



**SCOTTISH NATIONAL  
OBSTETRIC BRACHIAL PLEXUS INJURY  
SERVICE**

**Annual Report  
2020/21**

**NHS Greater Glasgow & Clyde**

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*Please refer to Guidance Notes for completion of the Annual Report prior to submission*

*The completed Annual Report should be sent electronically by 31 May to:*

*Email: [REDACTED]@nhs.net*

## Executive Summary

The Children's Brachial Plexus Injury Service is based at the Royal Hospital for Children (surgery and clinics) and the New Victoria Hospital (administration) within NHS Greater Glasgow & Clyde.

The Children's Service became a designated National Service for Scotland in April 2006.

The brachial plexus is a complicated network of nerves which controls the muscles in the shoulder, arm, elbow, wrist, hand and fingers, as well as providing them with feeling.

In children brachial plexus injury usually occurs during birth. It can also occur as a result of traumatic brachial plexus injury (e.g. falls, road traffic accidents, sporting accidents) or tumours involving the brachial plexus.

Children are referred from throughout Scotland by maternity units, paediatricians, orthopaedic surgeons, or plastic surgeons who have carried out initial assessment. Referrals are also accepted from Northern Ireland and occasionally from the north of England.

The service provides assessment, intervention, treatment and outpatient follow-up care for patients through an integrated multidisciplinary service for obstetric brachial plexus injury, traumatic brachial plexus injury, and tumours involving the brachial plexus, including:-

- Diagnosis: clinical examination, MRI, ultrasound, neurophysiology.
- Surgery: early surgical exploration and nerve repair; secondary reconstruction for shoulder and other deformities.
- Physiotherapy.
- Occupational therapy.
- Psychological support.

In 2020/21 the service undertook the following activity for patients from across Scotland:

- 49 assessments.
- █ procedures (including █ primary operations such as nerve explorations and nerve reconstructions and █ secondary operations such as tendon transfers).
- 191 follow-up appointments.

The onset of the Coronavirus pandemic in March 2020 presented a particular challenge for the service. The ongoing response to the situation is included in the report.

Further details can be found on the dedicated website at  
**<https://www.brachialplexus.scot.nhs.uk>**

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# 1. Service Delivery

The Obstetric Brachial Plexus Injury Service (OBPIS) provides integrated multidisciplinary management for obstetric brachial plexus injury, traumatic brachial plexus injury, and tumours involving the brachial plexus including:

- Diagnosis: clinical examination, MRI, ultrasound, neurophysiology.
- Surgery: early surgical exploration and nerve repair; secondary reconstruction for shoulder and other deformities.
- Physiotherapy.
- Occupational Therapy.
- Psychological support.

## **Target Patient Group**

Children with obstetric brachial plexus injury are the main group managed by the service.

Patients with traumatic brachial plexus injury or benign or malignant tumours involving or arising from the brachial plexus are also seen.

Patients are typically referred by neurologists, paediatricians, orthopaedic surgeons, or plastic surgeons.

In the year 2020/21 a total of 49 children with suspected obstetric brachial plexus injury were referred to the service. ■ were referred with a traumatic brachial plexus injury. Most were referred from within Scotland, with ■ patients referred from Northern Ireland.

## **Referral Process**

Referral forms are available on the service website and are emailed or posted to the administration office. Referral letters are accepted provided the referring Health Board includes sufficient background information on the injury. Patients can also be referred by their general practitioner via the electronic GP Gateway.

Patients are usually referred by paediatricians, orthopaedic surgeons or plastic surgeons who have carried out initial assessment, after which the Obstetric Brachial Plexus Injury Service provides assessment, intervention or treatment, and outpatient follow-up care for patients.

## **Description of Service/Care Pathway**

### **Clinical Assessment**

Along with their parents children with obstetric brachial plexus injury (OBPI) are assessed in the outpatient clinic by medical staff and therapists to confirm the diagnosis, exclude immediate complications (e.g. shoulder dislocation), counsel parents, ensure optimal parent-child bonding, address parental perceptions of the injury mechanism (and any related blame attribution) and to establish a likely prognosis. Some children are seen prior to this first clinical review by the specialist therapists and receive instruction on therapeutic exercises.

### **Care Plan**

A management plan is formulated that includes parental counselling, physiotherapy (initial passive stretching to mitigate shoulder deformity, later active range exercises, post-operative therapy as required), occupational therapy (safe positioning and optimal handling, age-specific sensorimotor developmental assessments, activity-based interventions, provision of aids, fit-for-schooling assessment, school visits and educational liaison role), psychological optimisation (screening assessment, to arrange therapeutic intervention where appropriate, primarily addressed at the parents' needs during infancy, and the child's needs during later development), investigations when necessary (neurophysiology, imaging studies), and monitoring of progress (developmental milestones, school progression, body-image development, pain, psychosocial welfare, fit-for-life).

### **Clinical Psychology**

A clinical psychologist was appointed to the service in summer of 2018 and is contributing to the above. The clinical psychologist undertakes screening assessment and therapeutic support both during clinics and out-with clinic times (either on an on-one basis or with telephone consultations), and can liaise with local services where capacity is available.

### **Surgical Intervention**

Surgical decisions on nerve surgery and prophylactic shoulder interventions are made at around 3 months of age and on secondary surgery (shoulder procedures, hand reanimation, functional muscle transfers) as necessary during growth into adulthood.

Interventions are carried out by the surgical team to:

- Optimise recovery from nerve injury: in a small percentage of children (more severe lesions with inadequate motor recovery at 3 to 6 months of age), exploration and microsurgical reconstruction of the brachial plexus nerves may benefit recovery and enable prognostic stratification.
- Optimise growth trajectory: early nerve surgery may reduce growth disturbance in more severe nerve injuries (detailed above). In these, and in other children with early shoulder subluxation/instability, conservative interventions (e.g. casting, Botox injections) can forestall more severe shoulder abnormalities.
- Correct functionally significant secondary deformity/functional impairment: joint releases, tendon transfers, bony procedures and free functional muscle transfers for upper limb deformities resulting from OBPI. These most commonly affect the shoulder.

## **Continuation of Care**

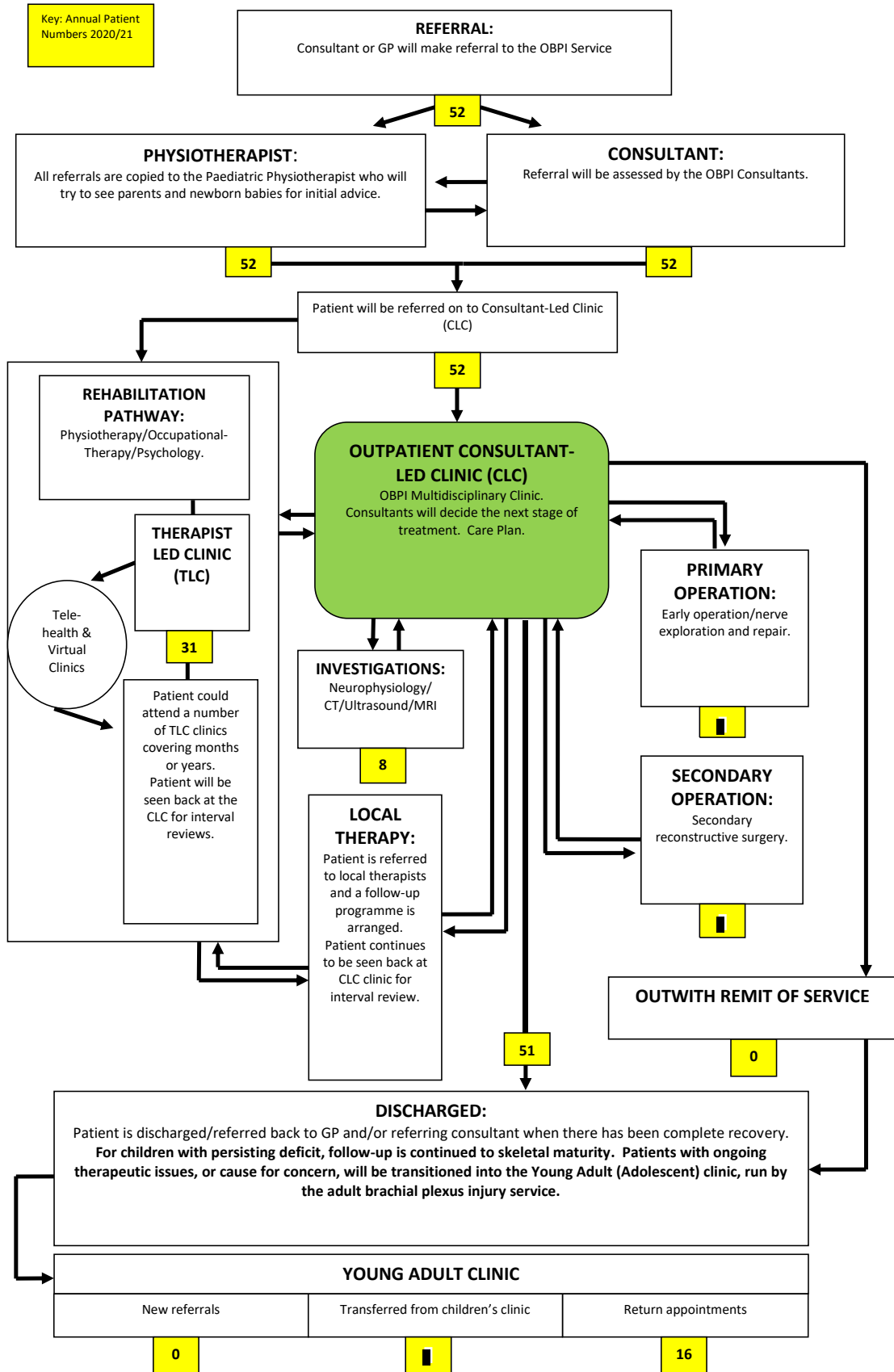
Children with persisting deficit are followed up in outpatients at least until skeletal maturity.

Patients who live in the north of Scotland can be seen for a review appointment at outreach clinics held at Woodend Hospital in Aberdeen up to twice per year.

Patients can be transitioned into the Young Adult Clinic once they are deemed to have reached an appropriate level of physical and cognitive development, and if they have ongoing issues best addressed through adult services.

*(See flowchart on next page)*

### Obstetric Brachial Plexus Injury (OBPI) - Patient Pathway





## 2. Activity Levels

### Referrals and Interventions

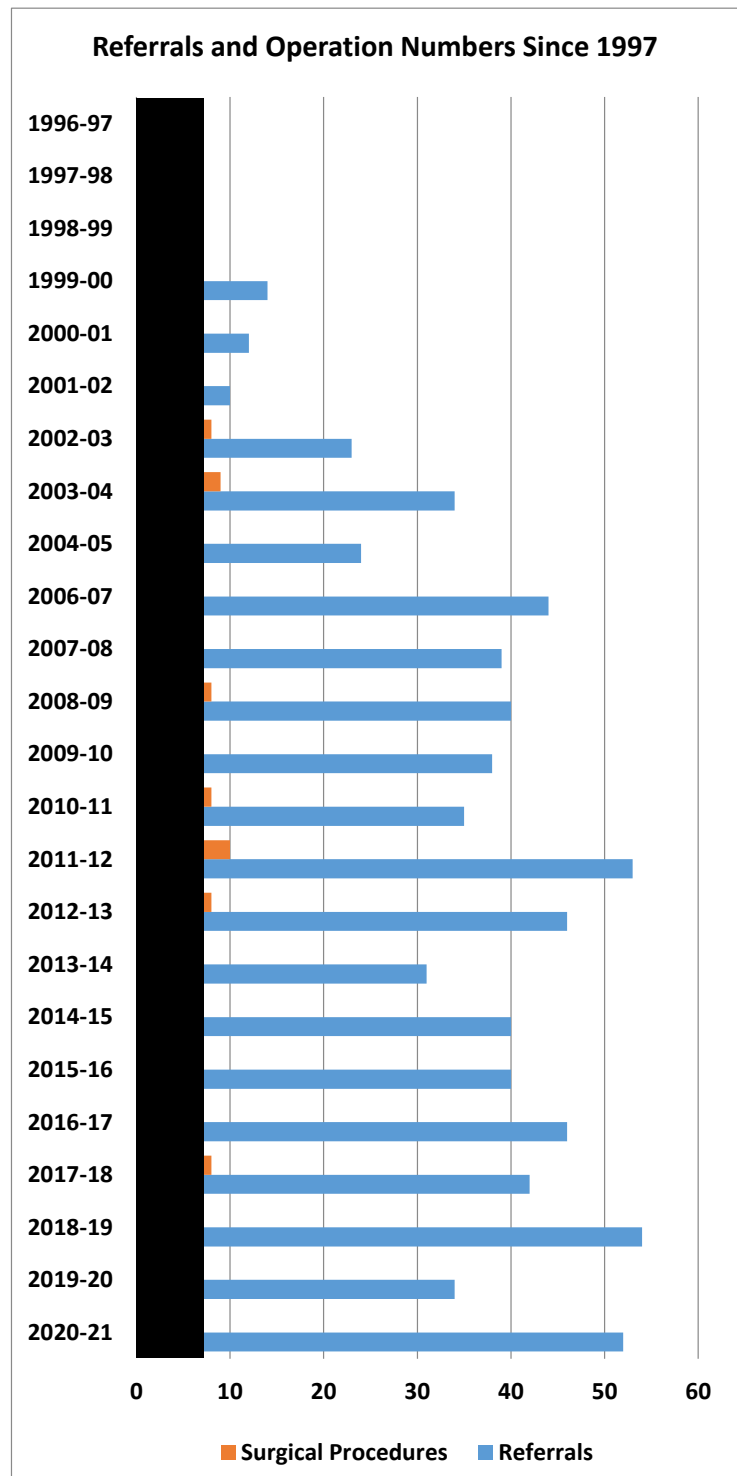
Referrals and Interventions				
	SA Level	2020/21	2019/20	2018/19
New patient referrals				
Referrals received		52	34	54
Referral does not meet criteria		0	0	■
Assessments				
Accepted for treatment by service	40	52	34	52
Did not attend (DNA)		■	■	0
Discharged following first assessment		34	17	30
Discharged from treatment		47	31	34
Outpatient Follow-Up Appointments				
	190	191	189	169
Intervention /procedures				
Nerve		■	■	■
Other (shoulder/elbow)		■	■	■
Total Procedures:	7	■	■	■
Ward Bed Days				
HDU/ITU		0	0	■
Nerve Surgery		■	7	10
Other Surgery		■	6	9
Total Ward Bed Days		9	13	20
Day Cases				
		0	■	0
Average length of stay for inpatients (days)				
		■	■	■

The activity for return appointments should be representative of children who have ongoing problems resulting from OBPI.

## Trends in Activity

### Referrals and Operations

Referrals and Operation Numbers Since 1997		
Year	Referrals	Surgical Procedures
1996-97	6	1
1997-98	1	1
1998-99	1	0
1999-00	14	1
2000-01	12	1
2001-02	10	1
2002-03	23	8
2003-04	34	9
2004-05	24	1
2006-07	44	6
2007-08	39	1
2008-09	40	8
2009-10	38	7
2010-11	35	8
2011-12	53	10
2012-13	46	8
2013-14	31	7
2014-15	40	6
2015-16	40	6
2016-17	46	1
2017-18	42	8
2018-19	54	1
2019-20	34	1
2020-21	52	1
Total:	765	129



During 2020/21, █ patients were treated for traumatic brachial plexus injury.

After assessment 11 patients were found to not to have evidence of brachial plexus injury, although referral for assessment was considered appropriate.

## Diagnosics

### Neurology/Neurophysiology

A consultant neurologist provides clinical assessment for our patients along with neurophysiology investigations, which is particularly useful in those who may require surgical intervention.

A dedicated OBPI Neurology appointment slot is available at the start of every OBPI consultant-led clinic to cater for urgent brachial plexus patients\*. This arrangement has proven to be beneficial to the service and means that referrals to Neurology can be expedited via the appointments office without affecting the consultant neurologist's pre-existing patients.

\*During the COVID-19 pandemic neurology clinics were greatly reduced leading to suspension of the agreed OBPI/Neurology appointment slot. OBPI patients are still seen for urgent neurophysiology tests on request. The service aims to return to normal once COVID restrictions are lifted.

### Location of Children's Neurology

The neurology clinics are held in the outpatient department of the Royal Hospital for Children in Glasgow on a Monday.

<b>Neurophysiology Activity (within NHS GG&amp;C)</b>			
	2020/21	2019/20	2018/19
Assessments	█	6	12
Maximim Wait (Weeks)	7	10	11
Minimum Wait (Weeks)	0	█	0
Median Wait (Weeks)	█	█	█
Did not attend (DNA)	0	0	0

Note. Minimum Wait = 0: █ from Lanarkshire had neurophysiology arranged and completed prior to being referred to the OBPI clinic. █ from Grampian had neurophysiology carried out on the same day as their first OBPI clinic appointment. █ patients from Northern Ireland travelled to Glasgow to have neurophysiology on the same day as their OBPI clinic review.

<b>Neurophysiology Activity (carried out in other centres)</b>			
	2020/21	2019/20	2018/19
Assessments	█	█	█
Maximim Wait (Weeks)	0	0	0
Minimum Wait (Weeks)	0	0	0
Median Wait (Weeks)	0	0	0
Did not attend (DNA)	0	0	0

Note. Maximum/Minimum/Median Wait = 0: █ from Forth Valley had neurophysiology arranged and completed in Lothian prior to being referred to the OBPI clinic.

## Imaging/Radiology

### X-Ray, CT, MRI and Ultrasound

In addition to radiographs, CTs and MRIs obtained at the children's hospital we also have access to the hospital's ultrasound machines in order to facilitate CFM to perform imaging of shoulders in young patients under the age of 1 year.

CFM can perform this study when the child attends the outpatient clinic in a 'one-stop-shop' setting, rather than having to re-appoint them to an imaging slot.

<b>Radiology Activity (within NHS GG&amp;C)</b>			
	2020/21	2019/20	2018/19
MRI	0	■	■
CT scan	0	■	■
Ultrasound	0	■	■
Total Imaging	0	7	8
Maximim Wait (Weeks)	0.0	4.4	3.4
Minimum Wait (Weeks)	0.0	0.0	0.0
Median (Weeks)	0.0	0.7	0.0
Did not attend (DNA)	0	0	0

<b>Radiology Activity (carried out in other centres)</b>			
	2020/21	2019/20	2018/19
MRI	■	■	■
CT scan	0	0	0
Ultrasound	■	0	0
Total Imaging	■	■	■
Maximim Wait (Weeks)	2	0	0
Minimum Wait (Weeks)	0	0	0
Median (Weeks)	1	0	0
Did not attend (DNA)	0	0	0

Note. Minimum Wait = 0 weeks: ■ from Forth Valley received a scan prior to referral to the OBPI clinic.  
Maximum Wait = 2 weeks: ■ from Grampian had a scan following referral to the OBPI clinic but prior to their first assessment.

X-rays continue to be routinely provided at clinic when necessary and are out-with the scope of the above tables.

### 3. Performance and Clinical Outcomes

#### 3.1 Equitable

##### NHS Board for Referrals

NHS Board for Referrals							% Population of Scotland by NHS Board	Actual Population of Scotland by NHS Board*
	2020/21	% of total	2019/20	% of total	2018/19	% of total		
Ayrshire and Arran	■	■	0	0	0	0	6.8	370000
Borders	0	0	0	0	0	0	2.1	115000
Dumfries and Galloway	0	0	0	0	0	0	2.7	149000
England	0	0	0	0	0	0		
Fife	■	■	0	0	■	■	6.8	372000
Forth Valley	7	13	■	■	■	■	5.6	306000
Grampian	■	■	■	■	■	■	10.8	585000
GG&CHB	24	46	18	53	30	56	21.6	1175000
Highland	■	■	■	■	0	0	5.9	322000
Lanarkshire	13	25	■	■	11	20	12.1	659000
Lothian	■	■	■	■	■	■	16.5	898000
Northern Ireland	■	■	6	18	■	■		
Orkney	0	0	0	0	0	0	0.4	22000
Shetland	0	0	0	0	0	0	0.4	23000
Tayside	0	0	0	0	■	■	7.6	416000
Western Isles	0	0	0	0	0	0	0.5	27000
Total:	52	100	34	100	54	100		5439000

\*2018 figures. Source: [www.scotpho.org.uk](http://www.scotpho.org.uk)

##### Distribution of Referrals

Referrals remain well distributed from around Scotland. The referrals from Greater Glasgow and Clyde were thought to be appropriate for the Obstetric Brachial Plexus Injury Service. Referrals from Northern Ireland have continued.

##### Travelling to Clinics

Information on how to claim travel expenses is routinely issued to new patients with their first appointment letter and highlighted on the service website. This encourages patients from outlying areas to attend clinics in Glasgow without encountering prohibitive financial constraints.

## NHS Board for Inpatient Procedures

NHS Board for Admissions							% Population of Scotland by NHS Board	Actual Population of Scotland by NHS Board*
	2020/21	% of total	2019/20	% of total	2018/19	% of total		
Ayrshire and Arran	0	0	0	0	0	0	6.8	370000
Borders	0	0	0	0	0	0	2.1	115000
Dumfries and Galloway	0	0	0	0	0	0	2.7	149000
England	0	0	0	0	0	0		
Fife	0	0	0	0	■	■	6.8	372000
Forth Valley	■	■	■	■	0	0	5.6	306000
Grampian	0	0	■	■	0	0	10.8	585000
GG&CHB	■	■	■	■	0	0	21.6	1175000
Highland	0	0	0	0	0	0	5.9	322000
Lanarkshire	0	0	0	0	0	0	12.1	659000
Lothian	0	0	0	0	■	■	16.5	898000
Northern Ireland	■	■	0	0	■	■		
Orkney	0	0	0	0	0	0	0.4	22000
Shetland	0	0	0	0	0	0	0.4	23000
Tayside	0	0	0	0	0	0	7.6	416000
Western Isles	0	0	0	0	0	0	0.5	27000
Total:	■	■	■	■	■	■		5439000

\*2018 figures. Source: [www.scotpho.org.uk](http://www.scotpho.org.uk)

## Outreach Clinics

### Aberdeen

The Aberdeen outreach clinic was set up to improve assessment and follow-up for patients in the north of Scotland. Utilisation of these clinics is variable. Both children and adults are seen at these clinics. The need for outreach clinics is kept under review according to the numbers of patients in each area.

Due to COVID-19 measures in 2020 the autumn Aberdeen outreach clinic was converted to a virtual video/telephone clinic held at the New Victoria Hospital in December 2020. ■ patients were seen (■ children and 6 adults). All of the children seen were return appointments. Another face-to-face or virtual clinic is planned for spring/summer of 2021 as COVID restrictions allow.

### Campbeltown

One long term OBPI patient was seen in the once-yearly orthopaedic outreach clinic in Campbeltown back in 2019 to save the family travelling to Glasgow. This patient has now been transferred to the adult service and will be followed up in the future either at Campbeltown, or in a young adult video clinic at the New Victoria Hospital.

## **3.2 Efficient**

### **Efficient**

a) Actual v Planned Activity

*See Section 2: Activity Levels*

b) Resource Use

See other parts of the report.

c) Finance & Workforce

*See Section 6: Financial report and workforce*

d) Targets (Referral to appointment to treatment)

*See Section 3.3: Timely*

### **3.2.1 Cost efficiencies**

Not applicable.

### 3.3 Timely

#### 1. Time from referral to first clinic appointment being offered < 6 weeks.

The mean wait between referral and the first outpatient appointment was 5.0 weeks and the median was 5.6 weeks (range 0 to 10.9 weeks).

Time from Referral to Treatment			
	2020/21	2019/20	2018/19
% within target	71	68	85
Maximum Wait (weeks)	10.9	15.4	12.0
Minimum Wait (weeks)	0.0	0.0	0.0
Median Wait (weeks)	5.6	4.6	3.6

Note. Fifteen children were seen out-with the six week target; eleven of those children were seen within eight weeks of referral. Of the ■■■ seen out-with eight weeks ■■■ were older children whose parents were happy to wait for a later review, and one was a new-born who didn't attend their first appointment and had to be reappointed several times. All new-borns were contacted by the specialist physiotherapist within two weeks of referral.

#### 2. Clinic letters issued within 2 weeks.

All clinic letters and operation notes were typed and checked within a few days of dictation.

#### 3. Assessment and stratification for nerve surgery benefit by 4 months; nerve surgery by 6 months.

Of the ■■■ nerve-surgery cases during 2020/21 ■■■ was a two year old child who required nerve surgery as a secondary procedure to enhance limb function, ■■■ was an older child who suffered a traumatic injury requiring urgent exploration and nerve repair. No new-born patients required nerve surgery in 2020/21.

Prompt theatre access remains difficult within RHC, although senior management support has been of critical assistance when needed, and is greatly appreciated.



### 3.4 Effectiveness

#### **OBPP Nerve Exploration/Repair Cases 2004 to 2020**

A continuing audit is being carried out to monitor the operations for nerve exploration and repair carried out for obstetric brachial plexus injury in Glasgow.

Since the appointment of Professor Andy Hart in 2008, exploration of the brachial plexus has been included in the interventions offered by the obstetric brachial plexus injury service.

A few cases had been carried out before 2008 with the help of Professor Rolfe Birch from the Royal National Orthopaedic Hospital and by Mr Tim Hems.

Nerve exploration is only considered in the most severe cases of OBPI. The main indication is failure of recovery of elbow flexion and shoulder movement by 4 to 6 months of age, which may be associated with complete or partial paralysis of the hand.

Interpretation of results is affected by:

- The small number of cases.
- The variation in the extent and severity of the injuries.
- Follow up is too short to assess the final result in the cases carried out during the last 2 years.

**22 cases** (13 male, 9 female) have been carried out between 2004 and January 2019.

#### **Timing of Operation**

The mean age at operation was 5.4 months (Median = 5 months, Range 4 to 14 months).  
(The child who had operation at 14 months was born 3 months prematurely and was not fit for earlier intervention).

#### **Classification**

Cases were classified using the Narakas system:

		<u>Number</u>
Group 1	C5, 6. Biceps and deltoid paralysis.	1
Group 2	C5, 6, 7. Only the long finger flexors work.	9
Group 3	Whole plexus involved with slight finger flexion only.	1
Group 4	Whole plexus involved plus Horner's syndrome.	7

### **Indications for operation:**

In 19 cases the aim of the procedure was reconstruction for elbow flexion and shoulder elevation. In 1 of these the lesion was found to be recovering and no repair was carried out.

Nerve repair was performed for shoulder function in 13 patients and 12 for elbow flexion.

In 1 cases the aim of the procedure was reconstruction for shoulder elevation and external rotation only. In one of these the lesion was found to be recovering and no repair was carried out. Nerve repair was performed in 1 patients.

### **Method of Repair**

Elbow flexion: Nerve grafting of the upper trunk of the brachial plexus or nerve transfer using ulnar nerve fascicle.

Shoulder elevation: Re-innervation of the Suprascapular nerve was by transfer of the Accessory nerve in 13 of 15 cases, transfer of the dorsal scapular nerve graft in 1 case, and nerve suture in 1.

7 children had release of shoulder contracture or MUA & Botox at the same time as nerve reconstruction which will also have affected the result for shoulder recovery.

### **Results**

All 16 cases who had nerve repair have sufficient follow-up for initial evaluation.

#### **Elbow flexion:**

Mean active elbow flexion = 91° (0 - 120)

1 children have subsequently had free muscle transfers to strengthen elbow flexion.

#### **Shoulder:**

Mean active shoulder elevation (Flexion or abduction) = 96° (Range 30 – 160°)

Mean active shoulder external rotation (in adduction) = 28° (Range -30 – 60°)

Mean Mallet score = 14.7 (Range 5 - 21)

### **Complications**

Overall the interventions appear safe.

One patient had phrenic nerve dysfunction after operation. However, the phrenic nerve may be injured in association with OBPI. It is therefore likely that the condition had been present before surgery. In subsequent cases phrenic nerve function has been assessed before operation.

## **Conclusions**

These results appear satisfactory taking into account the severity of injuries being treated.

Shoulder function: Results are suggestive of an improved outcome over spontaneous recovery in many of the cases treated.

The unit will continue to monitor new cases and longer term outcomes.

## 3.5 Safe

### Staff Vetting

All healthcare professionals funded within the structure of the Obstetric Brachial Plexus Injury Service meet Greater Glasgow & Clyde Trust requirements for vetting by Disclosure Scotland and registration with the Information Commissioner's Office.

### Governance

Patients reviewed or treated at the RHC site fall under the hospital's own governance system, reinforced by internal audit within the Orthopaedic and the Plastic Surgery services. No significant governance issues have been identified through these mechanisms during 2020/21.

### Compliance

The outpatient clinic has fully adopted recommendations on hand hygiene, dress code, and cleaning of equipment as recommended nationally. These measures are also in full implementation within the inpatient ward and theatre complex used. Regular monitoring of compliance within the hospital is performed by assessors independent to the SNBPIS. No peri-operative bacterial infections occurred during the period 2020/21.

### Child Protection

Child protection level 1 LearnPro was completed by all staff.

Child Protection level 2, risk assessment, maltreatment in infants LearnPro was completed by Prof Hart, Miss Murnaghan, & Mr Hems.

Miss Murnaghan has Child Protection training to Level 3 and has completed all mandatory Paediatric training modules on NES and LearnPro.

Safe Transfusion Practice for Paediatrics completed by Prof Hart & Miss Murnaghan.

## 3.6 Person centred

- Patient Information

Parents are directed to the service website which contains information on obstetric brachial plexus injury.

- Patient Satisfaction Survey

A patient satisfaction survey was carried out in 2019/20. Please see last year's report. The next survey is planned for 2021/22.

## **Young Adult Clinic**

Patients previously seen in the children's obstetric brachial plexus clinic often require ongoing review upon reaching the age of 16. It was felt inappropriate to continue to see these patients in the children's clinics, therefore a new clinic for young adults was created, the first being held in April 2011. A robust pathway is therefore in place for patients to transition from child to adult care.

The young adult clinic is held twice per year at the New Victoria Hospital, Glasgow, which is the same location as the adult brachial plexus clinic. The clinical nurse specialist, occupational therapist and physiotherapist who work with the adult service are contributing. Many appointments are now carried out via video using the Near Me/Attend Anywhere system.

Adults who have ongoing problems resulting from an OBPI are also referred to the service and are usually seen first at the young adult clinic.

## 4. Quality and Service Improvement

### Educational talks with referring specialties, care providers, and professional groups within and out-with NHS GG&C

During the 2020/21 period brachial plexus injury (adult & obstetric) has been taught to medical students, occupational therapy students, general plastic and orthopaedic surgeons and neurophysiology trainees. (Also see Appendices)

### Physiotherapy

#### Annual Report prepared by the Specialist Paediatric Physiotherapist

#### Role of Physiotherapy

- Attending consultant-led and therapy-led clinics.
- Assessing new babies/children referred to physiotherapy with concerns of OBPP.
- Liaising with physiotherapists across Scotland and Northern Ireland regarding children with OBPP.
- Promoting early intervention of babies born with OBPP by ensuring early referral to physiotherapy from the maternity hospitals.
- Continuing to educate junior physiotherapy staff and students in the role of physiotherapy in OBPP.

#### Patient Numbers

The following table shows the patient numbers seen by physiotherapy:-

Number of Patients Seen by Physiotherapy				
		2020/21	2019/20	2018/19
Consultant Clinic	New	15	10	22
	Return	26	50	51
Physiotherapy	New	9	10	14
	Return	11	19	25
Therapy Clinic	New	0	0	0
	Return	24	21	23

## COVID-19 and Physiotherapy

Despite the COVID-19 pandemic patients referred to physiotherapy at RHC have continued to be managed in a timely manner, being contacted by the specialist paediatric physiotherapist within a week of receiving their referral.

Due to the pandemic all patients were initially contacted by telephone where a history was taken from the parents and discussion about any improvements so far. Exercise programmes were discussed with parents over the phone and then emailed to parents with videos and a description. This helped to avoid unnecessary travel to the hospital for families where the baby was already improving and could therefore be managed virtually initially, however all babies that were not making improvements were then seen face-to-face.

## Therapy-Led Clinic

The therapy-led clinic continues to run well. The clinic has adapted to delivering seeing patients via Near Me/Attend Anywhere video and face-to-face appointments where appropriate.

This clinic allows longer appointment times for additional assessment/management strategies to be discussed with families. It also allows joint working between physiotherapy, occupational therapy and psychology.

Clinic notes for patients attending the therapy-led clinic are uploaded to the clinical portal along with the assessments that are carried out to ensure communication is maintained

Patients Appointed to Therapy-Led Clinic (TLC) by Health Board							% Population of Scotland by NHS Board	Actual Population of Scotland by NHS Board*
	2020/21	% of total	2019/20	% of total	2018/19	% of total		
Ayrshire and Arran	0	0	■	■	■	■	6.8	370000
Borders	■	■	0	0	■	■	2.1	115000
Dumfries and Galloway	■	■	■	■	■	■	2.7	149000
England	0	0	0	0	0	0		
Fife	■	■	0	0	0	0	6.8	372000
Forth Valley	■	■	■	■	■	■	5.6	306000
Grampian	0	0	0	0	0	0	10.8	585000
GG&CHB	16	52	14	61	21	70	21.6	1175000
Highland	■	■	0	0	■	■	5.9	322000
Lanarkshire	■	■	■	■	■	■	12.1	659000
Lothian	■	■	■	■	■	■	16.5	898000
Northern Ireland	■	■	■	■	0	0		
Orkney	0	0	0	0	0	0	0.4	22000
Shetland	0	0	0	0	0	0	0.4	23000
Tayside	■	■	0	0	0	0	7.6	416000
Western Isles	0	0	0	0	0	0	0.5	27000
Total:	31	100	23	100	30	100		5439000

\*2018 figures. Source: [www.scotpho.org.uk](http://www.scotpho.org.uk)

## **Paediatric Occupational Therapy**

### **Annual Report prepared by the Highly Specialist Paediatric Occupational Therapist**

During the past 12 months Nicola Hart has continued to perform the requirements of the Obstetric Brachial Plexus Injury specialist post. Job requirements have continued:-

- Evaluating how a child functions in daily activities.  
This helps the team to provide appropriate recommendations for rehabilitation and surgical planning if any secondary reconstructive procedures are necessary.
- Working with the child and family to evaluate their functional concerns by observing the child performing functional tasks.
- Shoulder, elbow and hand functional range of movement assessed in the areas of:
  - Fine Motor Skills.
  - Activities of daily living
  - School work (handwriting, posture)
  - Leisure activities
- Hand/wrist orthotics – either to stretch stiff joints or position the child’s hand for best function.
- Fine Motor Activities – aim to improve specific hand skills (pincer/power grasps).
- Encourage bilateral use of hands.
- Activities of daily living – encouragement to use affected arm in daily activities.
- Adaptations for activities of daily life – teaching techniques and assessment/provision of small adaptive equipment.
- Connecting with the child, family and their community – role as facilitator between the clinic and professionals in the community and school/nursery settings.
- Referral on to Community Occupational Therapy services when appropriate for ongoing intervention.

The Brachial Plexus Outcome Measure (BPOM) continues to be used specifically for patients attending the therapy-led clinic. It has been adapted to be used via Near Me/Attend Anywhere. The checklist of items is sent to the family prior to attending the appointment (*see Appendices in this report*).

A list of factsheets/activities and resources are provided to families and children attending the clinic. These have been produced by the Erb’s Palsy Group in conjunction with occupational therapists and physiotherapists. Families are signposted to this charitable organisation for resources and linking with families with obstetric brachial plexus injuries. The resources can be found at <https://www.erbspalsygroup.co.uk> or by emailing [erbspalsygroup@erbspalsygroup.co.uk](mailto:erbspalsygroup@erbspalsygroup.co.uk).

### **Ongoing Developments**

The AHP Collaborative Meeting was hosted virtually by the Occupational Therapy team in Stockholm. This continues to be a well represented AHP group meeting once a year to discuss best practice for children and adults with a brachial plexus injury.

The therapy-led clinic is well developed and will continue with dates planned for the rest of the year. Recently a final year Occupational Therapy student has been attending the clinic and found it very useful to see how a multidisciplinary team works for the patient and families.



<b>Attendance at the Therapy-Led Clinic</b>			
	2020/21	2019/20	2018/19
Under 5 years	11	8	3
5 to 10 years	8	8	12
10 to 16 years	12	7	8
Did not attend	█	█	7

### **Future Developments**

Funding has been secured from the Specialist Children's Occupational Therapy service for this therapist to attend the mini-Assisted Hand Assessment course (mini-AHA). The course dates are 7 to 9<sup>th</sup> July 2021 and it will be attended virtually.

A new version of the Assisting Hand Assessment (AHA) has been developed for young children with unilateral upper limb deficits aged 8 to 18 months called the Mini-Assisting Hand Assessment (Mini-AHA). The purpose of the Mini-AHA is to measure and describe how effectively children with unilateral upper limb deficits use their affected hand during bimanual play performance, to discriminate different levels of ability, and to evaluate change over time. It is a test of hand function in children with difficulties using one of their hands. The mini-AHA measures how effectively the affected hand and arm is used in bimanual performance. An assessment is performed by observing the child's spontaneous handling of toys in a relaxed and playful session. Like the AHA, the Mini-AHA involves a video-recorded play session using carefully selected toys that provoke bimanual hand use.

Following attendance on the course this will provide additional evidence for assessment and treatment of children in the younger age group (8-18 months). The BPOM is used for children aged 4 to 16 years. Through using both these assessments it is planned a wider age group will be formally assessed and benefit from the outcomes obtained.

## **Clinical Psychology**

### **Dr Helen Lowther, Principal Clinical Psychologist**

Clinical Psychology has provided 0.2 WTE (one day per week) NSS funded resource dedicated to and ring-fenced for the Obstetric Brachial Plexus Injury Service since the service began in July 2018. Planning for the Clinical Psychologist's role in the service is outlined in the Annual Report 2017/18.

Over the past 12 months the Clinical Psychologist, alongside the other professional groups and patients, has faced a lot of challenge and change as a result of the global pandemic. The focus of service delivery has continued to be a strong MDT approach so as to maximise the limited psychology resource and provide the best service possible to the widest number of families possible. The psychologist has continued to work within the MDT, and has carried out targeted interventions, alongside preventative, early intervention work within the consultant-led and therapy-led clinics. However, a certain amount of adjustment and flexibility has been needed and as a result of the need to socially distance particularly at the onset of the pandemic, psychology had to move towards a model of individual therapy sessions with families identified as having the greatest psychological need rather than being able to attend all of the consultant-led MDT clinics as was the practice pre-COVID. Many of these individual appointments were delivered using Near Me video conferencing technology which as time has progressed, has been a significant advantage for some patients and has increased the geographical equity of the psychology aspect of the service. Later in the year, the clinical psychology service was able to again return to a more significant role in the MDT clinic but there is consideration as to whether some of the service delivery changes, in particular the ongoing use of Near Me technology for some clinical delivery, may be beneficial to maintain in the longer term (see below in future plans).

### **Quantitative data**

Patients seen by Clinical Psychology at either the consultant-led or therapy-led clinics April 2020 to March 2021:-

<b>Patients Seen by Psychology at CLC or TLC</b>			
	2020/21	2019/20	2018/19
Under 5 years of age	18	25	24
6 to 10 years of age	11	19	17
11 to 16 years of age	12	20	13

There have also been 21 one to one Psychology appointments.

### **Current work**

1. The current focus has again been on providing a psychology presence at clinics where possible, but also considering where the psychology provision should be focussed in the future. Presence at the OBPI clinics has continued to be important in terms of providing early intervention, brief targeted psychoeducation to patients and families. It has also allowed families to meet the Psychologist and gather information about this aspect of the service, before being referred for one-to-one input.

2. It was concluded that screening measures would be useful in clinic to both identify psychology need and also allow families to easily communicate the choice of seeing the psychologist when it has not been possible to meet at clinic. In line with other medical clinics at the Royal Hospital for Children, Glasgow, (BMT, Cardiology, Respiratory), a 'distress thermometer' screening tool has been developed for both parents and children/young people to fill out. This is currently being piloted for face-to-face patients attending the therapy clinic, with verbal feedback collected from the families filling this out. Once this tool has been refined, it can be introduced at the consultant-led clinic across both face to face and VC appointments.
3. A list of NHS approved Apps/websites has been compiled to give out at clinics, if appropriate. In line with a stepped-care model, this signposting to appropriate mental health self-help would be beneficial for early intervention targeted work, where a referral for one-to-one psychology input is not warranted.

There have also been particular pieces of psychology intervention over the past year where the Psychologist has worked as part of the MDT to support parents and children when preparing for surgery. This has highlighted the benefit of having a Psychologist embedded in the team, who can dedicate fairly intense amounts of time on the build up to surgery for particular patient groups. It has highlighted the potential anxiety families can feel when facing surgery, and therefore the Psychologist's time can be used to support these patients, as part of the pathway.

### **Future plans**

1. One of the significant benefits of working with Near Me Video Conferencing (VC) technology is that the therapeutic work that would traditionally have been face-to-face can now reach a wider geographical population in a more equitable way. As such, a VC parent group has been planned for July 2021. The focus of this is a 'new diagnosis' group, to orient parents to psycho-social issues that they may face with an OBPI diagnosis. It will also be an opportunity for parents to meet other parents of children with OBPI. The format of the group will be mainly didactic, with opportunities for questions, which will allow more parents to be invited. It will also be clear that parents can sit with a muted mic and the camera off, so they can tend to their infants when needed. The aim of this talk is to be an educational, containing talk, inclusive of parents at a challenging time of their life. Further aims are to educate about infant mental health, and provide information on how to access follow-up support if needed. This will be carried out on a rolling programme, and will be part of the national Scottish OBPI care for new parents.
2. Linked to this is the work on a 'birth trauma pathway'. This patient population is a vulnerable group, who have potentially all experienced a traumatic birth and may need support around this. Potential ideas are that parents who are new to the clinic would be offered one-to-one time with the psychologist, or a follow-up phone call, who will provide supportive psycho-education around adjustment after birth and follow up where appropriate. This will be piloted and developed over the coming year to see if this is sustainable within the existing psychology resource.

## **Administration**

### **Overview**

Administrative duties for both the adult and children's services are provided by the service administrator based at the New Victoria Hospital in Glasgow, with access to offices and clinics at the Royal Hospital for Children and the Queen Elizabeth University Hospital.

The service administrator's main duties include: setting up clinics on the NHS TrakCare system; receiving and processing new patient referrals to the service; adding new patients to the in-house MS Access database; creating an electronic record for new patients on the TrakCare system and appointing them to the appropriate clinic as required; monitoring clinic attendance and booking review appointments as necessary; liaising with all members of the brachial teams in relation to patient reviews; gathering and recording clinical and attendance data for each patient on the in-house database; providing monthly activity reports to NHS National Services Division (NSD); updating, monitoring and improving the service website; providing administrative support to department of Trauma and Orthopaedics as required; collating year-end activity data for annual service reports; all other day-to-day ancillary administrative duties.

### **Clinics**

Adult OBPI clinics, for patients over sixteen years of age, are run by the adult service normally twice per year at the New Victoria Hospital (see the adult service report for activity levels). Monthly adult BPI clinics are run at the same location. Children's OBPI clinics take place at the Royal Hospital for Children in Glasgow, at least once per month. Outreach clinics in Aberdeen encompassing both the adult and children's services are organised by the service administrator up to twice per year.

### **Near Me/Attend Anywhere Virtual Appointments**

During the initial 2020/21 COVID restrictions all brachial plexus clinics shifted to largely virtual video or telephone consultations to limit numbers travelling to Glasgow for review. This was initially very challenging requiring clinic templates to be hastily redesigned in line with new requirements. Over the course of the year clinic requirements have been monitored by the service administrator and clinic templates streamlined accordingly. Although the requirement for virtual appointments was very high at the onset of the pandemic (in March and April 2020) this has lessened gradually over the course of the year, with the levels of virtual versus face-to-face appointments continuing to be reviewed by the service administrator and templates adjusted in accordance with current needs. The benefits of accessing this virtual system has been highlighted by both patients and staff, particularly for patients in outlying areas and in Northern Ireland. It is expected that virtual appointments will continue to be included alongside face-to-face appointments in the longer term.

### **Service Website ([www.brachialplexus.scot.nhs.uk](http://www.brachialplexus.scot.nhs.uk))**

The service website continues to be a valuable resource for clinicians and patients alike and is monitored and updated by the service administrator.

Patients can access various resources via the website including: a patient information booklet (PIB); general information on the nature and treatment of brachial plexus injury; links to outside resources such as support groups; and contact details for the service. Patient feedback continues to be positive.

Clinicians regularly use the website to access referral forms and referral guidelines and to contact the service. Feedback from clinicians has also been very positive.

In 2020/21 an Education page was added to the site, with video presentations narrated by the adult specialist physiotherapist. These presentations are intended to serve as guides for medical professionals who may encounter patients with brachial plexus injury.

The site continues to be kept under review and is maintained on a weekly basis. The intention is to continue to develop it in line with service requirements, technological advancements, and feedback from patients and clinicians.

## **Database**

The children's service database is maintained by both the administrator and the lead consultant. It is under constant revision, and is a primary resource in facilitating reporting and service developments.

Data from all clinics is gathered and recorded both in the electronic patient record (EPR) and on the service database for future clinical and reporting purposes. The administrator endeavours to gather this data within seventy-two hours of clinic attendance thus keeping available clinical information as current as possible.

## **Electronic Patient Record (EPR)**

In September 2020, in collaboration with the NHS Greater Glasgow & Clyde Clinical Portal and eHealth team, the children's brachial plexus injury service made the change from paper forms to electronic forms when gathering brachial plexus clinical assessment data.

The new electronic forms had been in the pipeline for some years and were developed in collaboration with eHealth, the lead consultant, the service administrator and the children's brachial plexus team.

The new forms have so far proved a success, enabling clinicians to input data at source (i.e. during a clinic appointment) straight into the patient's electronic record. This data can then be retrieved remotely by the service administrator and input into the service database for future activity reports, negating the need for paperwork and reducing the risk of losing any vital data in transit between hospitals.

The new system should improve data security, ensure accuracy and make the data gathering procedure quicker and more reliable than before.

Our thanks to the Business Analyst/Project Lead from eHealth who oversaw the implementation of this project.

## **5. Governance and Regulation**

### **5.1 Clinical Governance**

The brachial plexus team holds regular multidisciplinary meetings after clinics to discuss developments and any problems with the service.

Local governance reports for the Paediatric Orthopaedic Service are submitted monthly; incidents are reported, investigated and reviewed. Information is then passed to the quarterly Paediatric Orthopaedic GG&C Clinical Governance meetings and relevant information then passed to the GG&C groups attended by senior management.

Patients treated at the Canniesburn site also fall under that unit's own monthly governance and internal audit system.

No significant governance issues have been identified through these mechanisms during 2020/21.

### **5.2 Risks and Issues**

No adverse events arose during 2020/21.

### **5.3 Adverse Events**

The service uses existing Greater Glasgow & Clyde thresholds for instigation of adverse event reporting and investigation, plus online reporting systems.

No adverse events have been reported to occur during the period 2020/21.

### **5.4 Complaints and Compliments**

The GG&C policy on complaint handling is followed. There have been no complaints relating to the Children's Brachial Plexus Injury Service during 2020/21. Compliments are directed specifically to the service providers.

### **5.5 Equality**

The Scottish National Brachial Plexus Injury Service complies with NHS rules on Equality & Diversity in the appointment of staff. Similar care is taken in providing equal care standards to patients and relatives. Appropriate use of interpreters and awareness of cultural, ethnic and religious practices in regard to examination and interaction with parents is facilitated.

Staff have completed required LearnPro modules, as set by NHS GG&C (Module 004: Equality, Diversity & Human Rights).

## 6. Financial reporting and workforce

<b><u>NHS Greater Glasgow &amp; Clyde</u></b>				Actual Activity	4
<b><u>Women &amp; Children's Directorate</u></b>				Projected Activity	4
<b><u>Obstetric Brachial Plexus</u></b>				Contract Activity	10
<b><u>Twelve Month Report: 20/21</u></b>				Contract Type	C&V
	Full Year Funded Value Of Agreement	Twelve Month Funded Value Of Agreement	Actual Outturn As At 31st March 2021	Variance	Projected Full Year Outturn
	£	£	£	£	£
<b><u>FIXED</u></b>					
Nursing/PAM	80,339	80,339	80,339	0	80,339
Medical	11,709	11,709	11,709	0	11,709
Other direct	49,920	49,920	49,920	0	49,920
Indirect	16,936	16,936	17,154	-218	17,154
Capital charges	58	58	58	0	58
<b><u>Total Fixed</u></b>	<b><u>158,962</u></b>	<b><u>158,962</u></b>	<b><u>159,180</u></b>	<b><u>-218</u></b>	<b><u>159,180</u></b>
<b><u>VARIABLE</u></b>					
Pharmacy	5,488	5,488	2,242	3,246	2,242
Travel & Training	2,298	2,298	939	1,359	939
<b><u>Total Variable</u></b>	<b><u>7,786</u></b>	<b><u>7,786</u></b>	<b><u>3,181</u></b>	<b><u>4,605</u></b>	<b><u>3,181</u></b>
<b>TOTAL</b>	<b><u>166,748</u></b>	<b><u>166,748</u></b>	<b><u>162,362</u></b>	<b><u>4,386</u></b>	<b><u>162,362</u></b>
<b><u>Summary</u></b>					
Fixed			159,180		159,180
Variable (4 Cases)			3,181		3,181
Total			162,362		162,362
Less					
Variable Non Contract (2 Cases)			1,591		1,591
Fixed Costs (2 Cases)			31,836		31,836
<b>Final Total Owed By NSD</b>			<b>128,935</b>		<b>128,935</b>

## 7. Audit & Clinical Research / publications

### Tim Hems

#### **Natural history of elbow flexion contracture and restriction of forearm rotation after obstetric brachial plexus injury.**

Flexion contracture of the elbow and limitation of forearm rotation are common deformities after OBPI. A study has been started to investigate the severity of these deformities and how they progress during childhood, using the service database. The project has received approval from the research ethics committee.

Analysis is ongoing and an abstract has been submitted for presentation at an International meeting.

#### **Presentations:**

Natural history of elbow flexion contracture in obstetric brachial plexus injury. Federation of European Societies for Surgery of the Hand, Online conference, September 2020.

#### **Publications:**

Tim Hems. Commentary Re. Lombard, A., Bachy, M., & Fitoussi, F. (2020). C5-8 neonatal brachial plexus palsy. Operative findings, reconstructive strategy and outcome. *Journal of Hand Surgery (European Volume)*. 2020 Oct;45(8):805-806. doi.org/10.1177/1753193420902361

Hems T. Commentary on: Evidence that nerve surgery improves functional outcome for obstetric brachial plexus injury. *Journal of Hand Surgery (European Volume)*. 2021;46(3):237-238. doi:10.1177/1753193420935711

Tim Hems. Chapter. Obstetrical Birth Palsy: Late Complications and Treatment (Shoulder, Forearm and Hand). In: *Operative Brachial Plexus Surgery*. Edited by Alexander Y. Shin and Nicholas Pulos, Springer Nature. 2021.

### Claire Murnaghan

#### **Presentations:**

The Paediatric Brachial plexus Service at RHC, Glasgow – Who We Are” presented to the Neonatologists and Therapists in Lanarkshire (University Hospital Wishaw) on 12/05/21

#### **Publications:**

n/a



## 8. Looking ahead

### **Coronavirus**

Despite the challenges of COVID and the need to reduce footfall at the Children's Hospital we quickly adapted to new ways of working through the use of Near Me/Attend Anywhere video technology in April 2020. This is not ideal for all situations but it allowed us to maintain communication with children and families currently undergoing treatment, as well as initiating assessments of babies. Some parents opted for telephone consultations so we also arranged these where appropriate. If there were any clinical concerns we were able to invite the child for a face-to-face appointment in line with local practice and following the guidelines in place at RHC outpatients department. Therefore we do not feel that our patients had to wait significantly longer than usual for an opinion.

It is interesting that many of our families who live far away from the hospital found these virtual consultations easy and effective and well as being more efficient in terms of time of work/travel time etc. We plan to maintain this mix of styles of appointments in the longer term, at the request of parents. Administrative support from Johnny McCrum has been vital to implementing this change.

Provision of theatre time for operative cases has been adequate and we are currently up to date.

### **Electronic Patient Record (EPR)**

Over the last two years the EPR development team has been working to provide specific E-forms for the children's brachial plexus service for inclusion in the EPR. The development task was more complex and took longer than anticipated. The E-forms went live in the autumn of 2020 and some recent modifications have been made. They have reduced the burden of paper records and increased administrative efficiency for clinics.

### **National and International Interactions**

As a result of the coronavirus situation there have been no face-to face national or international meetings during the last year. The Narakas meeting, due to be held in Berlin in May 2021, has been postponed until at least 2022. A meeting of the Scandinavian and British brachial plexus groups planned to be held in Helsinki during 2020 was postponed with no new date yet announced.

There are, however, an increased number of online events providing ongoing update and education.

# Appendices

## Teaching and Education

### Tim Hems

#### Teaching

2 <sup>nd</sup> October 2020	Brachial Plexus Injuries: Investigation and Management. North of Scotland Orthopaedic Training Program. Lecture given via Microsoft Teams.
2 <sup>nd</sup> March 2021	Brachial plexus: Anatomy and Examination. Brachial Plexus Injuries: Investigation and Management. Obstetric brachial plexus injury. MCh Orth course, Dundee. Lecture given via Microsoft Teams.

#### Meetings Attended

1/9/20 to 5/9/20	Federation of European Societies for Surgery of the Hand online Congress.
14/10/20 to 15/10/20	British Society for Surgery of the Hand Virtual Webinar.

## **BPOM (Brachial Plexus Outcome Measure)**

### **Checklist**

1. Standard comb.
2. 5" circular container with lid.
3. Button/ snap belt – used to undo button at midline/ tummy level.
4. Computer mouse.
5. ½" round beads with holes.
6. Drumsticks (you can use pencils).
7. Theraputty or Playdough.
8. Shoelaces for stringing beads.