Scottish National Advanced Heart Failure Service

Annual Report
2023/24

Golden Jubilee University National Hospital

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Executive Summary

The Scottish National Advanced Heart Failure Service (SNAHFS) was established in 2006 to provide advanced treatment options including heart transplantation for patients who are both disabled and whose lives are threatened by heart failure despite all standard modern treatment. Specifically, as part of its remit, SNAHFS is charged with considering the introduction of new technologies which have emerged since the inauguration of the Scottish Heart Transplant Unit in 1992. The Scottish National Advanced Heart Failure Service is dedicated to managing patients with severe heart failure who may be candidates for heart transplantation and/or mechanical circulatory support (ventricular assist devices and ECMO). We provide a national service caring for patients throughout Scotland from the Borders to the Shetland Islands.

In 2023, SNAHFS/NHS Golden Jubilee submitted a Business Case to NSD. This Business Case has been funded, although not in full.

1. Service Delivery

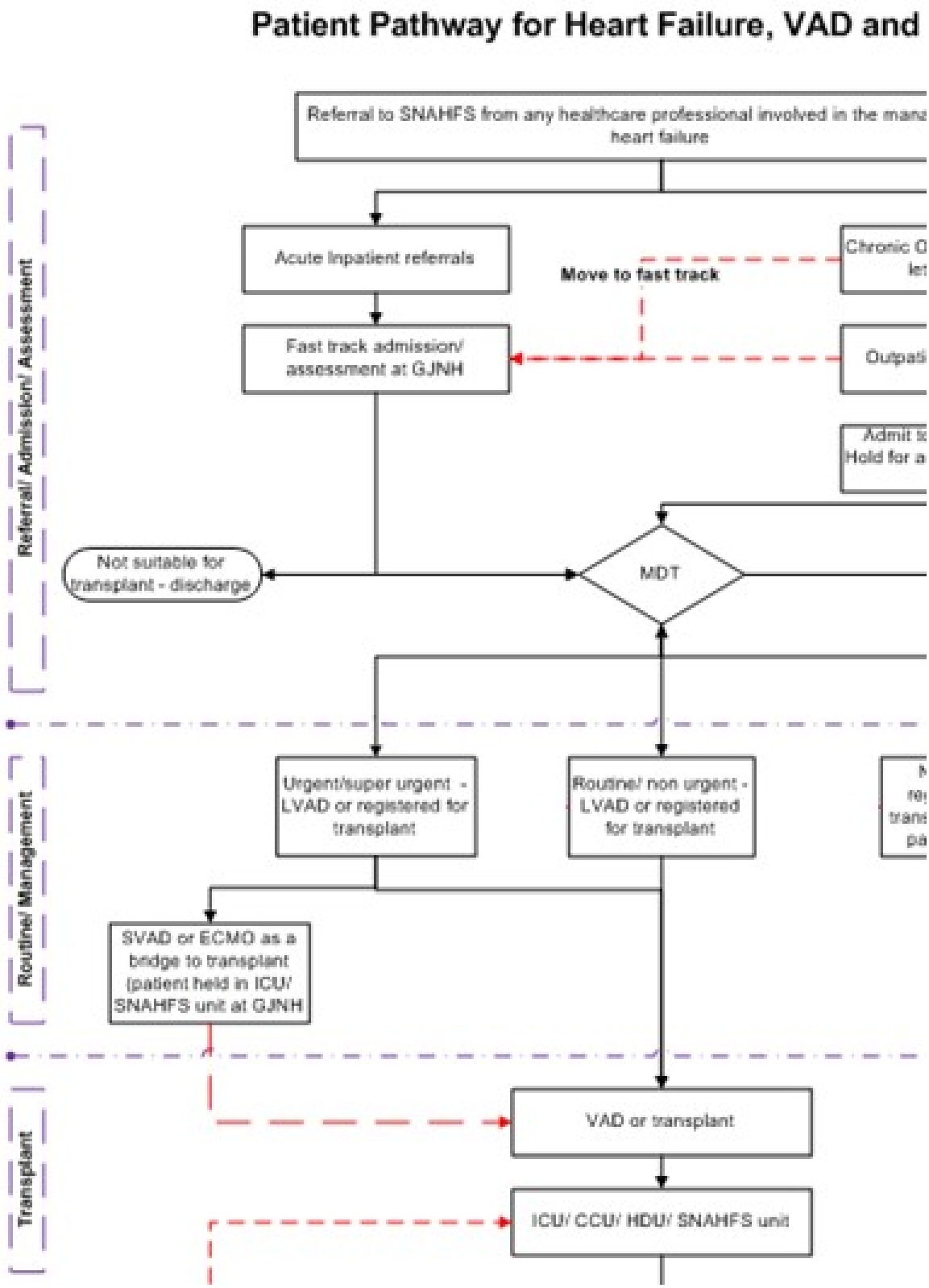
The target population for the SNAHFS are those patients with advanced heart failure who are symptomatic despite optimal pharmacological and complex device therapy. Patients who are candidates for cardiac transplantation or ventricular assist devices (VADs) are those with acute and chronic heart failure and are usually less than 65 years of age.

Patients with acute or chronic advanced heart failure are referred by healthcare professionals throughout Scotland to be assessed for cardiac transplantation and VADs (as a bridge to transplant). Within the SNAHFS, patients are assessed in a multidisciplinary environment. Patients are either accepted for these therapies, reviewed within the service or discharged to the regions for ongoing care. Clear communication with the regions and localities at all stages of their journey through the service is a daily priority to ensure that patients are managed in collaboration with referrers.

The service is delivered by a team of Consultant Cardiologists, Consultant Transplant &Retrieval Surgeons, Consultant Anaesthetists, SNAHFS Specialist Nurses, Clinical Psychologist and supported by specialist AHPs including physiotherapists and dieticians

The Pathway is described below.

Figure 1 Patient Pathway for Heart Failure, VAD and Transplant



2. Activity Levels

The table below provides a summary of the activity in 2023-24 against both the SLA and the proposal described within the Business Case.

	Current SLA (2023-24)		
	SLA	Proposal	23/24 Activity
New Appointments AHF	65	70	64
Return AHF Appts	490	540	516
Post Heart Transplant f/u appointments	1170	1200	1150
Routine inpatient assessment	100	130	168
Emergency Assessment Admissions	105	120	105
Transplants	30-35	30-35	32
Post Transplant Readmission		50	37
STVADs		7	
Impella			
ECMO (bridging and post transplant)	35	35	31
LTVAD			0

2.1 Transplant and VAD Activity

Figure 2: Total transplants and survival rates per annum

Total Transplants by Financial Year	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
Ayrshire and Arran	0										0		0		0		14
Borders	0	0	0	0	0	0	0	0	0					0		0	
Dumfries and Galloway	0	0	0					0		0	0						11
Fife	0	0		0			0				0						17
Forth Valley					0		0	0			0		0				18
Grampian	0	0	0	0	0		0	0			0						13
Greater Glasgow and Clyde		0			0	6							6	6	14	7	65
Highland	0	0		0		0		0		0							18
Lanarkshire				0				0	0					6	7		36
Lothian		0	0						0							7	28
Tayside	0			0				0	0	0							16
Western Isles	0	0	0	0		0	0	0	0	0	0		0			0	
Non Scottish	0	0	0	0	0	0	0	0		0	0		0	0	0	0	
TOTAL	**6**		**9**	**9**	**10**	**19**	**13**	**7**	**15**	**11**	**9**	**11**	**20**	**24**	**40**	**32**	**239**
Target	15	11	11	11	11	11	11	11	11	11	11	11	18	18	18	30	220
Dead within 30 days	0						6	0		0							25
Survival Rate at 30 days %	100.0%	75.0%	66.7%	66.7%	80.0%	94.7%	53.8%		93.3%		77.8%	90.9%	95.0%	95.8%	97.5.0%	93.6%	90.0%

NHS GJ Heart Transplantation Activity

32 transplants were carried out in 2023/24.These included:

Recipient Status

- 7 (21.9%) patients on the Super Urgent Transplant List
- 16 (50%) patients from the Urgent list
- 9 (28%) patients from the Routine list

There were [redacted] deaths within 30 days of transplant with 30-day mortality of [redacted] and a 90-day mortality of [redacted]

Overall 30d survival over the last five years – Scotland HTx was 93.5% versus UK 92.1% (2018-2023)
It is noted that since 2020/21 we have seen both a sustained growth in the transplant service, and an improvement in survival rate at 30 days.

Scotland DBD Heart Transplants

- DBD 21 - 65.5% of all GJ HTx versus UK DBD HTx 74.3%
- Scotland DBD 3.85 PMP HTx vs UK DBD 2.4PMP HTx (Scotland 1.6 X higher DBD rate as UK DBD HTx)

Scottish Recipient Status for DBD Hearts

- DBD Super Urgent 6 (28.6%)
- DBD Urgent 11 (52.4%)
- DBD Routine [redacted] (19%)

Scotland DCD Heart Transplants

- DCD 11 (34.5% of all GJ HTx) vs UK DCD HTx 25.7%
- Scotland DCD [redacted] PMP HTx vs UK DCD 0.8 pmp HTx (Scotland DCD HTx 2.5 X higher than the UK DCD HTx)

Recipient Status for DCD Hearts

- DCD Super Urgent [redacted] (9%)
- DCD Urgent [redacted] (45.5%)
- DCD Routine [redacted] (45.5%)

Scotland Compared to Rest of the UK

1. Transplantation rates in Scotland per million population (PMP) is the highest in the UK for the fourth successive year. [redacted] HTx PMP versus UK 2.7 PMP – Scotland HTx rates continue to outperform other centres with [redacted] x HTx rate PMP vs Rest UK centres.

2. GJ proportion of elective patients transplanted – 2023/24 was 25%, which is in line with national figures in the UK and the same percentage as 2023/24 for SNAHFS.

3. Recipient Status
   - Super Urgent Transplant List 7 (21.9%) vs UK Super Urgent Transplant List 26.4%
   - Urgent Transplant List 16 (50%) vs UK Urgent Transplant List 53.2%
   - Routine list 9 (28%) vs UK routine list 20.4%.

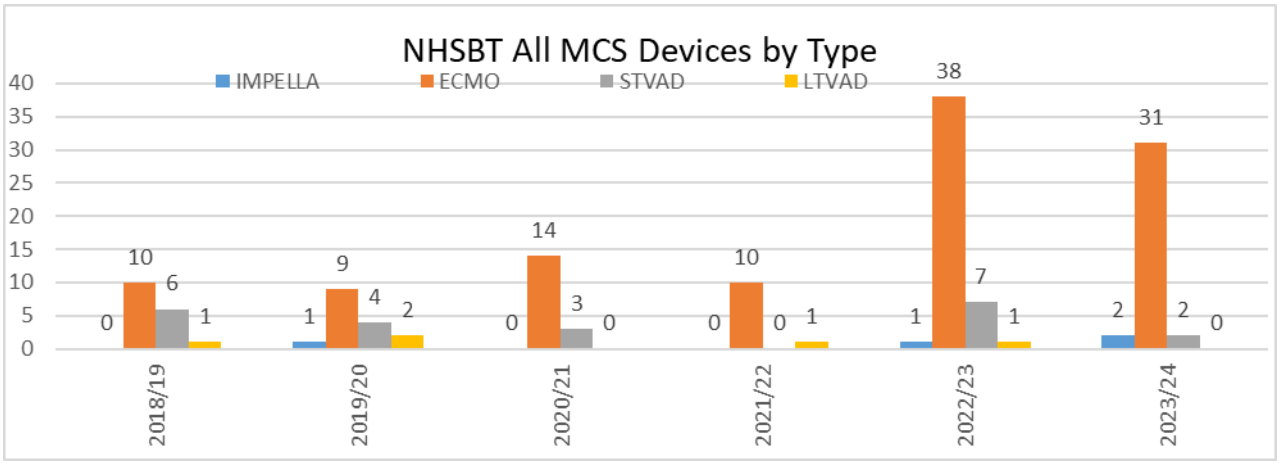
4. Registration rates for heart transplantation (PMP) in Scotland is the highest in the UK for the third successive year.

The number of declined organs 2023/24 was 399 compared with 358 declined in 2022/23.

Summary Scottish Heart Transplantation Activity 2023-2024
• Scotland has a higher HTx rate - 5.9 PMP vs UK 2.7 PMP
• Scotland HTx has a higher DCD HTx rate 35% vs UK 26%
• Scotland has a HTx higher DCD HTx - 2.5 x rate DCD HTx 2 PMP vs UK 0.8 PMP
• Scotland has a HTx higher DBD HTx - 1.6 x rate DBD HTx 3.85 PMP vs UK 2.4 PMP
• Scotland has a HTx 30d Survival that is non-inferior - 93.5% vs UK 92.1% (2018-2023)
• Scotland has less SuperUrgent and Urgent HTx recipients - 71.8% vs UK 79.6%
• Scotland has more Elective HTx recipients - 28% vs UK 20.4%
• Scotland Registration rates for HTx PMP highest in the UK
• HTx continues to outperform the rest of the UK HTx centres over the last 4 years since 2020 with last year 2023/2024 - higher 2.2 x HTx rate PMP vs Rest UK HTx centres.

NHS GJ Mechanical Circulatory Support Activity

Total number of MCS Devices per annum 2018-2024



In 2023/24, 34 patients were supported with 35 devices.

- 26 patients were supported with short term 'bridging' devices including 23 ECMO, 2 Impella and 1 short term VAD.
- 8 patients were supported with 9 'post-transplant' devices for primary graft dysfunction including 8 ECMO and 1 short term VAD.
- No long term VADs were implanted

Of the 26 'bridging' patients, 7 were transplanted and 10 were explanted following recovery. Overall survival to discharge was 62%.

Of the 8 'post-transplant' patients, [redacted] were explanted and [redacted] was re-transplanted. Overall survival to discharge was 57% with [redacted] currently moving towards discharge.

National Perspective

1. For the year 2023/24 Scotland had the highest number of patients receiving MCS as a bridge to transplantation per million population (pmp) in the UK 5.1pmp v 2.6 UK average.
2. Our 30d, 90d and 1 year survival rates remain above the UK median after short-term bridging device implants.

Source: NHSBT Annual Report on Mechanical Circulatory Support related to Heart Transplantation Report for 2022/2023 published November 2023

Figures 3 and 4 shows all MCS patients by Health Board and by number of patients from 20218 to 2024

Fig 3 All MCS Patients by Health Board 2018 to 2024

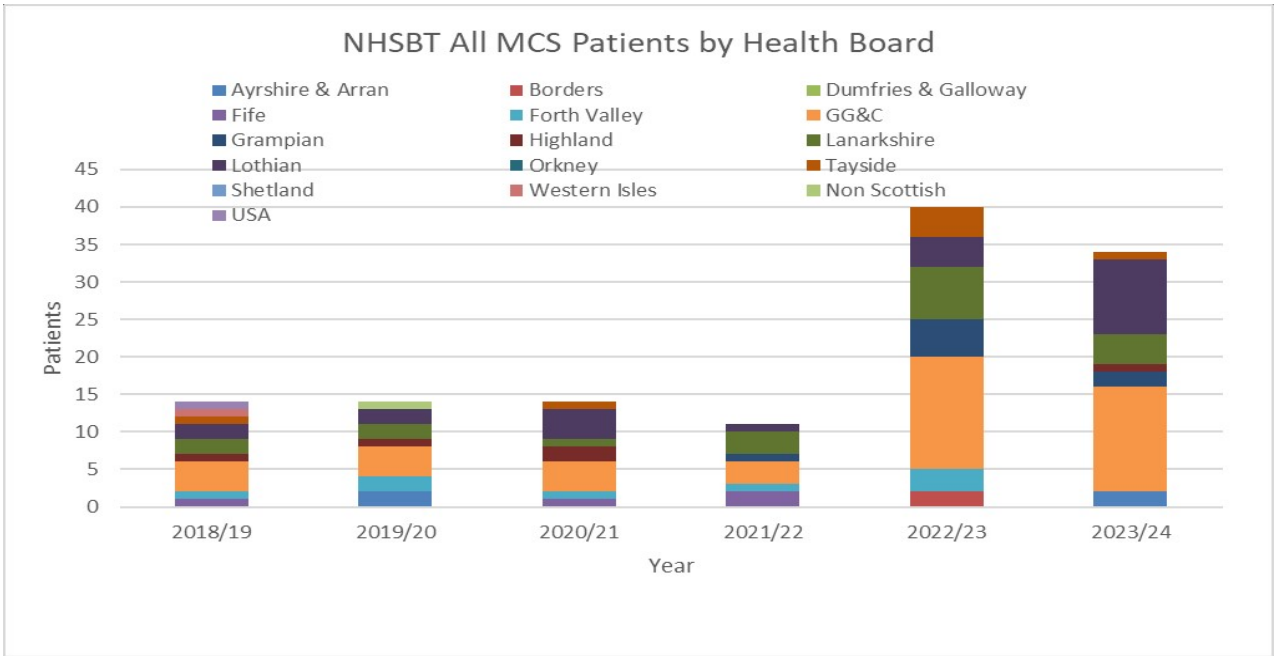


Figure 4: All MCS Patient Numbers by Health Board 2018-2024

Year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Patients	14	14	14	11	42	34
Ayrshire & Arran	0	[redacted]	0	0	0	[redacted]
Borders	0	0	0	0	[redacted]	0
Dumfries & Galloway	0	0	0	0	0	0
Fife	[redacted]	0	[redacted]	[redacted]	0	0
Forth Valley	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	0
GG&C	[redacted]	[redacted]	[redacted]	[redacted]	15	14
Grampian	0	0	0	[redacted]	[redacted]	[redacted]
Highland	[redacted]	[redacted]	[redacted]	0	0	[redacted]
Lanarkshire	[redacted]	[redacted]	[redacted]	[redacted]	7	[redacted]
Lothian	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	10
Orkney	0	0	0	0	0	0
Tayside	[redacted]	0	[redacted]	0	[redacted]	[redacted]
Shetland	0	0	0	0	0	0
Western Isles	[redacted]	0	0	0	0	0
Non Scottish	0	[redacted]	0	0	0	0
USA	[redacted]	0	0	0	0	0

Sustained Increase in Heart Transplant Activity at the GJNUH

The pandemic has changed the landscape in both primary and secondary health care. A recent UK study[1] found that patients waited significantly longer during the pandemic to seek medical treatment for Acute Myocardial Infarction (AMI) compared to before the pandemic, and that pandemic-specific protocols may delay revascularization for NSTEMI patients. These findings resulted in more than a threefold increase from the onset of symptoms to revascularization increasing the risks for future complications such as left ventricular dysfunction, heart failure and cardiovascular death.

In the UK, there have been more excess deaths involving cardiovascular conditions than any other disease groups in this analysis – a total of 96,540 since February 2020, the analysis of data from the Office for Health Improvement and Disparities (OHID). There have been over 500 additional deaths a week involving cardiovascular disease since the beginning of the pandemic. The cause is unclear but may include delay or deferral of care, or differential treatment during hospitalisation because of strains on hospital capacity. We know that Covid has caused direct (Covid leading to new CVD), indirect (reduced treatment and prevention of CVD) and long-term effects (CVD and Long Covid).

There are also concerns of a potential rise in heart problems in the long term linked to Covid-19. Another study[2] found that people with and without pre-existing heart conditions who caught Covid-19 before the vaccine roll-out were 40 per cent more likely to develop cardiovascular disease, and five times more likely to die in the 18 months after infection. People who had experienced severe Covid-19 infection were at even higher risk. Although COVID-19 was initially considered a respiratory disease, it has rapidly become clear that a multiorgan involvement was common. In particular, the heart often represents a target organ, and patients may develop heart failure (HF). Patients recovered from COVID-19 have an increased incidence of cardiovascular disease and heart structural changes. The conclusion of the study (referenced above), is included below.

"Overall, 21,463,173 patients (mean age 54.5 years, 58.7% males) were analysed. Among them, 1,628,424 had confirmed COVID-19 infection while the remaining 19,834,749 represented the controls. The mean length of follow-up was 9.2 months. A random effect model revealed a pooled incidence of post COVID-19 Heart Failure (HF) in 1.1% of cases (95% CI: 0.7–1.6). Moreover, recovered COVID-19 patients showed an increased risk of incident HF (HR: 1.90, 95% CI: 1.54–3.24, p < 0.0001) in the same follow-up period. Meta-regression showed a direct relationship for the risk of incident HF using age (p = 0.001) and hypertension (HT) (p = 0.02) as moderators, while an inverse association was observed when the follow-up length was adopted as moderating variable (p = 0.01). COVID-19 survivors had an additional 90% risk of developing Heart Failure after COVID-19 infection in the long-term period".

- Looking at the longer trends in heart transplantation at the GJNH there has been a sustained increase. For the decade 2001 – 2011 with a mean number of 8.6 heart transplants per year versus the last decade 2011 - 2021 with a mean number of 12.4 heart transplants per year at the GJNH representing a 44% increase in activity. The last 3 years 2020 – 2023 has seen a progressive increase in heart transplants.

- During 2023/24, 72% of Scottish adult heart transplants were on the urgent or super-urgent pathways.

- UK elective heart transplant rate has been 15% over last 10 years with increased Super Urgent / Urgent referral pathways. Over time, the proportion of urgent and super-urgent transplants has increased slightly in the UK; from 68% in 2012/2013 to 72% in 2023/2024, including 28 super-urgent transplants. For the GJNH comparing the last two years - the proportion of urgent and super-urgent transplants have increased; from 58% in 2021/2022 to 72% in 2023/2024, including 11 super-urgent transplants.

[1] **Cardiovascular disease and mortality sequelae of COVID-19 in the UK Biobank** *Heart* 2023;**109:**119-126.

[2] **Increased risk of acute myocardial infarction after COVID-19 recovery: A systematic review and meta-analysis.** Int J Cardiol. 2023 Feb 1; 372: 138–143. doi: 10.1016/j.ijcard.2022.12.032

Proportion of UK heart transplants versus Scotland by Urgency status						
	GJ SUHAS	**UK SUHAS**	**GJ UHAS**	**UK UHAS**	**GJ NUHAS**	**UK NUHAS**
2021-2022	12% ([redacted])	20%	46% (11)	58%	42% (10)	23%
2022-2023	28% (11)	19%	48% (19)	53%	25% (10)	28%
2023-2024	22% (7)	21%	50% 16)	52%	28% (9)	21%
	SUHAS = Super Urgent Heart Allocation System		**UHAS** = Urgent Heart Allocation System		**NUHAS** = Non-Urgent Heart Allocation System	

- The increasing potential of donor DCD heart pool has increased significantly with 35% (11) of the GJNH heart transplants from DCD heart donors in 2023/24 vs 12% ([redacted]) DCD donors in 2021/22.

- GJNH adds to their heart transplant lists approximately 40 patients per year for transplantation with 30 of these categorised on the Super Urgent / Urgent referral pathways, represents an increase in Urgent and an increase in Super Urgent recipient's compared to 2021/2022.

- GJNH proportion of elective patients transplanted – 2023/24 was 28% which is in line with national figures in the UK. This is a reduction from the preceding 2 years with 2020/21 elective heart transplants were 40% and 2021/22 elective heart transplants were 48% with 52% were urgent or super-urgent patients. This is likely to be reflective of the Covid limitations to other transplant centres not having capacity to accept offers for transplantation and the increase in DCD heart transplantation.

- Below are the relative proportions of both recipient aetiology and urgency status. This clearly shows an increase in the Ischaemic Cardiomyopathy (ICM) cohort in the Super Urgent listing which is reflective of the increased delayed / late presentation post MI patients presenting with end stage heart failure as mentioned earlier as a consequence of the post pandemic complications.

UK Heart Transplantation versus Scotland by Recipient Aetiology 2023/24		
HTx Recipient Diagnosis	**GJNH HTx**	**UK HTx**
Dilated Cardiomyopathy - DCM	**57.5%**	**70%**
Ischaemic Cardiomyopathy - ICM	**35%**	**21%**
Other	**7.5%**	**9%**

Scotland Heart Transplantation by Recipient Aetiology and Urgency status 2023/2024			
HTx Recipient Diagnosis	**GJ SUHAS**	**GJ UHAS**	**GJ NUHAS**
Dilated Cardiomyopathy - DCM	**22%**	**56.5%**	**22%**
Ischaemic Cardiomyopathy - ICM	**43%**	**28.5%**	**28.5%**
Other	**0%**	**67%**	**33%**

Registration for heart transplantation in Scotland has increased significantly with 6.2 PMP registered versus 4.2 PMP in the rest of the UK. This has now led to a change in the NHSBT UK heart allocation zones in favour of the GJNH due to the increased heart transplantation registration. An increase in the GJNH heart allocation zone now includes the Northwest of England and N. Ireland. This has the opportunity of additional 40 donor heart offers over a 3-year period - to be offered 1st to the GJNH for their recipients which could sustain an extra 13 heart transplants per year going forward.

Ongoing strategies are being progressed for increasing donor organ utilisation with a commissioned donor optimisation programme projecting a target increase in donor hearts of 35% over the next 5 years. These strategies have the potential to increase heart transplantation over the next 5 years, which could represent the Scottish target number of heart transplants sustainably at 30 – 40 per year at the GJNH. The points below summarise the sustained increase in heart transplantation in Scotland.

- HTx has decreased in the rest of the UK with a dip 2020/21 during COVID pandemic and now increasing.
- HTx has increased steadily in Scotland despite COVID pandemic
- Historically, GJ underperformed with overall Advanced Heart Failure Procedures (AHF-P) = LTLVAD $_{BTT}$ + HT$_x$ compared to the rest of the UK. Over the last two years this has increased and is comparable to 2017/18 Rest of UK figures of **>4 AHF- P per million population.**
- GJNH now matching the rest of the UK centres for overall Advanced Heart Failure Procedures with a particular focus on the heart transplantation pathway with minimal LTLVAD usage as a bridge to transplant strategy.
- This is both an overall cost-effective strategy with clinically significant better short- and long-term transplant mortality and morbidity.[1]

[1]***NHSBT 2016-2020 UK HTx 4-year data*** *LTLVAD bridged to HTx 1Yr Mortality 44% p<0.0001*
All other Urgent HTx 1Yr Mortality 12% p<0.0001. 1yr Mortality Odds Ratio 3.6 - LTLVAD bridged to Urgent HTx
Overall Odds Ratio of Mortality 4.05 for LTLVAD bridged to Urgent HTx

2.2 Retrieval Activity

Figure 6. Summary of Retrieval Activity

Declined offers	399
Offers Accepted & Used	32
Offers Accepted But Abandoned on Retrieval	12
Offers Accepted But Abandoned Before Retrieval	6
Offers Accepted But Withdrawn Before Retrieval	8
Retrievals attended by GJNH Team	64

Imported Heart	23
Retained Heart	9

The number of retrievals attended by the team was 64. A further increase in retrievals from previous 2 years. Due to local geography, the GJUNH retrieval team do attend fewer retrievals than the other centres and this has been acknowledged by NHSBT. The team therefore travels longer distances with extended travel times. The relatively low number of retrievals can provide challenges with retention and training of team members, ensuring suitable exposure. In particular, this has resulted in prolonged training of retrieval fellows (takes up to 1 year) with the service continuing to be consultant led. However, recruitment and retention of scrub nurses and retrieval practitioners to the rota is continuing to work well and team members are enthusiastic and committed to the retrieval programme.

There were 35 DCD Heart and Lung retrievals carried out by the GJNUH retrieval team in 2023/24 compared with 19 in 2022/23, 20 DCD hearts using the Organ Care System, 7 were DCD lungs and 8 non proceeding DCD donors.
Of note, GJNUH team attended 3 DCD retrievals when not on call.

Organ Decline Rates

For 2023/24, Glasgow decline rate compared favourably and continues to be below the national average. Current organ decline rates are reflective of a number of heterogeneous factors - discussed below.
All organs accepted and declined are reviewed weekly at the MDT forum and the fate of each organ is explored. Any learning is shared with the transplant team.

Approximately only one-third of the heart donors offered in the UK are accepted for heart transplantation with the remaining organs either declined or used for research or retrieval of heart valves. With little, and often controversial and inconsistent data to guide the process, transplant surgeons and physicians rely on a combination of prior experience, assessment data, donor and recipient risk factors, as well as negotiating the balancing act associated with accepting a donor organ. That is, determining the risk of the donor and matching it with the acuity and risk of the recipient and potential barriers to expeditious transplant with the goal of achieving excellent 1-year and long-term survival.

Donor attributes – risk and quality - are only one side of a complex algorithm. Ultimately, clinicians choose the right donor for the right recipient. There has been an increase in organ refusal in part related to the aging of donors and an increase in donor comorbidities.

Donor selection impacts transplant outcome and generally, each transplant centre develops criteria for acceptable donor organs based on local surgical experience and preferences. By consensus, through evidence based medicine and International Society for Heart and Lung Transplantation (ISHLT), guidelines the following criteria were used as contraindications to donor acceptance and are characterised as high risk donors including:

- Donor age ≥50 years,
- Physical distance and the concomitant organ cold ischemic time (CiT)
- Estimated down time ≥30 minutes or cardiac arrest
- Left ventricular ejection fraction <50%,
- Left ventricular hypertrophy defined as more than 1.4cm or regional wall abnormalities on echocardiogram
- Demonstration of coronary artery disease in any major artery
- Carbon monoxide poisoning
- Use of dopamine or dobutamine above 10 mcg/kg/min
- Elevated troponin levels
- Combinations of donor risk factors such as the presence of LVH in the setting of a potential long ischemic time will result in a centre declining an offer.

Additional exclusion factors include clear infectious issues such as positive blood cultures, unknown organism meningitis, hepatitis C virus (HCV) + donor, or evidence of malignancy.

Transplant centres have also become more conservative in their donor acceptance practices due to the widespread availability of mechanical assist devices, which provide excellent bridges to transplant and thus enable less risk taking. In addition, the use of LVADs has complicated transplant surgery with more frequent bleeding, need for transfusions and vasoplegia, all of which place additional burdens on the allograft.

More specific for the Scottish service we have three main areas that contribute to donor heart offer declines:

- No available echocardiography (ECHO) on the donor heart
- Donor age
- Donor organ cold ischemic time (CIT).

Other important determinants:

- Donor clinical status
- Recipient clinical status
- Theatre and Intensive Care Capacity
- Recipient Antibody status
- Donor Recipient size mismatch

The decline in the availability of NORS Retrieval teams performing routine echocardiography (ECHO) at the donor hospitals as it is not a mandatory investigatory tool for NORS teams and the overall lack of ECHO especially out of hours at donor hospitals, has led to the immediate decline of all donor heart offers without a baseline ECHO assessment. This is an ongoing problem that CTAG and NHSBT are fully aware.

In the 2018 report from the International Society for Heart and Lung Transplantation (ISHLT), the median heart-donor age was 32 years (5th to 95th percentile, 17–57 years) with the UK having a significant higher median heart-donor age of 48 years. ISHLT registry data revealed that older donor age was a significant predictor of death at one year and 5 years after heart transplantation and the correlation between older donor age and higher recipient mortality rates remained significant after multivariate analysis. Older donor age has also been associated with a higher incidence of cardiac allograft vasculopathy (CAV).

Importantly, audit data for the period 2010-15, identified cold ischaemic time (CiT) as the major factor for poor outcomes (primary graft dysfunction). In consequence, all hearts are double vetted (transplant surgeon and cardiologist or another transplant surgeon) and the team would not accept hearts if the CiT was to exceed 4 hours or up 4 hours and 30 minutes (only if the donor age is under 30 years old and a physiologically good assessment by the NORS team).

This approach has resulted in a significant fall in the mortality rate following transplantation reflected in the improved survival rates. Also, a fall in the acceptance rate of organs, which was highlighted as part of the Major Review. The ISHLT median allograft cold ischaemic time was 3.2 hours in the era 2009-2016.

Results have indicated the important interaction between cold ischemic time (CiT) and donor age: CITs <3.5 hr were associated with superior survival rates, and hearts from younger donors better tolerated longer CiTs. 5-year survival rates at short CiTs were similar regardless of allograft age; however, at CiTs beyond 120 minutes, the negative impact of older age was apparent. United Network for Organ Sharing database for recipient survival rates after heart transplantation reported a significant effect of CIT that depended on donor age, with greater tolerance for prolonged CiTs when grafts came from younger donors under 18 years of age.

The results of the current study confirm an important relationship between donor age, CiT, and outcomes, and implies that older hearts are more viable at CiT <120 minutes. Long-term graft survival in heart transplantation patients with older donor allografts improve when cold ischemic times are shorter.

Importantly these definitions need explanation to fully understand their relevance to heart transplantation. The internationally agreed definition of donor heart - **Cold Ischaemic Time** - CiT (otherwise known as is defined as allograft ischaemic time) is the time interval from application of donor aortic cross-clamp to the release of the recipient cross-clamp and reperfusion of the newly implanted donor heart.

Cold Ischaemic Time - CiT (otherwise known as is defined as allograft ischaemic time) is made up of three key component parts:

A. Donor aortic cross-clamp + donor retrieval + packed in ice (mean time 30 minutes)
B. Travel time from donor theatre to recipient hospital (overall travel time)
C. Release of the recipient cross-clamp and reperfusion of the newly implanted donor heart

The median (corrected since 2022) CiT for the GJ is 3 hours and 45 minutes – 3 hours and 55 minutes.

The effect of ischaemic time on survival after heart transplantation is dependent on donor age, with greater tolerance for prolonged ischaemic times among grafts from younger donors as detailed above. Both donor age and anticipated ischaemic time must be considered when assessing a potential donor. The heart transplant community uses the landmark - Banner NR, et al. 2008 UK CTAG study as a guide: they investigated the temporal trend in ischaemic time for heart transplantation in the United Kingdom and to determine the relationship between ischaemia time and postoperative mortality. Patient survival at 30 days decreased with longer total ischaemia times and the effect was most noticeable beyond 190 minutes. The 30-day survival rate decreased from 91% (95% confidence interval [CI]: 85–95) to 84% (95% CI: 76 – 90) over the study period, and evidence of a linear trend over time.

Their reference points were 120 minutes CIT and 90 minutes warm ischaemic time (WIT) with total ischaemia time 210 minutes (3 hours and 30 minutes).

ISHLT data has also shown significant correlation between donor age and anticipated ischaemic time. Independent hazard ratio for 1-year mortality according to allograft ischaemic time as a continuous variable and different age donor age categories clearly show that:

- with donor age = 24 years old the hazard ratio of 1.0 for 1-year mortality equates to a total ischaemia time of 240 minutes (4 hours)
- with donor age = 36 years old the hazard ratio of 1.0 for 1-year mortality equates to a total ischaemia time of 150 minutes (2.5 hours
- with donor age = 47 years old the hazard ratio of 1.0 for 1-year mortality equates to a total ischaemia time of 120 minutes (2 hours)

Transplant programmes in the UK are hesitant to compound risks and compromise surgical outcomes and therefore are reluctant to use a higher risk donor allograft for a higher risk recipient. With the increased intense scrutiny of transplant programs by NHSBT making transplant programs more risk averse, the individual decision to use or discard a donor organ is one of the most challenging aspects of heart transplantation. It requires balancing the donor risks against the exigencies of the recipient for the best possible outcomes for our recipients.

The team routinely analyses the monthly declined donor heart offers data with full explanation and reasons for decline for any learning lessons. This approach has resulted in a significant fall in the mortality rate following transplantation which reflects the GJNUH MDT acceptance criteria with inherent longer CiT. Additionally, NHSGJ is part of the NHSBT organ decline subgroup in which all 6 heart transplant centres review and debrief donor heart declines by other centres but that are subsequently used by another heart transplant centre for any learning points on these particular cases.

2.3 Clinic Activity

Figures 8 and 9 demonstrate outpatient activity against the SLA and by Health Board for the last 7 years. Overall, outpatient activity has continued to increase through 2023/24 with transplant follow up appointments accounting for this increase. The number of transplant follow up appointments has more than doubled since 2017/18 and will continue to grow as the number of transplant survivors increases

Figure 8: Outpatient activity against the SLA (appointments attended)

	SLA	23/24	22/23	21/22	20/21	19/20	18/19	17/18
New OP AHF	65	64	71	55	26	43	36	41
Return OP AHF	490	516	536	444	298	398	431	468
Transplant F/U	1170	1150	1075	853	465	608	545	555

Figure 9: Attended AHF outpatient clinics over last 4 years by health board

Attended	2019/20			2020/21			2021/22			2022/23			2023/24		
	New	Return	Total	New	Return	Total	New	Return	Total	New	Return	Total	New	Return	Total
A+A	10	43	53	[redacted]	26	28	[redacted]	53	57	[redacted]	50	55	[redacted]	49	52
Borders	[redacted]	14	17	[redacted]	7	8	[redacted]	17	20	[redacted]	10	14	[redacted]	14	19
D+G	[redacted]	11	12	0	7	7	0	8	8	0	6	6	[redacted]	8	10
Fife	0	26	26	[redacted]	17	20	[redacted]	24	28	[redacted]	23	27	[redacted]	21	25
Forth Valley	[redacted]	21	26	[redacted]	13	16	[redacted]	26	31	[redacted]	33	38	[redacted]	22	24
Grampian	[redacted]	17	18	[redacted]	11	12	6	18	24	7	44	51	[redacted]	24	28
GGC	9	108	117	8	90	98	17	125	142	16	172	188	21	188	209
Highland	0	19	19	[redacted]	12	13	[redacted]	17	20	[redacted]	26	31	[redacted]	16	20
Lanarkshire	[redacted]	54	57	[redacted]	40	42	11	66	77	15	108	123	9	125	134
Lothian	6	58	64	[redacted]	54	57	[redacted]	50	54	[redacted]	38	42	6	22	28
Orkney	0	0	0	[redacted]	[redacted]	[redacted]	0	[redacted]	[redacted]	0	[redacted]	[redacted]	0	0	0
Sheltand	0	[redacted]	[redacted]	0	0	0	0	0	0	0	0	0	0	0	0
Tayside	[redacted]	23	27	[redacted]	19	20	[redacted]	36	38	[redacted]	22	27	[redacted]	25	25
Western Isles	[redacted]	[redacted]	[redacted]	0	[redacted]	[redacted]	0	[redacted]	[redacted]	0	[redacted]	[redacted]	[redacted]	0	0
Non Scottish	0	[redacted]	[redacted]	0	0	0	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
TOTAL	43	398	441	26	298	324	60	446	506	71	536	607	64	516	580

Figure 10: Number of attended transplant appointments over 4 years by health board

Ayrshire and Arran	54	27	55	82	75
	[redacted]				
Dumfries and Galloway	13	10	28	33	29
Forth Valley	37	27	47	47	66
Greater Glasgow and Clyde	178	148	256	347	355
Lanarkshire	113	71	162	203	193
Orkney	0	7	0	11	10
Western Isles	0	0	0	0	0
	[redacted]	0	[redacted]	11	6
TOTAL	[redacted]	**465**	[redacted]	**1075**	**1150**

Diagnostic procedures continue to be carried out on the NSD ward. The numbers are presented in Figures 111 and Figure 12.

Figure 11 POD Procedures 2019 to 2024

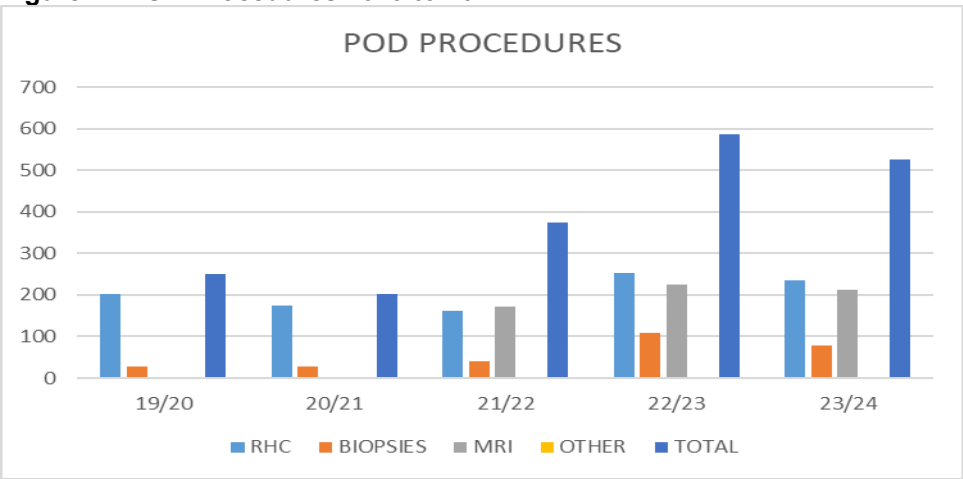


Figure 12 POD Procedures – Annual Comparison 2018-2024

POD PROCEDURES	18/19	19/20	20/21	21/22	22/23	23/24
RHC	157	203	175	163	252	236
BIOPSIES	36	27	27	40	109	79
MRI				172	225	212
OTHER	9					
TOTAL	**202**	**251**	**202**	**375**	**586**	**527**

2.4 Inpatient Activity

An increase in patient activity overall has been seen through 2023/24, routine admissions, transplant readmissions and new post transplant admission all increased with a reduction in acute transfer admissions. This is as expected, given amount of new transplant and MCS activity seen in year.

Total bed days for routine patients continued to reduce to 469– this was 588 in 2022/23 and 803 in 2021/22 demonstrating an increase in efficiency and reduced average length of stay for this cohort of patients.

Of note, number of “boarding” patients has reduced in 2023/24 to 730 days (from 777 in 2022/23) with the opening of the new NSD pod in November 2023. A total of 285 bed days have been used in NSD2.

Looking specifically at the transplant readmission category, of the 48 total admissions recorded, 12 patients had 2 admits, 7 had 3 admits and [redacted] had a total of 4 admits.

Figure 13a below shows the 2023/24 breakdown of total bed days and total patient numbers for routine, acute (transfer), new transplant and transplant readmissions as NSD, NSD2, ICU, hotel and boarding categories, Figure 13b demonstrates a 3 year comparison of total bed days and admissions and finally, Figure 13c outlines the agreed definitions for the different categories.

Figure 13a: Breakdown of total bed days & patient numbers 2023/24 -

Admission	Total Bed Days (including hotel)	Total Admissions
Routine	469	168
Transfer	1507	105
TX Re-admit	751	48
New Post-TX	1909	95
Total	**4636**	**416**
Routine		168
NSD	241	
NSD2	25	
ICU	22	
Boarder	75	
Hotel	106	
Acute (transfer)		105
NSD	955	
NSD2	68	
ICU	275	
Boarder	200	
Hotel	9	
TX Re-admit		48
NSD	393	
NSD2	125	
ICU	78	
Boarder	155	
Hotel	0	
New Post-TX		95
NSD	970	
NSD2	67	
ICU	568	
Boarder	300	
Hotel	4	

Figure 13b: Yearly comparison of total bed days & admissions

	2021-22	2022-23	2023-24		2021-22	2022-23	2023-24
Admission	**Total Bed Days (including hotel)**	**Total Bed Days (including hotel)**	**Total Bed Days (including hotel)**		**Total Admissions**	**Total Admissions**	**Total Admissions**
Routine	803	588	469		69	132	168
Transfer	1048	2029	1507		61	121	105
TX Re-admit	648	956	751		57	65	48
New Post-TX	716	1186	1909		24	40	95
Total	**3215**	**4759**	**4636**		**211**	**372**	**416**

Figure 13c – Definitions for Categories

1	Routine AHF Assessment (routine in patient	Routine assessment patients (not including previously transplanted patients)
		Patients in for elective procedures (who stay at least 1 night)
2	Acute AHF	Transfers from clinic
		Inpatient transfers from other wards
		Inpatient transfers from other hospitals
		Patients who present acutely (AHF-related collapse, MI, etc)
		Patients who have been placed on transplant waiting list, Patients who are admitted to ward pending Transplant
3	Post- transplant	Immediate post-transplant patients
		Patient on return from TX who transfers to a different ward and then back to NSD under the same admission episode
4	Transplant readmission	Transplanted patients who need re-admitted either from home, clinic or another hospital either acutely or routinely at any point after transplant.

3. Performance and Clinical Outcomes

Summary of Performance against 2023/24 Service Level Agreement (SLA)

Outpatients	SLA	2023-24
New appointments AHF Clinic: includes new outpatient assessment	65	64
Return appointments: includes AHF outpatients	490	516
In Patients		
Emergency assessment admissions: includes new emergency inpatients and outpatients known to service (e.g. reviewed at O/Pt Clinic)	105	105
Routine inpatient assessment - patients being worked up for transplant - patient that needs e.g. biopsy	100	168
Post Heart transplant follow up appointments	1170	1150
MCS		
Short term ventricular assist devices	[redacted]	[redacted]
Impella devices	[redacted]	[redacted]
Extra corporeal membrane oxygenation as bridge to cardiac transplant	35	31
Long term ventricular assist devices as bridge to cardiac transplant	[redacted]	0
Transplant		
Cardiac transplants	30-35	32

3.1 Equitable

3.1.1 Referrals to the Service

The total number of referrals reduced in 2023/24 following significant increase in previous 2 years
Figure 14 shows the total number of referrals including inpatient and outpatient referrals to the service.

Figure 14: Total number of referrals to SNAHFS – Annual Comparison 2015-2024

Total New Referrals by Financial Year	Total	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Ayrshire and Arran	82	11	10	11	9	16	[redacted]	8	9	[redacted]
Borders	34	[redacted]							9	
Dumfries and Galloway	37	10	7	6	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Fife	48	8	[redacted]				8	[redacted]	10	
Forth Valley	67	[redacted]	8	[redacted]	14	8	[redacted]	6	17	
Grampian	77	6	12	8	10	6	8	9	12	6
Greater Glasgow and Clyde	355	52	65	42	23	29	25	39	49	31
GJNH	13					[redacted]	0	6	[redacted]	[redacted]
Highland	50	6	7	[redacted]				7	12	
Lanarkshire	129	13	14	16	6	9	[redacted]	24	28	14
Lothian	102	15	3	12	[redacted]	20	9	15	11	12
Orkney	[redacted]	0	0	0	0	0	[redacted]	0	0	0
Shetland	[redacted]	0	0	0	1	0	0	0	0	0
Tayside	63	6	9	8	8	9	[redacted]	6	7	[redacted]
Western Isles	9	[redacted]					0	0	[redacted]	
Non Scottish	10	0	[redacted]				0	0		
TOTAL	1078	135	146	122	91	117	75	129	168	95

3.1.2 Diagnostic Assessment

The diagnostic investigations by Health Board are detailed in Figure 15 and Figure 16. Fig 15 details echo/CPET investigations as a total number. This is a combination of both AHF and post transplant, recorded on Trakcare (source: Trakcare Report Manager). This activity is directly related to the transplant activity as it is part of the assessment and subsequent follow up post transplant.

Figure 15: Diagnostic investigations by Health Board

	2022/23	2022/23	2022/23		2023/24	2023/24	2023/24	
POD PROCEDURES	MRI	RHC	BIOPSIES	**TOTAL**	MRI	RHC	BIOPSIES	**TOTAL**
Ayrshire and Arran	27	16	[redacted]	**47**	13	14	8	**35**
Borders	8	[redacted]	[redacted]	**16**	6	[redacted]	[redacted]	**12**
Dumfries and Galloway	[redacted]	[redacted]	0	**8**	8	11	[redacted]	**23**
Fife	20	19	0	**39**	16	7	[redacted]	**24**
Forth Valley	14	14	9	**37**	16	10	[redacted]	**28**
Grampian	9	11	[redacted]	**25**	[redacted]	23	[redacted]	**32**
Greater Glasgow and Clyde	51	95	40	**186**	62	74	21	**157**
Highland	16	17	17	**50**	16	12	14	**42**
Lanarkshire	39	47	17	**103**	34	28	9	**71**
Lothian	13	16	7	**36**	13	31	11	**55**
Orkney	0	[redacted]	[redacted]	[redacted]	0	0	0	**0**
Tayside	18	8	[redacted]	**30**	19	15	[redacted]	**37**
Western Isles	[redacted]	0	0	[redacted]	[redacted]	[redacted]	0	[redacted]
Non Scottish	[redacted]	0	0	[redacted]	[redacted]	6	0	**7**
TOTAL	**225**	**252**	**109**	**586**	**212**	**236**	**79**	**527**

Figure 16: Echo/CPET tests undertaken as a total – comparison 2021/23 & 2022/23

	2021/22	**2022/23**	**2023/24**
ECHO	899	946	845
Clinic ECHOs	Not collected	247	223
CPET	55	45	72

There is not sufficient capacity to meet demand - investment is required to expand both ECHO and CPET services to meet the increased demand associated with the higher volume of transplant patients and this was included within the business case. There is a national shortage of Echocardiographers and to date we have provided inhouse training to achieve the specialised skills required. There is a lead in time with this, and the ambition is to continue to adopt this successful model and to increase the pool of staff and deliver the capacity required to meet the growing needs of the SNAHFS.

CPET activity appears not to have increased in line with the overall activity as might be expected. As well as the demand outstripping capacity, another contributing factor is thought to be that 75% pts non elective pathway – patients on the urgent/super urgent pathway are not routinely having a CPET pre transplant.

3.2.1 DNA Rate

Figure 17 demonstrates a decrease in DNA rate transplant follow up clinics. There has been an increase in DNA rate for new and return AHF referrals. For AHF new referral DNAs, this represents 4 patients.

Figure 17: DNA rate

	AHF			Transplant F/U
	New	Review	Total	
2016/17	0%	11.4%	10.6%	7.5%
2017/18	0%	9.6%	8.8%	6.9%
2018/19	12.2% (5 pts)	7.9%	8.3%	4%
2019/20	10.4%	11.2%	11.1%	5.3%
2020/21	0%	8.0%	8.0%	3.9%
2021/22	1.8%	8.9%	6.4%	3.6%
2022/23	2.3%	2.4%	4.7%	3.1%
2023/24	5.7%	7.6%	7.4%	2.9%

3.3.1 Waiting time to first outpatient appointment

The outpatient clinics are organised flexibly to minimise delays to appointment. Patients are generally seen within 6 weeks of referral and earlier if considered urgent.

3.3.2 Transplant Waiting List

Figure 18: Snapshot of patients on the Transplant Waiting List at the end of each financial year.

	Mar 2017	Mar 2018	Mar 2019	Mar 2020	Mar 2021	Mar 2022	Mar 2023	Mar 2024
No. Patients on Super Urgent List	0	0	0	0	0	0	0	0
No. Patients on Urgent List	0	[redacted]	[redacted]	[redacted]	0	[redacted]	[redacted]	[redacted]
No. Patients on Routine List	13	22	22	17	11	14	12	12
Total No. Patients on Active List	13	22	22	20	11	13	13	16
No. Patients Suspended	0	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

3.4 Effectiveness

Figure 19 describes GJUNH Heart Transplantation 5 Year Results: 04/2018 - 03/2022 benchmarked to the UK Heart Transplantation 04/2017 - 03/2022

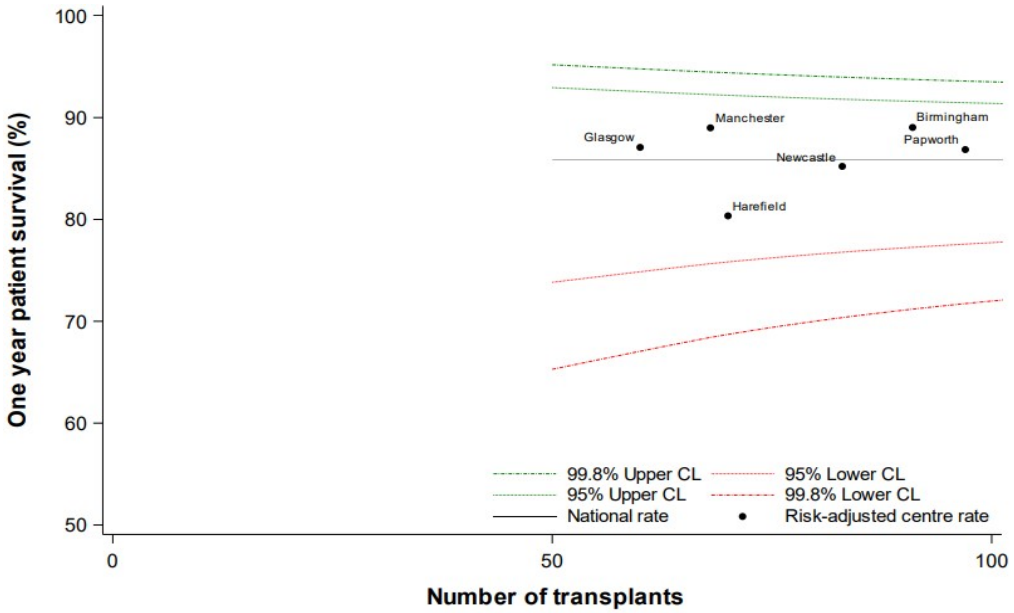
Figure 19: GJNH Heart Transplantation 5 Year Data

GJUNH Heart Transplantation 5 Year Data: 04/2017 - 03/2024					
Cohort	HTx	HTx Mortality			
		30d	90d	1yr	5yr
UK - 04/2017 - 03/2021*	**500**	**8.6%**	**11.8%**	**15.5%**	**27.7%**
GJUNH - 04/2019 - 03/2024	**127**	**3.9% (5)**	**6.3% (8)**	**7.1% (9)**	**12% (15)**
GJUNH - 04/2017 - 03/2021	**75**	**8.0% (4)**	**10.0% (6)**	**10.0% (6)**	**22.6% (11)**
GJUNH - 04/2016 - 03/2021	**45**	8.9% (5)	11.1% (5)	11.1% (5)	20.7% (11)
GJUNH - 04/2014 - 03/2019	**55**	16.3% (9)	18.2% (10)	20% (11)	27.3% (15)
GJUNH - 04/2013 - 03/2018	**65**	12.3% (8)	13.8% (9)	18.4% (12)	21.0% (14)
GJUNH - 04/2017 - 03/2018	**11**	0% (0)	9.1% (1)	9.1% (1)	18.0% (2)
GJUNH - 04/2018 - 03/2019	**9**	11% (1)	22% (2)	22% (2)	22.0% (2)
GJUNH - 04/2019 - 03/2020	**11**	9.1% (1)	9.1% (1)	9.1% (1)	18.0% (2)
GJUNH - 04/2020 - 03/2021	**20**	5.0% (1)	5.0% (1)	10.0% (2)	
GJUNH - 04/2021 - 03/2022	**24**	4.0% (1)	4.0% (1)	8.3% (2)	
GJUNH - 04/2022 - 03/2023	**40**	2.5% (1)	5.0% (2)	7.5% (3)	
GJUNH - 04/2023 - 03/2024	**32**	**6.25% (2)**	**6.25% (2)**	**6.25% (2)**	

- **UK Heart Transplant 30-day mortality was 8.6% vs GJUNH 6.25%**
- **UK Heart Transplant 90-day mortality was 11.7% vs GJUNH 6.25%**
- **UK Heart Transplant 1-year mortality was 15.5% vs GJUNH 6.25%**
- **UK Heart Transplant 5-year mortality was 27.7% vs GJUNH 20.7%**
- **Demonstrates that GJUNH outcomes over the subsequent 5 years are better than overall UK results with 30d/90d/1yr and 5yr survival post heart transplantation**
- **Overall 30d survival over the last five years – Scotland HTx was 93.5% versus UK 92.1% (2018-2023)**

Figure 20 below, taken from the NHSBT Annual Report Cardiothoracic Organ Transplantation Sept 2023 demonstrates favourable risk adjusted one year patient survival rate for adult DBD heart transplants

Figure 20: Risk adjusted one year patient survival rates for adult DBD heart transplants by centre, 1 April 2018 to 31 March 2022



Clinical Indicators Review/Audit Meeting

A transplant audit meeting with the multidisciplinary team takes place weekly. The meeting routinely reviews all organ offers and discusses the reasons for decline of offers during the previous week. The transplant coordinators present all offers at the weekly meeting, which allows the wider team to review the offered/accepted as well as fate of offered organs. In addition, there is a shorter weekly team meeting held to provide opportunity for case discussion

Monthly activity and year to date activity, compared with previous years is routinely reviewed in the business meeting. The Clinical Governance meeting reviews cases of early and late post-transplant mortality and includes presentation of a research topic or audit undertaken within the transplant programme.
Attendance registers are kept for the MDT and departmental meetings and all members of the transplant team are invited to attend.

Every patient requiring MCS is discussed at a debrief meeting regardless of outcome organised by the Extra Corpeal Life Support (ECLS) lead. This is done with the extended MDT including anaesthetic, intensive care as well as surgical, transplant cardiology and nursing staff as a minimum. A monthly MCS meeting is also held, providing a further opportunity to discuss activity, outcomes, strategy and education requirements.

There are also quarterly joint donor review meetings held with the SNODs and the NORS team via MS Teams to share experience.

A fortnightly NORS MDT audit meeting reviews all retrieval activity and a fortnightly operational group meets with Operational Manager and clinical nursing/medical teams.

Cardiothoracic Advisory Group of NHS Blood and Transplant (NHSBT)

The SNAHFS participates in the NHSBT coordinated audit of cardiothoracic transplantation in the UK. Monthly statistical reports of 30 day mortality are received. 30y day, 90 day, 1 year and 5 year mortality figures are published annually. Likewise, NHSBT sends weekly centre specific report on cardiothoracic offers, which are reviewed at the weekly SNAHFS local donor offers' meeting. Dr Dalzell and Mr Curry represent SNAHFS on the CTAG Hearts group. Ms Lynne Ayton represents the Transplant Managers Forum on CTAG.

SNAHFS is represented by various MDT members at the following national meetings: CTAG-Hearts Group, Heart Allocation Scheme, NHSBT annual MCS meeting, CTAG-patient group, National Retrieval meeting and the Scottish Donation and Transplant Group. Likewise, we have membership in the DCD heart transplantation working group.

3.5 Safe

NSD currently report data on 5 process measures. Owing to sustained reliability (over a period of years), the NHS Golden Jubilee implemented a 'stepdown' process for many of the monthly process measures. The Senior Nursing team have reviewed this and are keen to regain assurance therefore some measures have be stepped up again in 2023/24. See figures 20, 21 and 22 below)

= Above target 90% reliability target for process performance
= Measure Stepped down
↑ increased reliability in comparison to 2022-23, ≈ reliability at same level as 2022-2023

Figure 21: Safety Bundles

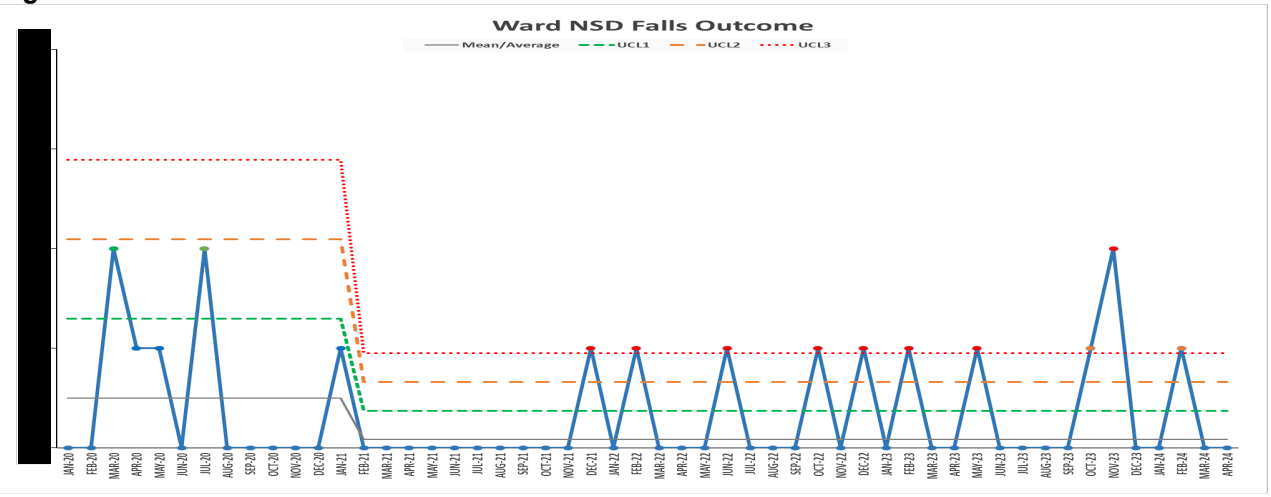
	Safety Briefs	CVC Maintenance	CVC insertion	PVC Maintenance	Falls care bundles FP1	Falls care bundles FP2	Pressure Ulcer care bundles	VTE prophylaxis	Medicines Reconciliation	PICC maintenance
2022 – 2023 median	Stepped down since 2020	100%	95%	100%	Restarted Jan'24 – no data as yet	Restarted Jan'24 – no data as yet	Not restarted	Stepped down since 2020	100%	100%
Stepdown (SD) or Maintained (M)	SD	M	M	M			SD	SD	M	M
2023-24 median	SD	100%≈	100%↑	100%↑	No Data	No Data	SD	SD	100%≈	100%≈

Pressure Ulcer Outcome

NSD had no reportable pressure ulcers in the timeframe reported (From 2023/2024). There was [redacted] reported 2022/23, [redacted] reported 2021/22.

NSD have reported [redacted] inpatient falls for the timeframe of 2023/2024. [redacted] of these falls resulted in minor harm (minor cut to the back of the head).

Figure 22: Falls in NSD



Quality Assurance – Reporting compliance

The Senior Charge Nurse continues to have overarching responsibility to ensure sustained compliance with safety essentials; nursing staff within individual areas have key roles to audit compliance with the safety essentials relevant to their areas. Over 2023/2024 there has been continued focus on audit compliance with increased support locally from Clinical Governance to ensure and sustain improvement within the ward teams. Audit compliance has remained consistent within NSD despite the integration of a large number of new nurses to the team. In addition to the audits above, NSD also collects information on Omitted Medications to minimise potential harm from drug errors. This has >95% compliance in 2023/24.

The CNM and the Infection Control Nurse Manager carry out HEI peer reviews to assess compliance with SPSP and infection Control standards.

The SCN continues to support development of the Senior Nursing staff within NSD to ensure robust Governance and learning needs are met within the Team. This has been aided by the appointment of another Band 6 Charge Nurse from within the team. All Registered Nurses have undertaken IRMER training to meet standards of ionising radiation safety in the NSD procedure room. Safe practice with this is audited to ensure compliance with regulatory legislation.

Healthcare Associated Infection (HAI) and Prevention and Control of Infection

Robust prevention and control of infection measures are in place within the GJUNH, which apply to each point in the patient pathway. Each area that the patient may visit is subject to regular environmental audits and compliance monitoring to establish compliance with standard infection control precautions and transmission based precautions.

The Senior Charge Nurses throughout the organisation have a specific focus within their remit to ensure ongoing compliance and attention to measures to combat HAI are in place, audited and acted upon.

CNM Peer Reviews continue to quality assure the SCN Standard Infection Control Precautions compliance monitoring process.

Staphylococcus aureus bacteraemia (SAB)

Historically SAB rates are very low within the Board despite the vulnerability of patients and essential device use. The Prevention and Control of Infection Team continue to work closely with the clinical teams, Clinical Governance Department (CGD) and clinical educators to gain insight into the sources of SAB acquisition and associated learning. Each SAB is subject to an enhanced surveillance process involving the PCIT, SCN and responsible consultant to determine any learning from the source of the SAB. During the period 23/24 only one SAB case noted within NSD, source identified as Vas cath related.

Clostridioides difficile

Clostridioides difficile is an organism which is responsible for a large number of healthcare associated infections, although it can also cause infections in people who have not had any recent contact with the healthcare system. NHS Boards in Scotland carry out surveillance of Clostridioides difficile infections (CDI), and there is a national target to reduce these. One case was noted in the service 23/24.

NHS Golden Jubilee Expansion Programme

As part of the Scottish Government's investment of £[redacted] million to meet demand for elective surgery, NHS Golden Jubilee has been focusing its plan to expand its services in a phased approach. Construction on Phase 2 Surgical Centre - delivering five additional orthopaedic theatres, a new endoscopy and endoscopy decontamination unit, surgical admissions unit and a new larger CSPD.

SNAHFS service has worked closely with the Expansion Team & Prevention and Control of Infection to develop a risk assessment detailing control measures to protect transplant patients from the risk of fungal infection during construction work. This risk assessment is under constant review to ensure the control measures meet the scope of construction activity. Whilst the some wider restrictions remain, the restrictions for post transplant patients staying in the onsite hotel accommodation ceased in 2023.

3.6 Person centred

3.6.1 Patient Carer / Public Engagement

Within the NHS Golden Jubilee, our public engagement & equality and diversity activity comes under the Involving People Strategy. We have a dedicated Equality and Service Design lead.

Pre pandemic, our supper club in NSD was a big success with patients and this will be restarted in 2024/2025. This club helps to foster community development and peer support by providing space for patients to eat together and socialise to reduce feelings of isolation in long-term patients. We have managed to maintain the offer of a virtual meeting (telephone/face time) for patients on waiting list for transplant with patients who have already undergone a heart transplant and in fact, more recently, in specific circumstances, we have reinitiated face to face meetings. We have two volunteers who are now able to have face to face visits with the transplant patients. This has proved to be beneficial for both patients and their families. In 2023, the annual Christmas lunch for the post transplant patients was reintroduced. This has proved very popular and gives patients the opportunity to catch up with fellow transplantees and share experiences. Where appropriate we have mobilised patients outside for some fresh air and to boost their mental health, with positive feedback. We are also hopeful that we will be in a position to restart the learning café soon.

Interpretation and Translation

In the last year, NSD has had 34 patients who have been unable to communicate in English. The GJUNH has provided daily Interpretation services for the following languages. Arabic, British Sign Language (BSL), Dari, Krio, Kurdish Sorani, Malayalam, Polish, Portuguese, Punjabi, Urdu, Romanian, Spanish, Tamil and Ukrainian. It should be noted that our Interpretation and translation services are not only for our patients but for their carers and families too. Interpretation services have provided translation for information booklets, appointments and discharge letters, use of medications and other form of written communication in all of these languages.

A key element in how we deliver our Involving People Strategy is our Volunteer Service.

The Volunteer Service has supported the work of NHS Golden Jubilee for over 14 years. All 10 of the volunteer services have returned with plans to fully return the Quality Walkround Service as Care Experience in the coming months. The Volunteer Manager continues to build partnerships in the local community to increase the number of volunteers from 37 to meet the needs of the Phase 2 Development. Many new volunteers from diverse backgrounds are supporting the current services together with longstanding volunteers.
Many volunteers fulfil patient-facing roles including Pastoral Care and Patient Peer Support. Volunteers continue to support The Eye Centre and the Meet & Greet Service and Outpatient Support Service are developing in preparation for their role in The Surgical Centre when it opens at the end of the year.

In 2023, there was an increase in our activity as services returned and our volunteer provided:-

- 988 volunteer sessions
- 2267 volunteer hours of support to patient focussed services
- 15,027 Patients were supported

Our Volunteer Forum meets quarterly and is chaired by one of our Non-Executive Directors. This acts as a consultative group for support and development of the volunteer service and the aim is to have each volunteer service represented at the meetings.

We are most proud of these aspects of our volunteer service:-

- An increase in the number of volunteers through partnership working, resulting in a diverse mix of volunteers together with the recruitment of more young people.
- The development of the Patient Peer Support Service with 4 volunteers who support patients in SNAHFS, SACCS and the thoracic departments.
- The continued growth of the Pastoral Care Service which the aim of volunteers visiting patients morning, afternoon and evening over 5 days. There are a total of 12 volunteers who are active or training for the role.

4. Quality and Service Improvement

SNAHFS participates in the NHSBT coordinated audit of cardiothoracic transplantation in the UK. Monthly statistical reports of 30 day mortality are received. 30 day, 90 day, 1 year and 5 year mortality figures are published annually. Likewise, NHSBT sends weekly centre specific report on cardiothoracic offers that are reviewed at the weekly SNAHFS local donor offers' meeting.

There are currently two Clinical Audits running within the SNAHFS service. One is a rolling audit. Details of these are provided below:

1) Extra Corpeal Life Support (ECLS) activity and outcome audits for ECMO and STVAD/LTVAT Patients (rolling Audit 1751)

- To improve and maintain management of all ECLS patients.
- Ensure compliance with guidelines and protocols.
- Ensure implementation of anti-coagulation management as per guidelines.

2) Retrospective audit of promptness of discharge summaries from SNAHFS service September – December 2022 (Audit 1990) Jonathan Dalzell/Alice Brennan - Completed early 2024

- To ensure discharge summaries from SNAHFS service are completed within agreed periods of 24 hours for Immediate Discharge Letters (IDLs) and 1 week for Final Discharge Letters(FDLs).

Nursing Workforce Planning

The Nursing Workforce Planning group meet monthly to review and implement nursing workforce plans. The CNM provides the Head of Nursing with a workforce position paper each month this report is presented to the wider senior nursing team. As part of the safe staffing legislation, the Advanced Specialist Nurses within the service once again this year will complete the professional judgement tool for Specialist nurses. This will support the nurse management to review future service requirements and has allowed a more structured review of the Specialist nursing roles on a day to day basis. This tool is used as a triangulated approach and includes professional judgement, quality markers and an overview of the nursing service provision. The last two reports have indicated a shortfall in ACNS – this has still to be fully quantified. The CNM works closely with the Head of Nursing and the Advanced Practice & Non Medical Prescribing Lead within the hospital to ensure the Specialist Nurses within the service meet the educational requirement for the role. National competencies have been rolled out to determine the role of an Advanced Nurse Specialist.

Two trainee out of hours transplant coordinators have recently been recruited. This will help assist and maintain a robust rota. One of the coordinators has taken partial retirement (0.6 WTC) and a senior ICU nurse has been appointed to the remaining hours. This is enhancing succession planning.

The three weekly transplant clinics and the workload associated with them is managed solely by 1 Band 5 nurse – this can be challenging, particularly during periods of annual leave. Part-time phlebotomy is provided for both the transplant and heart failure clinics every week.

Due to the large volume of phone calls received from patients, GPs and other Healthcare providers to the transplant office, the nurses have implemented a telephone messaging service to enable appropriate triaging of calls and this is working well for both patients and staff alike.

The Nursing Workforce Group continues to identify areas of workforce focus, including consistent dependency scoring, promoting attendance at work with a focus on maintaining high staff resilience and retention, demographic challenges and care assurance which will be incorporated as part of Excellence in care as part of the nationally agreed indicators of high quality nursing and midwifery care. The national introduction of eRostering will be implemented during 2024/25.

Care Assurance (Excellence in Care)

“Excellence in Care” continues to be utilised within the hospital this ensures further scrutiny of key quality measures at ward level and supports the Nurse Manager to review the current care provision against a standard set of measures.

Palliative Care

It has been recognised that despite the lack of a formal Palliative Care Team within NHS Golden Jubilee, that there are processes to support palliative care and end of life care within NHS Golden Jubilee. The team form part of the hospital wide end of life group and feed in to this any issues of concerns.

A new development for 2024/25 to provide additional funding to support the wider palliative care pathways for our more complex patient cohort will start from April 2024. This project will involve formally linking with NHS Greater Glasgow and Clyde Palliative Care Team and accessing their expert advice virtually and in person consultation.

Psychology

The Psychology department at the Golden Jubilee University National Hospital has continued to reliably deliver core activities within SNAHFS and benefit from a broad range of clinical expertise available to our patients. The Psychology team hosts trainees and currently provides a clinical placement and research supervision across our services. This has led to the development of innovative offerings of psychological therapy including the creation of a new rapid one session group treatment for needle phobia. Future plans to develop a digital regional heart failure psychology service will doubtless inform the application of digital solutions for the SNAHFS population to improve access to psychological therapies. Forthcoming planned staff absence will not be fully covered by the GJNUH, diluting the Psychology capacity across NSD. The Psychology service will continue to prioritise the resource to ensure minimal impact on patient services.

5. Governance and Regulation

5.1 Clinical Governance

The SNAHFS Clinical Governance team is grateful for the oversight and support given by the Clinical Governance department within the Golden Jubilee University National Hospital.

The SNAHFS team have a robust clinical governance process with dedicated joint governance leads. Monthly clinical governance meetings are held as well as the weekly MDT meeting which offers time and scope for early review in a face to face setting.
The formal Clinical Governance group reviews multiple aspects of care including the Risk Register and the outcomes from any DATIX investigations. The findings and actions of these meetings are then reported to the Clinical Governance Risk Management Group (CGRMG) on a quarterly basis.

The clinical management of all patients receiving cardiac transplantation or VADs is reviewed through SNAHFS Clinical Governance and the Mechanical Circulatory Support Group. Mechanical Circulatory Support (MCS) patients are routinely debriefed. Our aspiration is to review all MCS and Transplant patients irrespective of the outcome to celebrate achievements and address any learning opportunities and areas for improvement.

In addition, there is a fortnightly NORS review meeting, to review all retrieval and NHSBT incidents. This meeting is well established.

Case review of deceased transplant patients are discussed at both the Cardiothoracic (CT) Morbidity and Mortality (M&M) meeting and the SNAHFs MDT. In addition, deceased transplant patients currently also trigger an SAER. This allows the extended team involved in the care of these patients the ability to contribute to discussions and identified learning points.

Members of the Transplant team attend quarterly Donor review meetings. These meetings involve discussion surrounding donor activity and potential incidents and help maintain vital links with the donor and transplant teams throughout Scotland.

5.2 Risks and Issues

During the year 2023/2024, 1 risk was closed (relating to issue maintaining the transplant surgeon rota due to vacancy and independent operating) and 1 was added (DR-232) outlining the risk associated with the NORS Retrieval Service. Figure 23 outlines the open risk.

Figure 23: SNAHFS Risks

DR-232	NORS Retrieval Service - on call rota	Fortnightly retrieval rota is adequately and reliably staffed. Awaiting confirmation of recurrent funding for DCD retrieval across all 4 nations	1.Fortnightly NORS debrief meeting – which includes: i) Review of retrievals from previous week ii) Review of the on call rota for the forthcoming week (consultant, SAS and theatre) groups of staff. iii) Review of any adverse incidents relating to retrievals 2.Formal and informal discussions with NHS BT regarding issues with rota cover in an effort to try to cover from other sites 3.Using individual contacts from other centres to assist with locum cover. These individuals have been encouraged to join our Staff Bank to ensure payment can be made. 4. Working to appoint a 2nd retrieval surgeon to help reduce impact on 5 NORS surgeons – awaiting formal sign off still 5. All SAS doctors now trained in DCD retrieval and there is a training programme in place for theatre nursing staff.

5.3 Adverse Events

The top categories of Datix events are shown in Figure 26 below:

Figure 26: Datix Categories

Category	NHSBT	NSD Pods	SNAHFS	Total
Administrative Processes	0	0	[redacted]	[redacted]
Communication	[redacted]	0	0	[redacted]
Diagnostic Processes/Procedures	[redacted]	[redacted]	0	[redacted]
IT systems	[redacted]	0	0	[redacted]
Medical Devices/Equipment/Supplies	[redacted]	[redacted]	0	[redacted]
Service Disruptions (environment, infrastructure, human resources)	19	0	[redacted]	**21**
Therapeutic Processes/Procedures	[redacted]	0	0	[redacted]
Unexpected Deaths or Severe Harm	0	0	[redacted]	[redacted]
Total	**25**	[redacted]	[redacted]	**33**

The highest reported incidents are in the Service Disruption category and relate to NORS retrieval. The majority of service disruption events are reported via NHSBT. There are recognised processes followed to ensure all incidents are investigated and reported to ensure learning is shared and feedback to relevant teams.

5.4 Complaints and Compliments

During 2023/2024 there was one complaint and one concern logged in datix against the service, the complaint which was subsequently withdrawn. The team receive numerous amounts of thank you cards/letters from grateful patients, with three being sent directly to Clinical Governance from patients, to share with the team involved.

5.5 Equality

The Golden Jubilee Diversity and Inclusion Strategy 2021-2025 features an ambitious set of deliverables and associated outcomes to further strengthen its position as a leader in the field of equality, diversity, and inclusion. The four year strategy and 2023 midpoint report are available to review on the hospital website. The strategy has 3 key themes:

Theme A: Diversify Talent
Theme B: Wellbeing and cohesion
Theme C: Inclusive Service design

Staff diversity networks
NHS Golden Jubilee recognise the benefits that staff networks can bring towards fostering an inclusive workplace culture. Over the past 24 months, we have embarked on an ambitious journey to establish a family of networks to represent the nine protected characteristics and Fairer Scotland duty.

Staff network	Protected Characteristic	Executive lead
Ethnic minority	Race	**Medical Director** Mark MacGregor
Ability	Disability	**Director of Transformation, Strategy, Planning and Performance**
LGBT+	Sexual orientation Gender reassignment (trans status)	**Director of Nursing** Anne Marie Cavanagh
Spiritual Care	Religion and belief Marriage and civil partnership	**Director of People and Culture** Laura Smith
Women's	Sex Maternity and Pregnancy	**Director of Operations** Carolynne O' Connor

Young Person's	Age Socio-economic status	**Director of Finance** Graeme Stewart (Interim)
Armed Forces	Intersectional	**Director of People and Culture** Laura Smith

The SNAHFS team mirror these values

Spiritual Care

Spiritual Care is person centred, meaning that we are here for everyone (patients, families, carers and our staff and volunteers). We are delighted that our highlight report of our local Spiritual Care Strategy highlights the significant impact being made in delivering Spiritual Care at the NHS Golden Jubilee.

Spiritual Care throughout the hospital includes a listening ear, Spiritual and Religious Care as well as a Spiritual Care Centre to come for some quiet, reflection, spiritual and religious reading and prayer.

We continue to provide wellbeing activities in the Spiritual Care Centre including Mindfulness, Meditation and Breathe in to the weekend all very well attended.

As part of our strategy, we launched a Bereavement Service that provides support to individuals who experienced a bereavement.

6 Financial Reporting and Workforce

Figure 27

SNAHFS Finance Report Month 12 - 2023/2024

Based On 30-35 Transplants							** For 23, complete
	2023/24 Profile	Fixed Costs	Variables	2023/24 Profile		YTD M12	YTD M12
	w.t.e.	£	£	£		w.t.e.	£
Staff Costs						Fixed	Fixed
Consultant Cardiologist	[redacted]	[redacted]				[redacted]	[redacted]
Locum Consultant							
Speciality Doctor/Fellow Cardiology							
Consultant Cardiothoracic							
Specialty Doctor Cardiothoracic							
Anaesthetists							
ACCP							
Medical	15.54					15.54	
Psychologist	[redacted]					[redacted]	
Psychologist Admin							
Transplant Coordinators							
Theatres							
Critical Care	10.89					10.89	
MCS Nurse	[redacted]					[redacted]	
NSD Ward	19.19					19.19	
New NSD POD	18.73					18.73	
Nursing	59.48					59.48	

Radiology	[redacted]		[redacted]				[redacted]
Labs							
Cardiac Physiology (Echo)							
CPET Respiratory physiology							
Other Clinical Staff	**16.40**					**16.40**	
Total Staffing Costs	**99.94**					**99.94**	
Critical Care - Supplies (Excl Drugs) - 579 OBD	Supplies OBD		[redacted]		946		
NSD POD - Supplies (Excl Drugs) - 2,625 OBD	Supplies OBD				2,611		
New POD Area - 1,916 OBD	Supplies OBD				1,056		
Drugs (Transplants)					32		
Outpatients	Supplies						
Theatres (Transplant only)	Supplies						
Lab (Transplant only)	Supplies						
Sub Total		**0**					
Hotel stay - 178 OBD	OBD	0			121		
Sub Total		**0**		**0**			
Tissue Typing		0					
Pro BNP Pressure		0					
Sub Total		**0**					
HTA Licence fee							
Sub Total		**0**					
Overheads							
TOTAL NON STAFFING COSTS		**0**					

7 Clinical Research / publications

Presentations / Publications (2023/24)

5-year Outcomes of Orthotopic Heart Transplantation by A Novel Implantation Perfusion Technique That Eliminates Warm Ischaemic Time (WIT). International Society for Minimally Invasive Cardiothoracic Surgery. Athens. Annual Scientific Meeting. 29 May-1 June 2024. Athens GREECE. **David Varghese[1],** Sylvia Yew[2], Amy Tang[2]**, Prashant Mohite[1], Karim Morcos[1], Yasser Hegazy[1], Phil McCall[1], Philip Curry[1].** [1]Golden Jubilee National Hospital, Glasgow, United Kingdom, [2]University of Glasgow, Glasgow, United Kingdom**.**

How well does PREDICTA predict Primary Graft Dysfunction? Society of Cardiothoracic Surgeons Annual Meeting 24th March 2024**. David Varghese,** Sanjeet Singh Avtaar Singh, Sylvia Yew, Amy Tang, **Prashant Mohite, Karim Morcos, Yasser Hegazy, Philip Curry.**

Procurement of heart and heart-lungs block with simultaneous abdominal normothermic regional perfusion. *JTCVS Techniques* Vol. 25p100–103 Published online: March 9, 2024. **Prashant N. Mohite, Simon Messer and Philip Curry.**

UK Experience of Direct Procurement of Lungs with Ongoing Abdominal Normothermic Regional Perfusion from Controlled DCD Donors. Journal of Heart and Lung Transplantation Volume 43, Issue 4, Supplement- S432, April 2024. **P. Curry, S. Messer, P Mohite et al.**

A single centre early experience of donation after circulatory death (DCD) heart transplantation. Society of Cardiothoracic Surgeons Annual Meeting 24th March 2024**. Mr David Varghese[1],** Miss Amy Tang[2], Miss Sylvia Yew[2], **Mr Sukumaran Nair[1], Mr Simon Messer[1], Mr Hari Doshi[1], Mr Prashant Mohite[1], Mr Karim Morcos[1], Mr Yasser Hegazy[1], Ms Lorraine Jerrett[1],** and **Mr Philip Curry**

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Research (2023/24)

Heart Research UK / NHSBT funded National Trial

F-CUSToS - Feasibility study for Randomised Controlled Trial of CUstodiol-HTK vs St Thomas' solution for cardioplegia and cold static Storage of UK donation after brainstem death hearts in cardiac transplantation.

Stage IV Clinical Trial / Single-blind, multi-centre, national, randomised feasibility study.

All adult patients undergoing heart transplantation in the UK from a DBD donor.

Principle Investigator GJNH – **P Curry**

8 Looking ahead

A. Service Sustainability

There has been a significant increase in the number of transplants and MCS episodes carried out over past 5 years and a formal business case has been submitted to NSD for increased funding to support this work – the request for funding has not been met in full by NSD. The case was for 30-35 transplants per year and is outlined in Figure 29 below. Part of this business case was an additional 8 bedded ward (6 beds opened initially) which opened in October 2023 (in advance of formal funding)

It is well recognised that each transplant generates significant additional workload in addition to the consumables associated with each procedure.

1. Theatres
2. Critical Care
3. Post transplant – NSD
4. Follow up outpatient clinics and diagnostic tests

In addition to the consumables, one transplant patient generates the following service impact at a basic minimum per patient of-

- 8-10 hours theatre session – often out of hours
- Average of 11 bed days in ICU immediate post transplant
- Average of 17 bed days in L2 ward – NSD pod
- Year 1 follow up consisting of -
  - 20 clinic appointments/pt/year
  - 11 echocardiograms/pt/year
  - 6 biopsies/pt/year
- Year 2, Year 3 and ongoing care – clinic/diagnostic/potential admission
- Potential transplant readmission – L2 bed

There is a cumulative effect of the increasing number of transplants as these patients receive lifelong treatment at the national Transplant Unit. The change in the donation policy has likely resulted in an increase of available organs as well as the DCD heart retrieval programme. The growing confidence of the SNAHFS cardiology and transplanting surgical teams has also played a part in the overall success of our programme.

The successful outcomes for our patients and the shift in culture to accepting more organs is expected to have a self-fulfilling effect in that referring centres will be more inclined to consider referral to the transplant service. The business case submitted to NSD at end of 2023, outlines plans to ensure the infrastructure and workforce is in place to meet increasing demand and availability of organs to continue to sustainably deliver high quality heart failure services now and in the future. This business case was partially approved with a significant increase in recurrent funding to deliver the increasing capacity to meet the demand, in particular the growth in transplantation and MCS. The priority for 2024/25 will be to implement the business case and recruit to critical services as detailed in Fig 28.

Figure 28: Summary of Key Priorities for SNAHFS 2024/25

1.	Increase Physical Capacity	• NSD 2 POD opened November 2023 (up to 8 additional beds) - Complete • Critical Care Redesign – identifies the medical & nursing model to sustain the additional transplant and MCS activity whilst protecting the elective cardiac activity • Outpatient Capacity – additional weekly OPC in place and will continue – Complete • Demand/capacity for Diagnostics – CPET/echo/MRI to support increased activity – Work in progress
2.	Workforce	• Support strategies for in house training of cardiac physiologists/ echocardiographers and perfusionists – In progress – trainee posts and robust succession planning • Clinic - additional ACNS hours to support increased clinic in place, however increased phlebotomy support to be explored
3.	Cardiac Theatres	• Through Cardiac Quality Improvement Programme (CQIP) - review need for fully staffed emergency cardiac theatre • Robust planning of rotas for anaesthetist, theatre and perfusion to ensure OOH work does not impact day time activity
4.	Retrieval Service	• Full review of current NORS model to identify if alternative model would provide more sustainability as well as supporting the national DCD rota • Review to include option of a 2nd retrieval surgeon and 5th SAS Transplant doctor
5.	Research	• Set up SLWG and develop strategy - still to progress • Strengthen links with University – University Hospital status achieved

B. DCD Heart Transplantation

GJUNH is one of 3 hospitals (other 2 are Harefield and Papworth) taking part in the UK DCD Heart Retrieval National Rota.

The DCD programme will continue to develop expertise through education and use of novel technologies such as the Transmedics Organ Care System (OCS) and Sherpa Pak.

However, it is acknowledged that this programme has a heavy workforce element for GJNH and as yet, still no recurrent funding available centrally to support.

C. Retrieval Service – Future Proofing

In line with NHS BT SCORE Programme, undertake a full review of our current NORS model to identify if an alternative model would provide more sustainability as well as supporting the national DCD rota.

D. Palliative Care Project

Evaluate the 6 month project due to start from April 2024 which aims to provide additional funding to support the wider palliative care pathways for our more complex patient cohort. This project will involve formally linking with NHS Greater Glasgow and Clyde Palliative Care Team and accessing their expert advice virtually and in person consultation. The GG&C team will also provide education and training for our clinical staff at GJNUH.