infection Control Team, all patients are 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 6 expected deaths in the Unit in 22/23 and no unexpected deaths.

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 two formal complaints, one which was not upheld and the other unresolvable due to the patient not engaging in the consultation process. Consultants and senior nursing staff continue to provide advice to the Clinical Services Manager regarding complaints involving management of patients out with the Unit.

The Unit also receives feedback via Care Opinion.

Compliments

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

Several positive stories within the Unit over the year have been picked up by press, such as a feel good wonderful day out at Castle Semple Loch in Lochwinnoch for patients to the happy retirement wishes for the recently retired Spinal Specialist Doctor in GGC's StaffNet. The success of the eWALK research project and the recently installed Zero G story were picked up by STV and BBC.

5.5 Equality

A new equality, diversity and human rights e-learning module is now live on LearnPro. All staff are required to complete the module 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.

NHSGGC carry out regular Equality Impact Assessment Tools (EQIA) for clinical areas. The Unit EQIA was conducted in 2014.
An interpreting service is available to all services users. The Unit used the face to face interpreting service to aid inpatient communication 19 times during 2022/23, for Farsi, Polish and German speaking patients. The telephone interpreting service was also widely used by the service.

6. Financial Reporting and workforce 2022/23

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

Financial Report for the twelve months to 31st March, 2023

	AfC Banding	WTE	Contract Value £	Contract Value YTD £	Actual YTD £	Variance YTD £	Year End Forecast £	Year End Forecast Variance £	% variance	Comments
Dedicated Staff Costs										
Consultant		5.71	998,804	998,804	1,046,567	-47,763	1,046,567	-47,763	- 5%	Medical pay award is 4.5%; NI 0.6% v. funding of 3%
Specialty Doctor		1.00	93,982	93,982	113,175	-19,193	113,175	-19,193	- 20%	Medical pay award is 4.5%; NI 0.6% v. funding of 3%
Senior Medical		*6.71*	*1,092,786*	*1,092,786*	*1,159,742*	*-66,956*	*1,159,742*	*-66,956*		
Junior Medical		2.48	168,447	168,447	168,447	0	168,447	0	+ 0%	
		9.19	*1,261,233*	*1,261,233*	*1,328,189*	*-66,956*	*1,328,189*	*-66,956*		
Administrative	4	6.50	226,142	226,142	229,798	-3,656	229,798	-3,656	- 2%	
Administrative	3	0.14	4,409	4,409	4,518	-109	4,518	-109	- 2%	
Administrative	2	2.49	71,545	71,545	73,928	-2,383	73,928	-2,383	- 3%	
		9.13	*302,096*	*302,096*	*308,244*	*-6,148*	*308,244*	*-6,148*	*- 2%*	*Expenditure incl 2022/23 pay award v. average funded value*
Senior Manager	8a	0.50	41,913	41,913	40,541	1,372	40,541	1,372	+ 3%	Ward costs based on ledger
Nursing	7	7.80	450,450	450,450	463,281	-12,831	463,281	-12,831	- 3%	Ward costs based on ledger
Nursing	6	9.36	481,853	481,853	669,062	-187,209	669,062	-187,209	- 39%	Ward costs based on ledger
Nursing	5	54.30	2,322,643	2,322,643	2,093,072	229,571	2,093,072	229,571	+ 10%	Ward costs based on ledger
Nursing	2	23.88	686,144	686,144	1,207,366	-521,222	1,207,366	-521,222	- 76%	Ward costs based on ledger
Housekeepers	2	2.00	57,466	57,466	26,407	31,059	26,407	31,059	+ 54%	Ward costs based on ledger
Phlebotomist	2	0.53	15,229	15,229	0	15,229	0	15,229	+ 100%	Ward costs based on ledger
		98.37	*4,055,698*	*4,055,698*	*4,499,728*	*-444,030*	*4,499,728*	*-444,030*	*- 11%*	*Expenditure incl 2022/23 pay award v. average funded value*
Psychologist	8B	1.00	83,826	83,826	84,881	-1,055	84,881	-1,055	- 1%	Incremental drift
Orthotist	7	0.20	11,735	11,735	11,633	103	11,633	103	+ 1%	
AHP	7	12.26	696,280	696,280	800,404	-104,124	800,404	-104,124	- 15%	Difference is funded v. actual pay award values over many years
		13.46	*791,841*	*791,841*	*896,918*	*-105,077*	*896,918*	*-105,077*	*- 13%*	*Expenditure incl 2022/23 pay award v. average funded value*
Total Staff		**130.15**	**£ 6,410,868**	**£ 6,410,868**	**£ 7,033,079**	**- £ 622,211**	**£ 7,033,079**	**- £ 622,211**		
Supplies Costs										
Drugs			179,886	179,886	199,739	-19,853	199,739	-19,853	- 11%	Ward costs based on ledger
Surgical Sundries			531,384	531,384	317,460	213,924	317,460	213,924	+ 40%	Ward costs based on ledger
CSSD/Diagnostic Supplies			4,940	4,940	7,272	-2,332	7,272	-2,332	- 47%	Ward costs based on ledger
Other Therapeutic Supplies			122,687	122,687	71,666	51,021	71,666	51,021	+ 42%	Ward costs based on ledger
Equipment/Other admin supplies			61,189	61,189	99,584	-38,395	99,584	-38,395	- 63%	Ward costs based on ledger
Hotel Services			44,806	44,806	70,341	-25,535	70,341	-25,535	- 57%	Ward costs based on ledger
Direct Supplies			**£ 944,892**	**£ 944,892**	**£ 766,063**	**£ 178,829**	**£ 766,063**	**£ 178,829**		
Charges from other Health Boards										
Lothian Spinal Clinic			6,329	6,329	-26	6,354	-26	6,354	+ 100%	
Charges from other Health Boards			**£ 6,329**	**£ 6,329**	**- £ 26**	**£ 6,354**	**- £ 26**	**£ 6,354**		
Allocated Costs										
Medical Records			129,198	129,198	132,392	-3,194	132,392	-3,194	- 2%	
Building Costs			225,516	225,516	225,516	0	225,516	0	+ 0%	
Domestic Services			85,319	85,319	88,161	-2,842	88,161	-2,842	- 3%	
Catering			232,418	232,418	240,160	-7,742	240,160	-7,742	- 3%	
Laundry			83,910	83,910	86,705	-2,795	86,705	-2,795	- 3%	
Neuroradiology			97,747	97,747	97,747	0	97,747	0	+ 0%	
Laboratories			98,789	98,789	98,789	0	98,789	0	+ 0%	
Anaesthetics			46,665	46,665	46,665	0	46,665	0	+ 0%	
Portering			90,872	90,872	93,899	-3,027	93,899	-3,027	- 3%	
Phones			59,293	59,293	59,293	0	59,293	0	+ 0%	
Scottish Ambulance Service			11,214	11,214	11,214	0	11,214	0	+ 0%	
General Services			34,247	34,247	34,247	0	34,247	0	+ 0%	
Allocated Costs			**£ 1,195,189**	**£ 1,195,189**	**£ 1,214,789**	**- £ 19,600**	**£ 1,214,789**	**- £ 19,600**	**- 2%**	**Expenditure incl 2022/23 pay award v. average funded value**
Total Supplies			**£ 2,146,409**	**£ 2,146,409**	**£ 1,980,826**	**£ 165,583**	**£ 1,980,826**	**£ 165,583**		
Overhead Costs										
Fixed costs										
Rates			64,335	64,335	64,335	0	64,335	0	+ 0%	
Capital Charge			435,774	435,774	435,774	0	435,774	0	+ 0%	
Overheads			164,048	164,048	164,048	0	164,048	0	+ 0%	
Total Overheads			**£ 664,157**	**£ 664,157**	**£ 664,157**	**£ 0**	**£ 664,157**	**£ 0**		
Total Expenditure		**130.15**	**£ 9,221,435**	**£ 9,221,435**	**£ 9,678,062**	**- £ 456,627**	**£ 9,678,062**	**- £ 456,627**		
Postgraduate Dean Funding			-143,727	-143,727	-143,727	0	-143,727	0	+ 0%	
Total Expenditure net of Postgraduate Dean Funding			**£ 9,077,708**	**£ 9,077,708**	**£ 9,534,335**	**- £ 456,627**	**£ 9,534,335**	**- £ 456,627**		
Income from non-Scottish resident patients					-65,518	65,518	-65,518	65,518		
Income from delayed discharges: NHS Tayside					0	0	0	0		
Income from delayed discharges: NHS Lanarkshire					-60,750	60,750	-60,750	60,750		
Total Net Expenditure		**130.15**	**£ 9,077,708**	**£ 9,077,708**	**£ 9,408,067**	**- £ 330,359**	**£ 9,408,067**	**- £ 330,359**		
					£		**£**			
Fixed					8,642,004		8,642,004			
Variable					766,063		766,063			
					£ 9,408,067		**£ 9,408,067**			

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:
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.

2022/2023 continued to be a challenging year for research globally, with the knock on impacts of the COVID pandemic seeing a number of research studies having to finish early due to poor recruitment and difficulties gaining new funding. 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 11 different clinical studies, with more research studies approved to take place in 2023/2024.

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
- Electrical spinal stimulation to improve upper extremity performance in individuals with spinal cord injury (Pathfinder 2)
- Electrical spinal stimulation to enhance walking function in chronic SCI (E-Walk)
- 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
- Duroplasty for Injured cervical Spinal Cord with Uncontrolled Swelling (DISCUS)

Research Spotlight

Pathfinder 2

The QENSIU and SCISCI are continuing their pioneering work on spinal cord stimulation in chronic complete tetraplegia. We are currently investigating the feasibility of a prolonged and intensive training programme of upper limb activity based therapy in conjunction with electrical stimulation applied over the skin above the cervical spinal cord. This involves a six week pre-training programme with upper limb cycling combined with functional electrical stimulation over key muscles, followed by 16 weeks of individualised activity based therapy with spinal cord stimulation for at least one hour, three times a week. The main outcome is change in grip function but we will also be investigating changes in neurology, autonomic function, quality of life, spasticity, functional ability, pain and any potential mechanisms underlying any improvements through regular extensive neurophysiology testing. The QENSIU aims to recruit 10 participants to this study with 6 already active.

DISCUS

We are recruiting for the "Duroplasty for Injured cervical Spinal Cord with Uncontrolled Swelling" study. This is an international, multi-centre randomised controlled trial investigating the effect of adding an expansion duroplasty as part of the surgical treatment of cervical cord injuries. We enrolled our first patient in November 2022 and hope to add to this in the next few years. This study is being managed by the Oxford Clinical Trials Research Unit with funding from the NIHR EME programme.

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 are assessing the benefits of spinal stimulation combined with step and walking training using a randomised controlled trial design including a sham intervention. Spinal stimulation is delivered for up to one hour, three times per week for 12 weeks with a subsequent follow up. The main outcome is improvement in walking, but we also assess neurological function, spasticity, quality of life and potential mechanisms underlying any improvements. Globally, 50 participants will be recruited to determine convincingly whether function is improved with the QENSIU recruiting 4 participants to this study in 2022/23.

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 is one of two UK sites in a multi-centred international study that compares 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. The QENSIU recruited 6 to this study in 2022/23

Recently completed studies

The Up-LIFT study evaluating ARC-EX Therapy demonstrated the effectiveness of the device to improve extremity strength and function in people with movement disabilities, a prospective, single-arm pivotal study designed to evaluate non-invasive electrical spinal cord stimulation (ARC-EX Therapy) to treat upper extremity functional deficits in people with chronic tetraplegia. The study enrolled 65 people at 14 leading SCI centres in the U.S.,

Europe, and Canada, including QENSIU (the sole UK study site). The results are positive and have been submitted to the New England Journal of Medicine for publication.

Publications and conferences
Our researchers published 17 articles on SCI in 2022/2023. More information about these articles can be found in our research report, or on the SCISCI website: www.scisci.org.uk
Our researchers were also active at a number of conferences, presenting their work at the International Spinal Cord Society Annual Conference in Vancouver, Canada, and the International Spinal Research Trust Annual Meeting in London, amongst others.

Connect with us
Our dedicated research website was updated in 2021. Further information about our research activities can be found at https://www.gla.ac.uk/research/az/scisci. 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. More information can be found at: https://www.gla.ac.uk/research/az/scisci/getinvolved

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 was submitted to the national commissioners for a significant increase in therapy staffing.

The Unit hosted the Guttmann Meeting in June 2022 virtually, this is the annual UK scientific meeting for all clinicians working in spinal cord injury.
Scotland will host the 2023 Annual Scientific Meeting of the International Spinal Cord Society, the premier international meeting for the specialty. The Unit will host a visit from international delegates along with breakout sessions focusing on the particular strengths of our Scottish Unit as seen internationally, hyperacute admission, lifelong care including Outreach, a highly successful embedded research facility and programme along with excellent working relationships with the third sector. In parallel the Unit will host a visit from Ukrainian delegates.

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 Spinal App has been approved for development at board level and funding secured for an eHealth librarian band 6 to support the App build. Staff are working collaboratively to launch the first phase of the App which will be public facing. It is anticipated that patient's families and healthcare professional from across the country will be able to use the App pre admission during admission and that it will be a lifelong resource.
The App will be fluid where posts can be made and information amended in real time. We will be able to heighten education sessions, workshops, friends and family days as well as information regarding clinics etc.
The second phase will be to focus on the professional side this will have resources and information for healthcare professionals in the care and management of the patient following spinal injury.

The Unit has been identified as an early adopter for the introduction of Digital Clinical Notes (DCN), a digital platform for nursing documentation and risk assessment. Support will be given from eHealth and practice development.

Test of Change is underway for implementation of GRATIX which recognise the good news stories and celebrate success.

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.