National Haemoglobinopathy Registry

Annual Report 2024/2025

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Foreword and Authorship

It gives me great pleasure to introduce the second full annual report of the National Haemoglobinopathy Registry, covering data from 1 April 2024 - 31 March 2025.

The NHR in its current form (NHRv2) continues to serve as an invaluable resource for healthcare professionals, health commissioners, researchers and patients, providing an increasingly comprehensive picture of care for those living with sickle cell disease, thalassaemia and rare inherited anaemias across England.

The integration of the NHRv2 as the primary data source for the Specialised Services Quality Dashboard brings with it both opportunity and responsibility. It has sharpened our collective focus on data completeness and accuracy and has driven improvements in specific data fields. The introduction of Microsoft Power BI reporting available through the MDSAS website https://nhr.mdsas.com/ allows some high-level data to be queried live. In this report, we provide detailed data and analysis on the demographics and care for people living with sickle cell disorder, thalassaemia and rare inherited anaemia in England.

The NHRV2 remains unique in its scope among registries for red cell disorders, and its value to patients, clinicians, commissioners and researchers continues to grow. I hope that this report serves both as a record of genuine progress and as a stimulus for the further improvements that our patients deserve.

The 2024-25 report reflects the hard work of data managers, clinical teams, and the steering group (https://nhr.mdsas.com/index.php/steering_group/), as well as the continued commitment of our patient and public voice representatives. The authors of the report are listed below in alphabetical order for recognition.

Best wishes

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National Haemoglobinopathy Chair

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Chapter 1: Introduction

The NHRv2 publishes a "data only" annual report, and a report with full analysis every 3 years. This is our second analysed NHRv2 Annual Report (the first was published for 2021–22) since the revised NHRv2. It covers the 12-month period to 31st March 2025.

Registry Size and Population

The NHRv2 continues to grow. As of 31st March 2025, it holds records for 18,968 (16,332 active) sickle cell disease (SCD) patients, 2,766 (2,308 active) thalassaemia patients, and 754 (611 active) patients with rare inherited anaemias (RIA). This represents a total of approximately 22,488 (19,251 active) registered patients. The RIA cohort has grown 20.3% since the 2021–22 report (from 508 to 611 active patients), reflecting improved ascertainment and a focus of some of the centres to add in their RIA patients as most centres initially concentrated on ensuring SCD and thalassaemia patients were entered. Nevertheless, all three populations are likely under-represented relative to true national prevalence estimates, and data completeness remains a material constraint on the conclusions that can be drawn. The Steering Committee, the DARG (Data Access Review Group) and MDSAS (Medical Data Solutions and Services, the providers of the NHRv2) work hard to ensure data quality is as high as possible.

Sickle Cell Disease

SCD remains the largest cohort. With 16,332 patients marked active for this year's annual review. The population is predominantly young (33.5% aged under 17) and predominantly of Black African ethnicity (56.5%), but data gaps remain, with 14.4% of patients having no ethnicity recorded. As expected, HbSS and HbSC are the dominant genotypes. Annual review completion reached 62.8% (10,257 patients), leaving 6,075 active patients without a documented review. This is of concern not only around issues of data completeness and what conclusions can be drawn if we know that not all patients have a recorded annual review, but perhaps of greater concern is the extent to which these patients have not had an annual review at all. As annual reviews are the mechanism by which clinical teams and patients can together take stock of a patient's past, current and future health, trends in deteriorating results and/or opportunities to detect early complications may well be missed if annual reviews are not recorded.

Disease-modifying therapy data recorded on patient annual reviews shows hydroxycarbamide prescribed to 22.7% of the cohort (3,708 patients) and regular transfusion to 7.5% (1,230 patients), though both figures are likely under-recorded given that 41% of eligibility data is missing. The wide inter-centre variation in hydroxycarbamide use (2.8%–28.1%) and transfusion rates (0.6%–19.7%) likely reflects a combination of genuine clinical differences between centres and data submission gaps.

70 deaths of SCD patients were recorded in 2024–25. New comorbidities were documented in 749 (4.6%) patients, individual comorbidities recorded are led by painful crisis (39.0%), Parvovirus (11.0%) and acute chest syndrome (10.1%). Chelation and MRI monitoring data remain substantially under-recorded.

Thalassaemia

2,766 patients are registered (485 more than in 2021–22), with 2,308 marked active for this year's annual review. The population is skewed towards a younger age, with the majority of 1,528 (66.2%) aged under 40, and predominantly of South Asian heritage (51.3%). Notably, 11.3% of active registered patients are from White backgrounds. This is a clinically important finding given that thalassaemia syndromes may not always be considered in anaemia workups in this demographic.

1,446 patients with thalassaemia are recorded as having transfusion-dependent thalassaemia (TDT), but transfusion data is incompletely captured (only 1,027 patients have regular transfusions recorded in 2024-2025). Chelation is documented for 749 patients, with deferasirox monotherapy being the most common regimen. MRI monitoring data suggests that the majority of monitored patients have well-controlled iron but is almost certainly under-reported relative to guideline standards. Reporting of non-mandatory data such as bone density imaging is almost absent, with only 7 patients having this recorded. Annual review completion stands at approximately 1,315 patients, a completion rate of only 57.0%. This raises the same concerns of both data completeness and of potential sub-optimal patient care if a proportion of these people genuinely did not have an annual review with their specialist clinical team.

For the thalassaemia cohort, 15 deaths occurred in 2024–25, including two children under 17. These numbers are likely a significant under-estimate. Having a direct link to the Office for National Statistics to ensure all cases are recorded in the NHRv2 will be a much better way of ensuring data completeness. Cause of death was documented for only 2 of 15 deaths. Seven curative/disease-modifying procedures were recorded, including one gene therapy. All of these are also likely to be an under-representation.

Rare Inherited Anaemias (RIAs)

In the RIA section, Diamond Blackfan Anaemia (DBA) remains the most common diagnosis (156 patients). The ethnic distribution (44.0% White) is notably different from SCD and thalassaemia, reflecting the pan-ethnic nature of these conditions.

89 patients are regularly transfused (14.6%), with 10 receiving ad hoc transfusions. Critical monitoring gaps have been identified: 23.6% of regularly transfused patients have no MRI imaging recorded; 85.4% of ad hoc transfusion patients have no iron burden imaging at all. Of 67 patients with ferritin >1,000 µg/L, 21 have no record of any iron imaging, a finding that carries direct clinical risk if this is indeed accurate. Antibiotic prophylaxis is not documented for 21 post-splenectomy patients despite being a mandatory standard of care.

11 deaths occurred during the reporting period, with causes including cardiac complications of iron overload (3 patients) and sepsis (3 patients, 2 post-splenectomy).

Psychology

The psychology chapter demonstrates that some psychological support is being delivered when need is identified. Those who received support (in whom a need was identified and recorded) was 67–70% across all condition groups. However, the fundamental problem is recognition and documentation: over 55% of the entire cohort has no recorded data on psychological support requirements. SCD has the highest documented psychological burden; RIA data is largely absent due to small numbers and under-recording. Improving routine psychological needs assessment across all conditions is a clear priority.

Data Quality

Data quality remains the most significant challenge facing the NHRv2. Key issues include incomplete medication and chelation records, substantial missing data for annual reviews, accuracy of MRI monitoring, record of causes of death, and pregnancy outcomes. For the cohort as a whole there are issues around duplicate patient records, inconsistent HCC patient allocation and marked inter-centre variation in data completeness are evident. The 2025 attempt to populate the SSQD by direct NHRv2 export highlighted the scale of this challenge. Remediation will require national coordination, dedicated data manager resources, and a national Standard Operating Procedure- all of which are currently in development. The NHRv2's integration as the primary tool for SSQD reporting may act as a driver for improvement in specific data fields going forward.

Chapter 2: PPV Patient and Public Voice Contribution

Understanding the NHRV2 Annual Report 2024–2025: What the Data Means for Patients.

The National Haemoglobinopathy Registry (NHRV2) keeps track of people living with sickle cell disease, thalassaemia, and rare inherited anaemias across England. Each year, the data collected is used to understand how services are working, where things are going well, and importantly, where patients may not be getting the care they need. Here is a plain-language summary of what this year's report tells us, including the honest gaps.

How Many People Are Registered?

The registry now holds records for around 22,488 people:
18,968 with sickle cell disease
2,766 with thalassaemia
754 with rare inherited anaemias (such as Diamond Blackfan Anaemia, Pyruvate Kinase Deficiency, and others)

These numbers are growing, which is a positive sign — it means more patients are being registered and their care is being tracked. However, experts believe the true numbers are higher, meaning some people with these conditions are not yet on the registry.

Are Patients Getting Their Annual Reviews?

Annual reviews are appointments where a specialist checks on your overall health, treatment, and wellbeing. They are one of the most important ways that healthcare teams monitor your condition. The data shows:

SCD: 62.8% of patients had an annual review recorded. That means more than 6,000 patients did not.
Thalassaemia: 57% of all active patients had a completed annual review. 987 active patients had no recorded review at all.

This is a concern. An annual review is your opportunity to flag problems such as picking up signs that you may be developing complications, re-assessing whether your treatment is working as well as it could, discussing your mental health, addressing fertility and family planning issues, or anything else. If your review is not happening or not being recorded, important issues may be missed.

What patients should know: You have a right to an annual specialist review. If you have not had one, or are not sure whether yours was recorded, please ask your haemoglobinopathy team.

Mental Health and Psychological Support - A Clear Gap

Living with a lifelong blood condition is hard, not just physically, but emotionally. The report shows that psychological support is available in some centres and that for those that have access to it, most people who are identified as needing it do receive it (around two-thirds to 70%).

But here is the problem: more than half of all patients (over 10,000 people recorded in the NHRV2) have no record of whether psychological support was needed or received. This does not mean those patients are fine. It means the question was never recorded.

What patients should know: If you are struggling emotionally, with pain management, with anxiety, or with the burden of treatment, please tell your team. You should be assessed for psychological support. If you have not been asked, ask them to ask you. Not all centres have access to psychologists and recording that these are needed is an important part of the data being collected, so that those who decide how NHS money should be spent can see where the gaps are.

Treatment Options: Who Is Getting What?

For sickle cell disease, the two main disease-modifying treatments are hydroxycarbamide (a tablet to reduce crises but which has also been shown very clearly to reduce complications and lengthen life) and regular blood transfusions (often but not always for people who cannot tolerate hydroxycarbamide or for whom it hasn't worked). For thalassaemia and rare anaemias, regular transfusions are often essential. Some specific rare anaemias also have specific therapies that may improve outcomes in some patients.

The report shows that hydroxycarbamide use varies enormously between hospitals- from less than 1% of patients at some centres to over 43% at others. At this point it is not quite clear whether this is all due to genuine differences or whether there is a problem with how data is recorded in some centres. However, if you have sickle cell disease and have not been offered or discussed hydroxycarbamide, it may be worth asking your doctor whether it is suitable for you.

Iron Monitoring: A Critical Gap for Transfused Patients

If you receive regular blood transfusions, iron builds up in your body over time and can damage your heart, liver, and other organs. MRI scans and blood tests (ferritin) are used to monitor this. The report reveals some very concerning gaps:

- For rare anaemia patients on regular transfusions: nearly two-thirds have NO recorded MRI scan in the last two years.
- For patients receiving occasional (ad hoc) transfusions: 85% have no iron imaging at all.
- 67 rare anaemia patients have very high ferritin levels (a sign of iron overload) — and 21 of them have never had an MRI to confirm this or guide treatment.

What patients should know: If you are on regular transfusions, you should be having MRI scans and ferritin blood tests to check your iron levels. If you are not sure when you last had these, please ask your team. Some people whose ferritin is extremely stable may not need as many MRI scans, but it is better to check and be sure.

Deaths: What We Know and What is Missing?

In 2024–25, 70 sickle cell disease patients, 15 thalassaemia patients, and 11 rare anaemia patients died. Every death is important, and the registry tries to track these to help improve care.

However: for 13 out of 15 thalassaemia deaths, no cause of death was recorded. Most of those patients also had no annual review completed. This means the opportunity to learn from these deaths (to potentially prevent future ones) is lost. This is not acceptable, and the report acknowledges it as a significant gap. In addition, because the NHRV2 relies on individual teams to update on deaths, we know that the current number of reported deaths is likely to be an under-estimate. Only by linking directly with the ONS (Office for National Statistics) will we be sure that all deaths are recorded, and can we draw accurate

conclusions about what aspects of care, if any, need to change in order to prevent avoidable deaths in these patient groups.

Access to New Treatments

For the first time, this report includes a section on novel therapies. 17 thalassaemia patients have participated in clinical trials over recent years, and one patient received gene therapy in 2024–25 — a potential cure. More curative options (including gene therapy and bone marrow transplants) are available now than ever before, and the report highlights that good registry data is essential to plan services and ensure equitable access to these.

Rare Anaemias: Still Underserved

Patients with rare inherited anaemias are a smaller group and often less visible within haematology services. Many of the services around England have acknowledged that they have prioritised putting sickle cell and thalassaemia patients on the registry and have not yet started putting their RIA patients in the NHRV2. In other centres, not all RIA are systematically entered in the NHRV2- only those with the more severe forms of these conditions.

The report highlights some important concerns specific to this group of patients, even knowing that not all of them have been entered on the NHRV2:

- Post-splenectomy patients must take lifelong preventive antibiotics (e.g. penicillin). 21 patients have no record of this — leaving them at risk of serious infection.
- Bone density (DEXA) scans are rarely being recorded, despite being an important monitoring test for many of these patients.
- For DBA patients: corticosteroid use appears lower than expected — it is unclear whether this reflects true clinical practice or simply incomplete recording.

What patients Care About: Gaps in the Registry

Based on this report, here are the areas where we know the data is not adequately capturing what matters to patients:

What matters to patients	What the data shows
Am I getting good care?	Annual review completion is below 65% in SCD and 60% in thalassaemia.
Is my mental health supported?	Over 55% of patients have no psychology data recorded at all.
Are my iron levels safe?	MRI monitoring is severely under-recorded across all three condition groups.
Is my treatment working?	No systematic outcomes data captured (e.g. chelation efficacy, transfusion response).
What happened to people who died?	Cause of death undocumented in 87% of thalassaemia deaths in 2024–25.
Can I have children?	Pregnancy outcomes are not captured — only whether reproduction occurred.
Can I access new treatments?	Gene therapy and novel therapies newly reported, but data capture is limited.

Do hospitals treat people fairly?	Wide variation between centres in treatment rates and monitoring is documented but not fully explained.

Table 1 - What patients care about

The Bottom Line

The NHRV2 is a vital tool for improving care for people with sickle cell disease, thalassaemia, and rare inherited anaemias. It is growing, and some things are genuinely improving, such as more patients registered, more services tracked, more transparency about outcomes. But significant gaps remain. Some of these may be about the way care is given or not given, while many of these gaps are about care not being recorded. And what is not recorded cannot be improved.

If you are a patient or carer, you can make a difference by:

- asking whether your annual review has been completed and recorded
- raising any mental health concerns with your team
- asking about iron monitoring if you are on transfusions
- engaging with patient participation groups to push for better data collection.

The registry exists to serve you. The more complete the data, the better the care.

Funmi & Petra

Chapter 3: Thalassaemia

This is the second report within the NHRv2 for people living with thalassaemia syndromes. In this report, the new additions include the number of successful pregnancies, granularity on deaths reported and a section on novel therapies.

Demographics

The total number of people registered within the NHRv2 has increased by 485 compared to the first report in 2021-2022. As of 31/3/2025 there were 2,766 patients registered on the NHRv2 with a diagnosis of thalassaemia. Male and female patient numbers were almost equal with 52.4% female and 47.6% male respectively (Figure 1). The number of new births reported in England in 2024-2025 is 28.

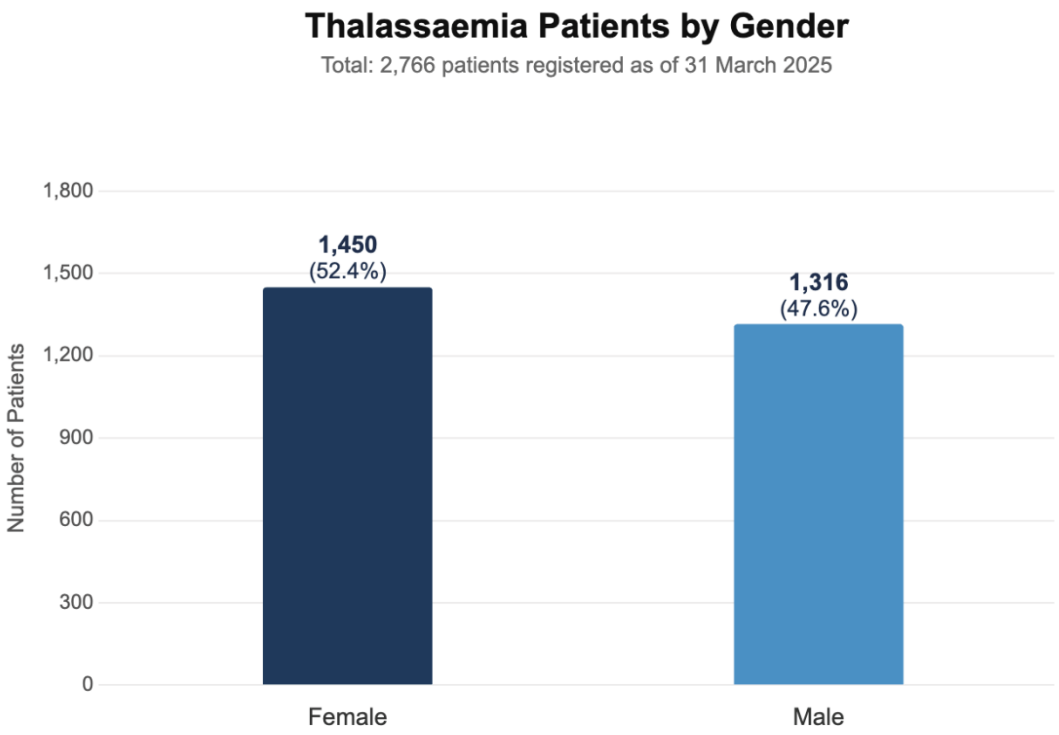

Figure 1 - Thalassaemia patients by gender

Disease Categories

Most of the patients are transfusion-dependent beta thalassaemia major (1,312), followed by patients with HbH disease (538). The total number of patients dependent on regular blood transfusion support are 1,446 (alpha thalassaemia major, beta thalassaemia major and HbE beta thalassaemia transfusion dependent). Other thalassaemia patients may need transfusion support occasionally. “Other thalassaemia” patients who do not fit any of the above categories totalled 213. Some of these patients are homozygous or compound heterozygous beta globin variants with C, D or E thalassaemia, but it was noted that some people included in the NHRV2 were only found to be thalassaemia carriers. It is recognised that some people with genuine non-transfusion thalassaemia are only known to have a beta thalassaemia trait on genetic testing. Sometimes the additional genetic change which distinguishes beta thalassaemia trait from clinically significant NTDT is the co-inheritance of a triplicated alpha gene. However, even in the absence of a triplicated alpha gene, some

individuals have a significant anaemia (e.g. Hb<80g/L) despite only having beta thalassaemia trait on genetic testing. Likely currently unknown additional genetic changes are probably responsible and could be identified in future. For data accuracy, the NHRV2 should have clear inclusion criteria for people with a diagnosis of NTDT in whom only a beta thalassaemia trait is found.

Diagnosis	Patient Numbers
Alpha thalassaemia Major	14
Beta thalassaemia intermedia (excluding HbE thalassaemia)	438
Beta thalassaemia major (excluding HbE Beta thalassaemia)	1312
E Beta thalassaemia (not transfusion dependent)	119
E beta thalassaemia (transfusion dependent)	120
HbH : variant	7
HbH Disease	538
HbH: constant spring	5
Other Thalassaemia	213
Grand Total	**2766**

Table 2 - Thalassaemia diagnosis and registered patients

The majority of patients with thalassaemia syndromes in England are of South East Asian ancestry and they make up just over half at 51.3% (Table 3,Figure 2). The largest population of patients are of Pakistani heritage, followed by Indians and Bangladeshis. It is noted that about 11.5% of people being diagnosed with thalassaemia syndrome are recorded as white background. This is about 319 people recorded in the report this year. Clinically this is relevant and raises an important learning point for clinical teams to think of thalassaemia as a differential diagnosis when patients are being worked up for anaemia.

Ethnicity	Patient Numbers
African	46
Any other Asian background	319
Any other Black / African / Caribbean background	17
Any other ethnic group	259
Any other Mixed / Multiple ethnic background	41
Any other White background	236
Arab	36
Bangladeshi	177
Caribbean	20
Chinese	122
English / Welsh / Scottish / Northern Irish / British	83
Indian	230
Irish	1
Not stated	579
Pakistani	572
White and Asian	17
White and Black African	2
White and Black Caribbean	9
Grand Total	**2766**

Table 3 - Thalassaemia patients by ethnicity

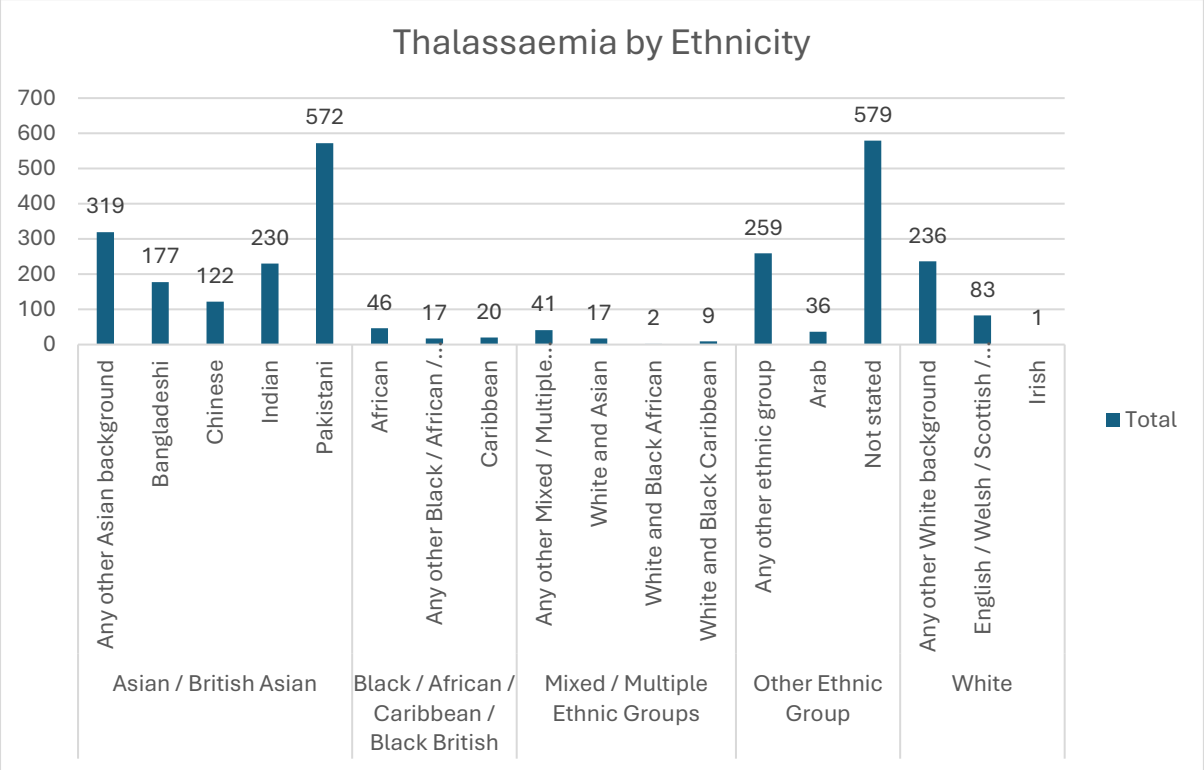

Figure 2 - Thalassaemia patients by ethnicity

The thalassaemia population remains a young population with the majority of patients below the age of 40 years. The majority of older patients in their 70s and 80s have a diagnosis of HbH and other compound heterozygous thalassaemia syndromes rather than transfusion dependent thalassaemia (Figure 3).

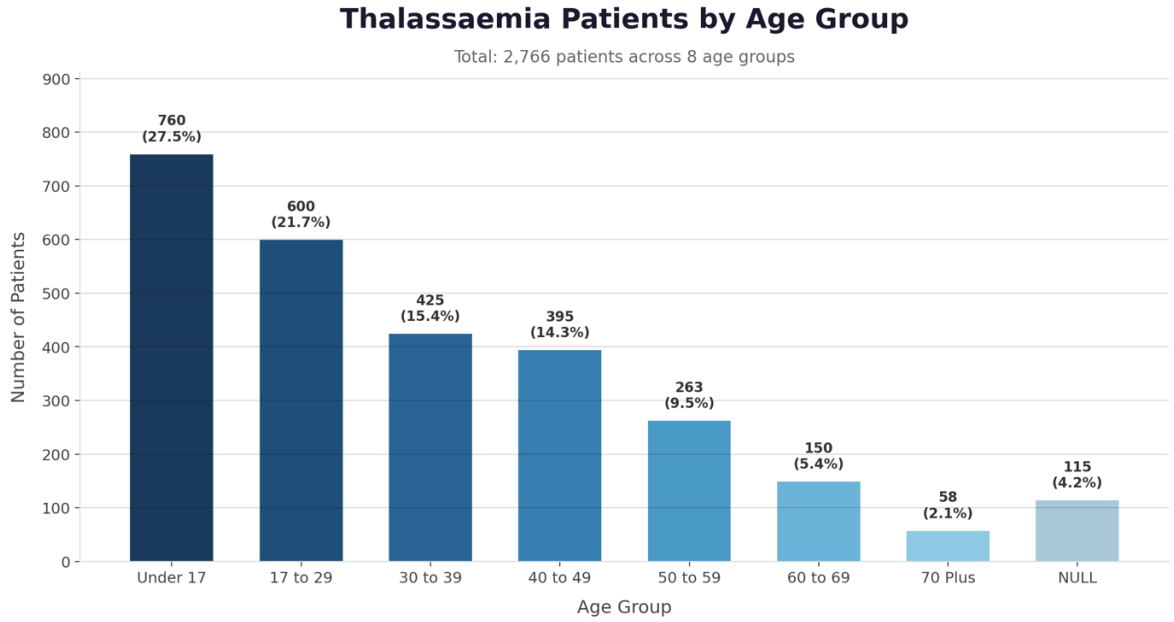

Figure 3 – Thalassaemia patients by age group

Thalassaemia Prevalence across England

This is the first report on the NHRv2 with patient numbers by SHTs, as seen in Table 4. Not all the local hospitals have been mapped to the correct SHTs, and until the NHRv2 can complete its full mapping exercise, this will remain an issue. There were 248 patients for which there was no available data on their SHT. The top 10 hospitals for patients with thalassaemia show that the largest population of patients continues to be based in cities such as London, Birmingham and Manchester.

SHT	Patient numbers
Addenbrooke's Hospital Cambridge (Cambridge University Hospitals NHS Foundation Trust)	22
Barking Havering and Redbridge University Hospital Trust	34
Barts Health NHS Trust	195
Birmingham Women's and Children's Hospital NHS FT and Sandwell and West Birmingham Hospitals NHS Trust	359
Croydon Health Services NHS Trust	5
Guy's and St Thomas' NHS Foundation Trust	57
Homerton Healthcare NHS Foundation Trust	13
Imperial College Healthcare NHS Trust	123
King's College Hospital NHS Foundation Trust	62
Leeds Teaching Hospitals NHS Trust	165
Lewisham and Greenwich NHS Trust	28
London Northwest University Healthcare NHS Trust	98
Manchester University NHS Foundation Trust	219
North Middlesex University Hospital NHS Trust	65
Nottingham University Hospitals NHS Trust	69
Oxford University Hospitals NHS Foundation Trust	97
Royal Liverpool University Hospital (Liverpool University Hospitals NHS Foundation Trust)	44
Sheffield Children's NHS Foundation Trust	16
Sheffield Teaching Hospitals NHS Foundation Trust	35
St Georges Healthcare NHS Foundation Trust	84
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	44
University College Hospitals NHS Foundation Trust	259
University Hospital of Wales (Cardiff and Vale University Health Board)	11
University Hospital Southampton NHS Foundation Trust	21
University Hospitals Bristol & Weston NHS Foundation Trust	73
University Hospitals of Leicester NHS Trust	85
Whittington Health NHS Trust	235
No SHT stated	248
Grand Total	**2766**

Table 4 - Specialist Haemoglobinopathy Teams and patient numbers

Service provision

Annual reviews and Admissions

There were 2,308 active thalassaemia patients for this year's annual review field completion. Of this group, 1,315 patients had their annual review completed, with 987 patients having a "null" entry suggesting no data was available for the year. It is not possible to differentiate between patients who have had an annual review by their clinical team but whose data has not been recorded due to a lack of data managers to input this data, from patients who clinically have not had an annual review. The latter group represent a clinical risk as the annual review is the opportunity for clinical team to detect complications early, review treatment options with patients and improve education.

Annual Review Complete	Patient Numbers
Yes	1315
Started but not completed	6
No annual review recorded	987
Grand Total	**2308**

Table 5 - Annual Review Completed

There is no admission data collected in the annual review for thalassaemia patients, so resource utilisation cannot be determined as for sickle cell patients.

Pregnancies

There were 21 episodes of successful conception and pregnancies: 11 pregnancies were in female patients, and 10 male patients became fathers in this financial year (Table 6). No further information is available on complications or management of these pregnancies as this is not currently being collected in the NHRv2. For 140 patients, the answer to the question whether the patient had reproduced this year was recorded as unknown status. It is therefore possible that there were more pregnancies than those reported above.

The 3 pregnancies seen in the "other thalassaemia" group include a Hb D Punjab/beta thalassaemia, with 1 patient being transfusion-dependent and the other 2 being non-transfusion-dependent.**Diagnosis**	**Female**	**Male**	**Total**
Beta Thalassaemia Intermedia (excluding Hb E Thalassaemia)	4	1	5
B thalassaemia major (excluding Hb E Beta thalassaemia	2	8	10
E Beta thalassaemia (Non-Transfusion Dependent)	1		1
Hb H	2		2
Other Thalassaemia	2	1	3
Total	**11**	**10**	**21**

Table 6 - Pregnancy numbers by diagnosis and gender

Blood Transfusions

Transfusion data is incomplete on the NHRv2 as highlighted by the diagnosis data identifying 1,446 transfusion-dependent patients registered (alpha thalassaemia major, beta thalassaemia major and HbE beta thalassaemia transfusion-dependent) but only 1,027 patients having regular transfusions recorded. Some of these patients are recorded as

receiving automated exchange and manual exchange transfusions. It is not clear whether the exchange transfusions reported are genuine (a rare but possible treatment choice in thalassaemia) or whether there is an element of incorrect data entry. In addition, there is lack of consistency regarding what determines a regular transfusion programme compared to someone with NTDT who is receiving ad hoc transfusions. Some people, for example, are recorded as receiving one unit every 12 weeks. While there is no single universally agreed numerical threshold, most guidelines converge on ≥ 6 transfusion episodes per year at planned intervals as the working definition of a "regular programme". This should be implemented in the NHRv2 to ensure data consistency.

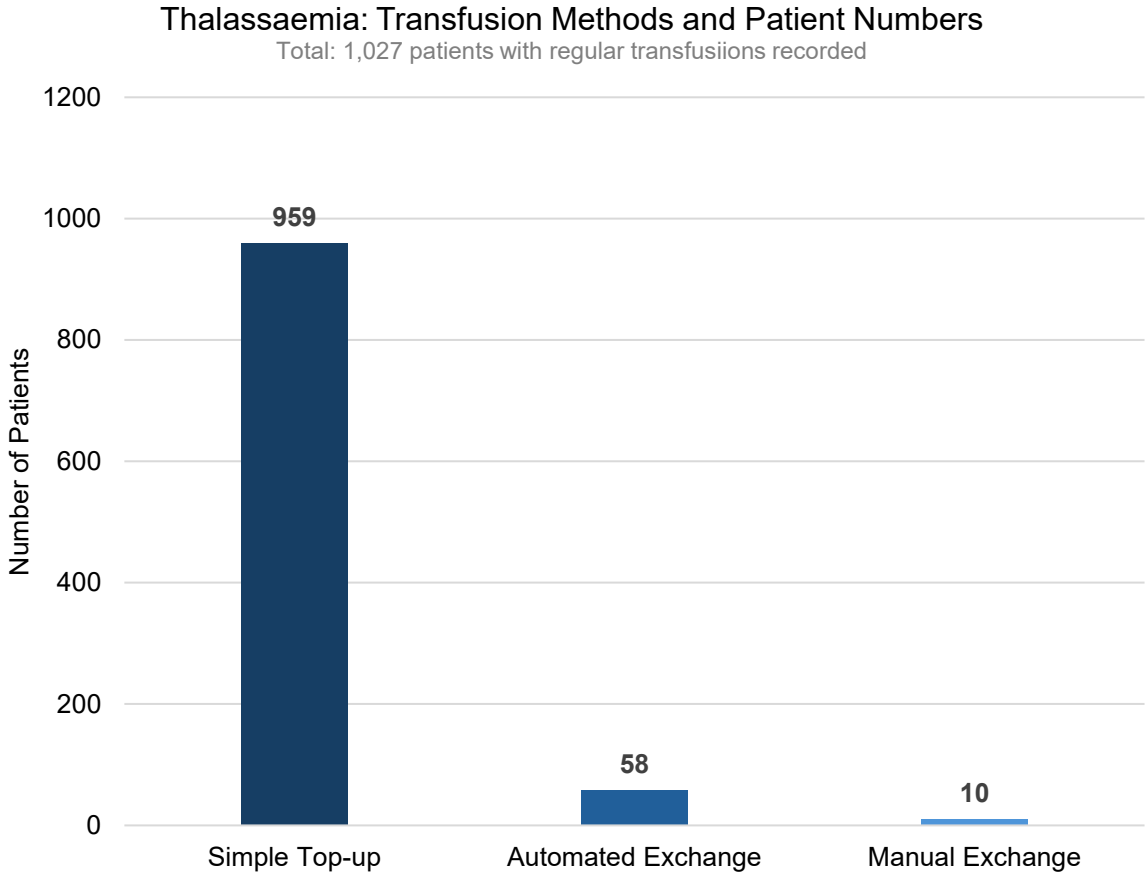

Figure 4 - Transfusion methods for Thalassaemia patients

Patients had an array of red cell antibodies reported on the NHRv2 despite Rh and Kell group matching which is widely undertaken in the UK. The commonest antibodies identified were Anti-E, Anti-K, Anti-Kpa and Anti-c, as shown in Table 7 - Antibody specificities for Thalassaemia patients.

Antibody	Count 2024-5	Total
Specificity Not Determined	32	83
Anti-E	13	79
Anti-Kpa	8	48
Anti-K	3	46
Pan-reactive antibody	7	45
Anti-c	4	31
Anti-Jka	7	24
Anti-D	5	23
Anti-Lua	3	18
Anti-Cw	5	17
Unassigned Antibody Identity	3	14
Anti-Jkb	2	8
Anti-S	3	7
Anti-M	1	6
Anti-Lea	0	5
Anti-Bga	0	4
Anti-Fyb	3	4
Anti-Leb	0	3
Anti-Ytb	0	3
Anti-Ce	1	3
Anti-Bgb	0	2
Anti-f [ce]	0	2
Anti-Fya	0	2
Anti-S	0	2
Anti-Wra	1	2
Anti-A1	0	1
Anti-Ch	0	1
Anti-Jk3	0	1
Anti-Yta	0	1
IgG Anti-A x A1 Cells	0	1
IgG Anti-A x A2 Cells	0	1
IgG Anti-B	0	1
IgM Anti-A x A1 Cells	0	1
IgM Anti-A x A2 Cells	0	1
IgM Anti-B	0	1
Anti-G	1	1
Grand Total	**102**	**492**

Table 7 - Antibody specificities for Thalassaemia patients

In total the NHR has 492 antibodies recorded for Thalassaemia patients. In 2024-5, there were 102 new antibodies detected amongst 30 patients. In five patients, only one new antibody was detected, while in five, more than one new antibody was detected (range 2-6). The most frequently identified new antibody was anti-E.

Management of iron overload

Chelation

Chelation therapy was recorded for 749 patients, and they were on a range of treatment regimes. The discrepancy between the number of patients reported to be on a regular transfusion programme (1,027) and those on regular chelation (749) is concerning. This may once again be due to incomplete data but does raise concerns that there could be patients on regular transfusions who are not being adequately chelated, if at all. In addition, as some NTDT patients would also have iron overload and need chelation, we would expect the number of thalassaemia patients being chelated to be greater than the number on regular blood transfusions.

Regarding specific regimes (Figure 5), 514 were taking deferasirox monotherapy, 127 on desferrioxamine monotherapy, 82 on deferiprone monotherapy and 114 patients were on combination regimes. It will be important to try to ensure this data is more accurately collected and reported in future, as the evidence from the literature is that chelation is one of the key determinants of long-term survival in transfusion-dependent thalassaemia. As such it should be one of the items in the NHRv2 that is mandatory to collect, and crucial to ensure data accuracy.

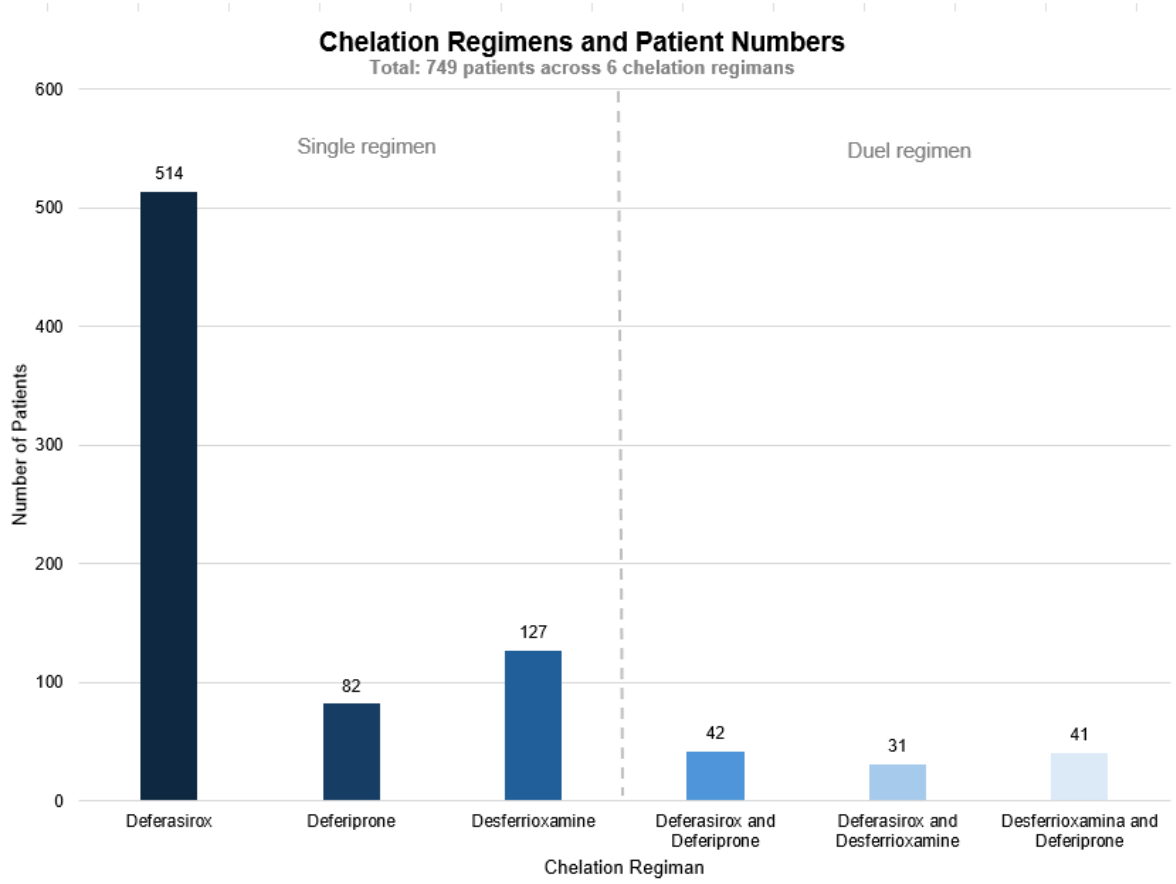

Figure 5 - Chelation regimens in Thalassaemia patients

MRI assessments for Iron Overload

Cardiac Assessments

According to the data collected (Figure 6), 317 thalassaemia patients underwent MRI assessments for iron overload during 2024/25. The majority of those in whom data is available had no cardiac iron overload. 20 patients in total are at risk of heart failure with documented cardiac T2* values between 2-10 ms. In this group, 5 patients have been noted to have severe cardiac iron overload for this annual report. Data completeness is however a concern again here as 370 patients had a "null" entry regarding cardiac iron monitoring. This could include patients who were referred for a scan but did not attend, who were not referred for a scan despite it being indicated, or where the data manager was unsure about whether a scan had been carried out or not.

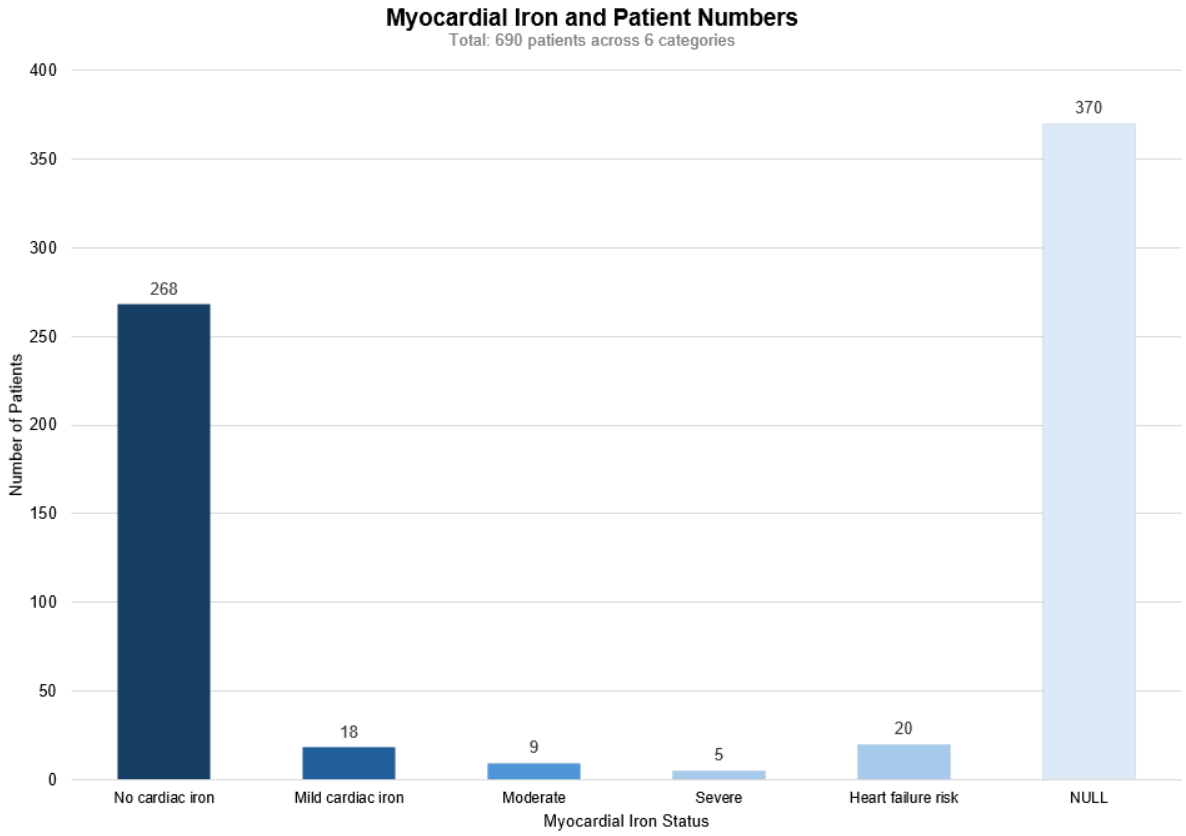

Figure 6 - Myocardial Iron and patient numbers

Liver Iron Assessments

398 patients had a liver iron assessment undertaken during the annual review year 2024/25 (Figure 7). Of these, 109 were a liver T2* assessment and 289 were Ferriscan liver iron assessment. 33 patients had both. 49 patients had a severe LIC by Ferriscan method, and 27 patients had a severe LIC by liver T2* method. The liver iron values show that for the vast majority of patients the liver iron is well controlled.

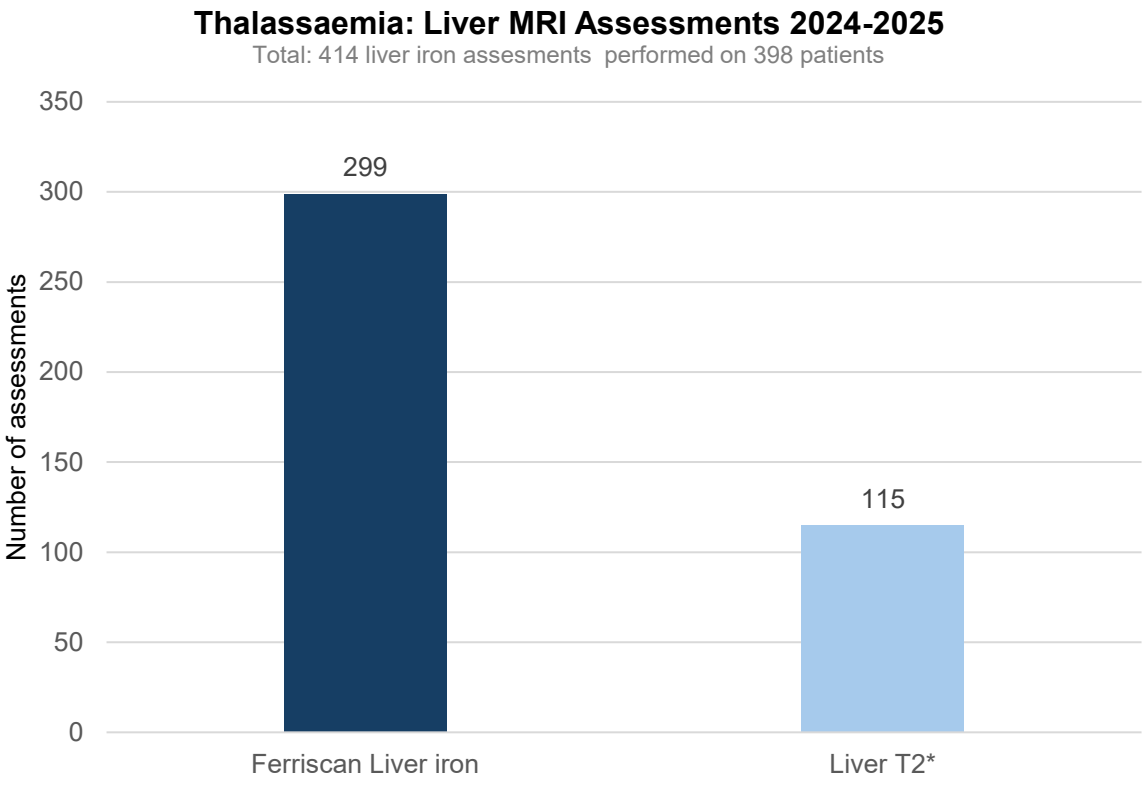

Figure 7 - Liver MRI assessments for Thalassaemia patients

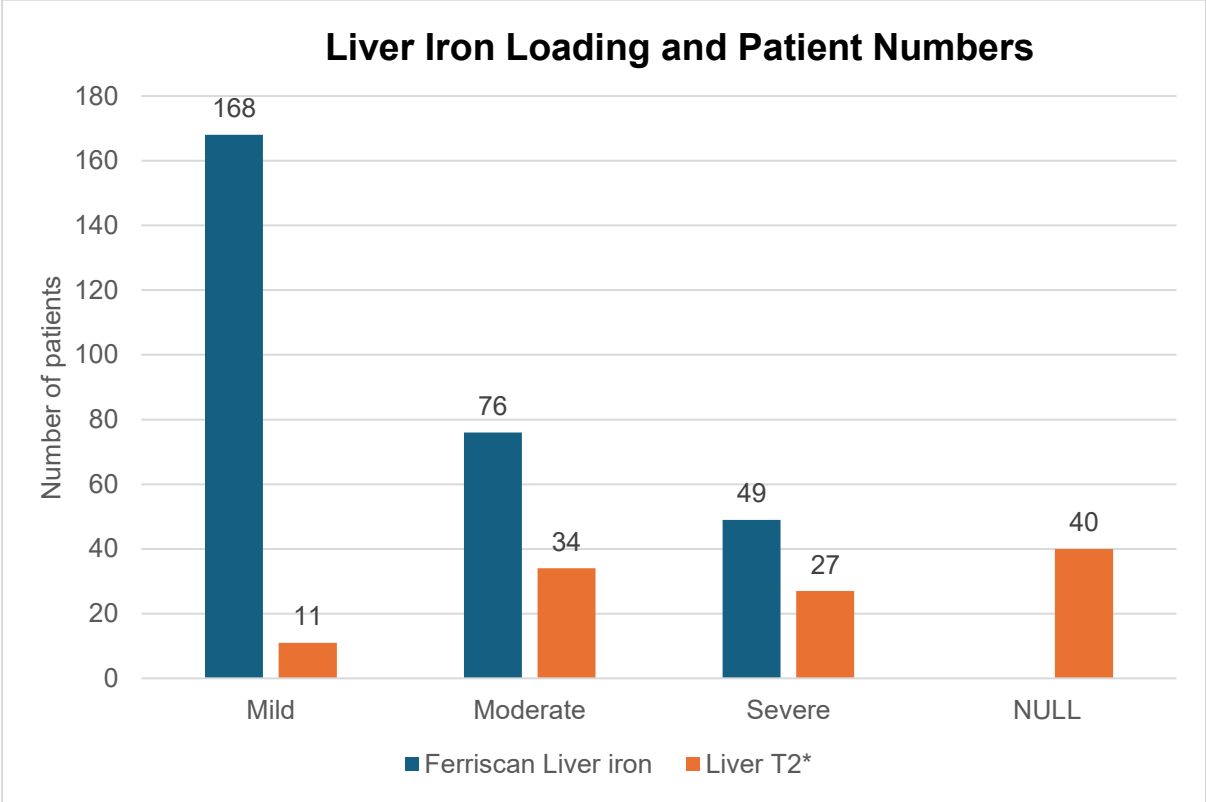

Figure 8 - Liver iron loading for Thalassaemia patients

The current data collection does not require ferritin results to be entered at annual review, so it is not possible to assess from the aggregated data whether all patients who are eligible for

MRI monitoring as per BSH guidelines did indeed receive the correct scan. However, a rough calculation would be that most people with transfusion dependent thalassaemia, and some with NTDT, would at least need a liver MRI, so we would expect about 1000 liver MRIs to be carried out and entered into the NHRv2. It may also be helpful to examine whether patients who should be having monitoring and who are not having it are the same patients who are not having an annual review, as this would raise the possibility that the reason for the missed scans is that the annual reviews are not being carried out. However, lack of data entry could mean that some of these patients have had both an annual review and the appropriate MRI scans but not been entered into the NHRv2.

Bone Density Imaging and Cardiac ECHO

A total of 7 patients had bone density scans reported during the 2024/25 reporting period (Figure 9). 3 had normal bone density with 3 having osteopenia and 1 having osteoporosis and osteopenia recorded. This is not a mandatory field in the annual review and clearly not many centres are recording this data. Likewise cardiac echocardiograms are infrequently reported into NHRV2.

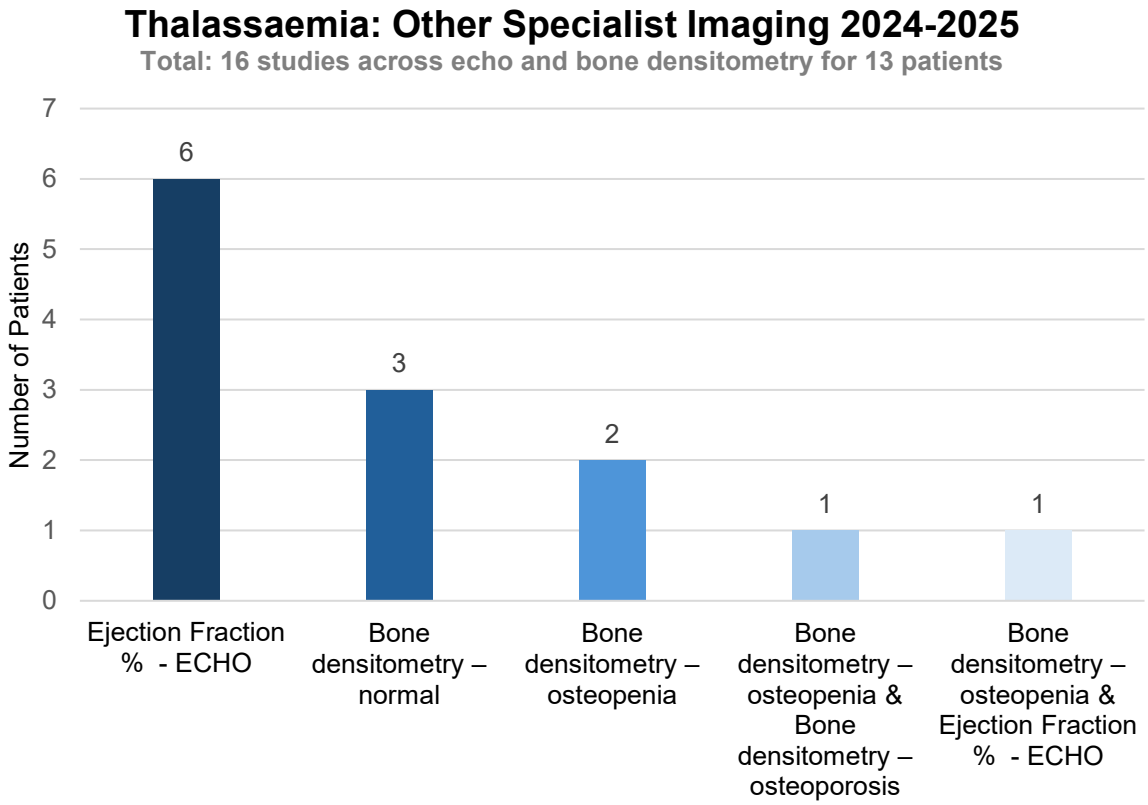

Figure 9 - Specialist Imaging Performed in 2024-2025 for Thalassaemia patients

Comorbidities and SAEs

In total, 44 comorbidities and complications have been recorded in the thalassaemia cohort for the 2024-2025 reporting year (Figure 10). This included 15 serious adverse events. The serious adverse events included 11 deaths (recorded on the comorbidities section of the NHRv2), 2 strokes, 1 delayed haemolytic transfusion reaction with new antibody formation, and 1 cardiac failure. 5 cases were discussed at HCC level. 3 out of the 11 deaths recorded in the SAE section of the NHRv2 were discussed at HCC level. No further details are available.

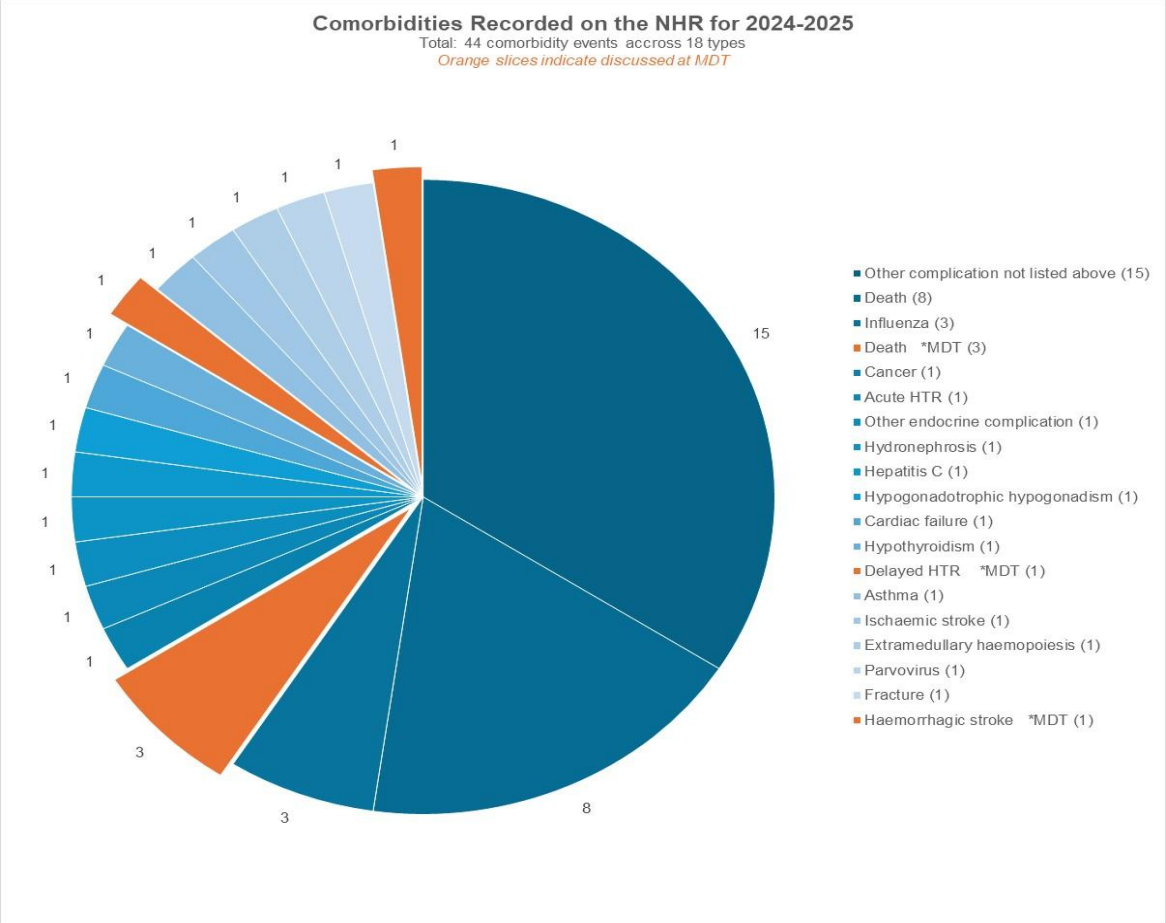

Figure 10 - Comorbidities in 2024-2025 for Thalassaemia patients

(The orange bar indicates discussion at HCC)

Deaths

A total of 15 deaths were recorded in the 2024-2025 reporting year. No adverse event information was recorded for 4 patients recorded as deceased. Nine were male and six were female. Nine were transfusion-dependent thalassaemia, four were thalassaemia intermedia and two were other thalassaemia.

Patient No.	Age range	Cause of death documented in the NHR	Annual Review completed for 2024-2025
1	Under 17	Post Transplant TMA	None recorded on NHR
2	Under 17	No	None recorded on NHR
3	17 to 29	No	None recorded on NHR
4	17 to 29	No	None recorded on NHR
5	30 to 39	No	None recorded on NHR
6	40 to 49	No	None recorded on NHR
7	40 to 49	No	None recorded on NHR
8	40 to 49	No	None recorded on NHR
9	50 to 59	No	Yes
10	50 to 59	No	None recorded on NHR
11	50 to 59	No	None recorded on NHR
12	50 to 59	No	None recorded on NHR
13	70 Plus	No	None recorded on NHR
14	70 plus	No	None recorded on NHR
15	50 to 59	Severe cardiac iron with a cardiac arrhythmia and pneumonia.	Yes

Table 8 - Deaths reported in 2024-2025 for Thalassaemia patients

Surgery and procedures

The most common procedures undertaken in thalassaemia patients are splenectomy followed by cholecystectomy and allogeneic bone marrow transplantation (Figure 11). This data spans over several years. With the emerging evidence now, we no longer perform splenectomy upfront for patients and so this trend will change in later reports. In the 2024-2025 reporting year, a total of 7 procedures were recorded with allogeneic bone marrow transplant as the most frequent procedure.

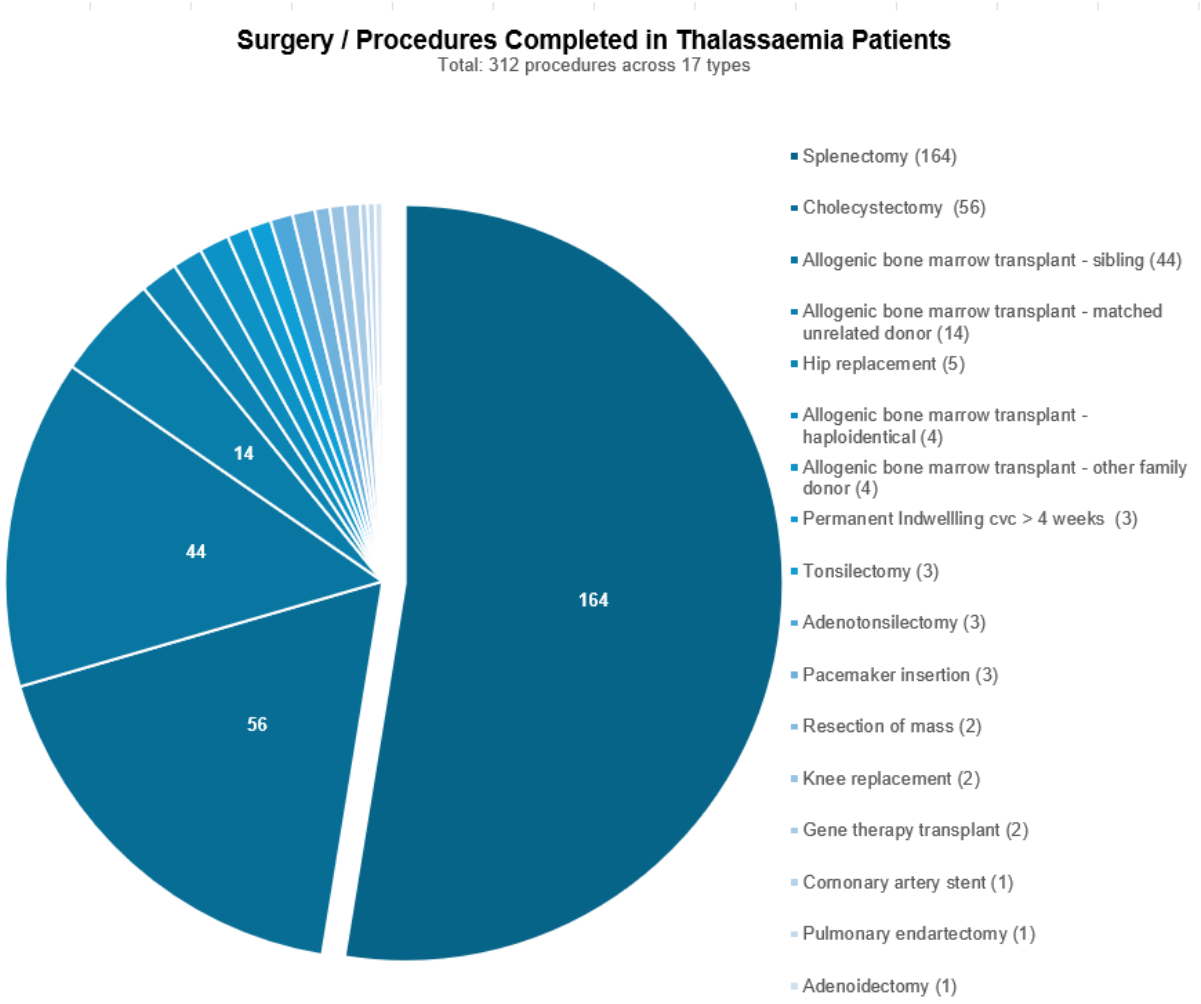

Figure 11 - Surgery/procedures completed in Thalassaemia patients

Novel Therapies

The NHR now has the capability for the centres to record patients on clinical trials. In total 17 Thalassaemia patients were recorded on the NHRv2 as having participated in a clinical trial over several years. This information is likely to be incomplete at this time.

Data Challenges

Whilst it's encouraging to see the data entered on the NHRv2 for thalassaemia is increasing, it remains limited. It is clear that many centres are not able to enter a comprehensive set of data for their patients. More granular information on deaths, pregnancy outcomes, chelation regimens, HCC discussions, and MRI iron assessments recording could improve. With the new emerging disease-modifying and curative treatment options becoming available for thalassaemia, investing in a data manager is crucial in each SHT in ensuring the data is accurately captured on the NHRv2.

Chapter 4: Sickle Cell Disease

Demographics

For the recording period, a total of 16,332 patients with sickle cell disease were registered in the NHRv2 and marked as “active” for their centre. Females comprised 53% of the cohort, with males accounting for 47%. The most common genotypes were HbSS and HbSC, with other genotypes representing a smaller proportion of the cohort, as depicted in Figure 12.

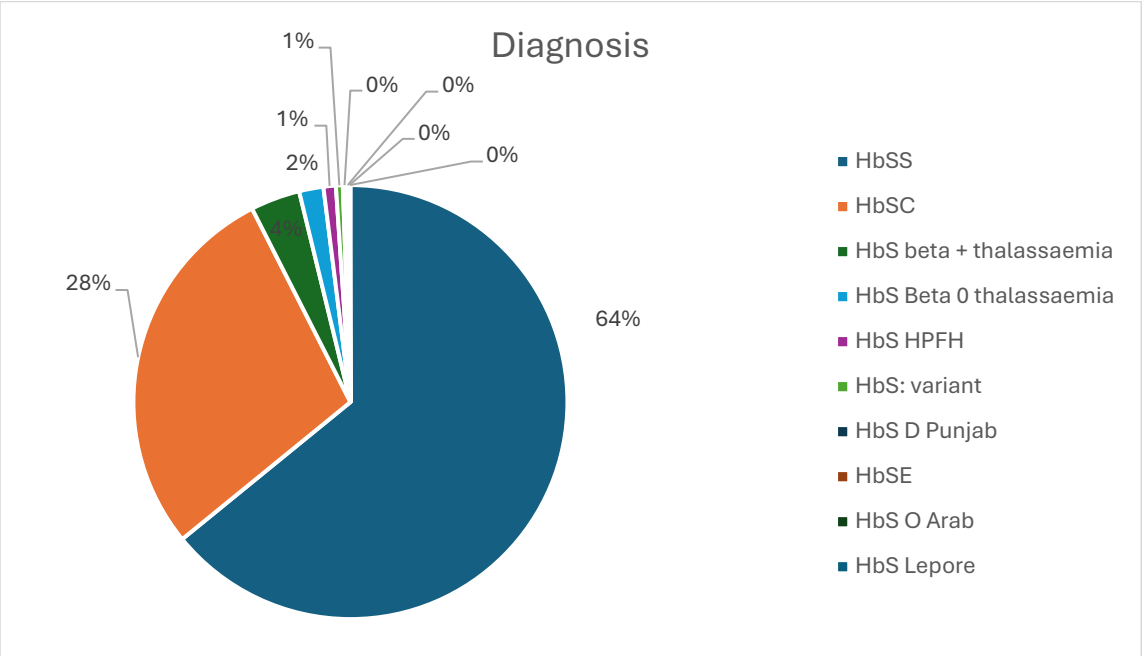

Figure 12 - Total Sickle cell patient cohort divided by diagnosis

The age distribution (Figure 13) demonstrates a predominantly young population. The largest age category was the under-17 group, comprising 33.5% (n=5,469) of the cohort, followed by 17–29 year olds at 24.6% (n=4,016), 30–39 year olds at 16.1% (n=2,626), 40–49 year olds at 11.6% (n=1,892), 50–59 year olds at 7.9% (n=1,294), 60–69 year olds at 4.6% (n=752), and 70 years and over at 1.1% (n=187). 0.6% (n=96) had no date of birth recorded. The progressive reduction in older age groups reflects the cumulative burden of disease-related morbidity and mortality across the lifespan.

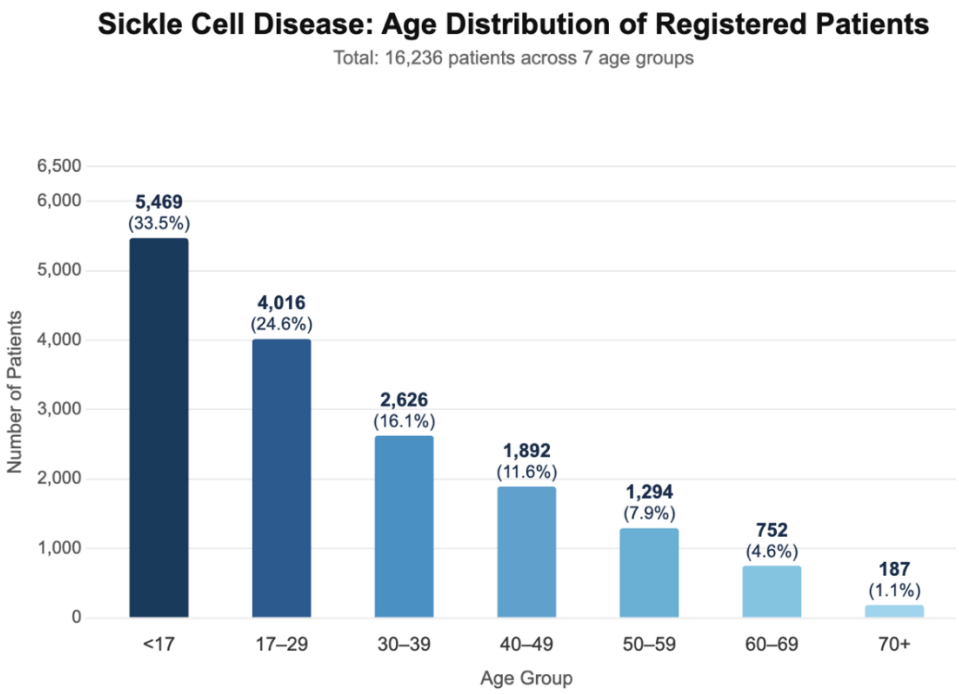

Figure 13 - Distribution of age groups for Sickle cell patients

Ethnicity

The majority ethnicity in the active cohort was Black African (n=9,226; 56.5%), followed by Caribbean (n=2,156; 13.2%) and other Black/African/Caribbean backgrounds (n=1,564; 9.6%). Ethnicity was not stated for 2,353 patients (14.4%). All other ethnic groups each represented less than 2% of the cohort. The proportion of missing ethnicity data limits precise assessment of population distribution and may mask further diversity within the cohort. (Figure 14)

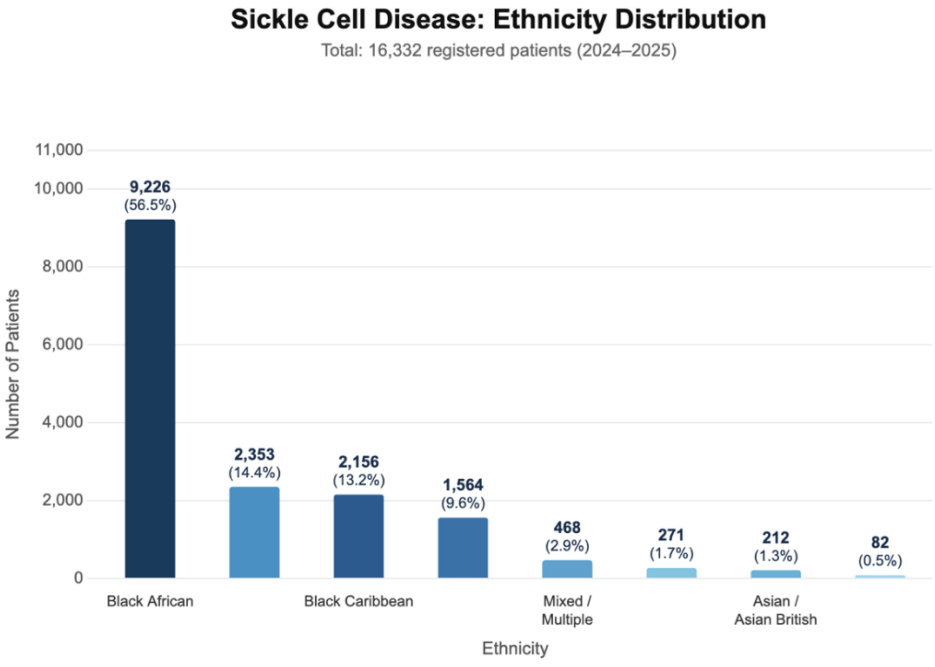

Figure 14 - Ethnicity distribution of Sickle cell patients

Service Provision

Annual Reviews

Of the 16,332 active patients, 10,257 (62.8%) had an annual review recorded for the 2024–2025 period, while 6,075 (37.2%) had no annual review documented. Although some of this may reflect incomplete data submission, the scale of missing data suggests that a substantial proportion of annual reviews are either not being recorded or not being performed in a structured manner, limiting the ability to assess quality of care across the networks. Equally if not more concerning is the possibility that some patients are not receiving an annual review at all. This would represent sub-standard care, as the annual review allows complications to be detected early, treatment options to be reviewed, and patient choice and education to be improved.

Admissions

It is known that admissions data reported to the NHR is incomplete for a number of centres. Using the admissions data that has been reported to NHR across the 27 Specialist Haemoglobinopathy Teams (SHTs), analysis of unscheduled inpatient activity appeared to demonstrate marked variation in healthcare utilisation. It is important to note that this variation is likely to be impacted by the incomplete reporting of admissions data to NHR. Eight high volume SHTs (>250 admissions) managed 49.7% of the cohort (n=8,140) but accounted for 68.1% of all inpatient admissions (n=3,380) and 64.7% of all bed days (n=13,064), with a reported admission rate of 41.5 per 100 patients compared to the overall cohort average reported to NHR of 30.6. Within this group, one centre was a clear outlier, accounting for 15.8% of all national admissions reported to NHR, despite managing a smaller proportion of patients. This centre reported an admission rate of 119.7 per 100 patients, an average of 4.0 admissions per admitted patient, and 578 bed days per 100 patients, all substantially higher than both group and cohort averages. Again, these figures may simply reflect more complete reporting of admissions to NHR by this centre compared to others. Other high-volume centres showed more moderate activity, with admission rates reported to NHR ranging from 29.0 to 52.8 per 100 patients and average lengths of stay between 1.2 and 5.3 days.

The six medium volume SHTs (n=2,723; 16.6% of the cohort) accounted for 18.6% of admissions reported to NHR (n=925), with an average rate of 34.0 admissions per 100 patients. While overall performance aligned broadly with cohort averages, some centres demonstrated prolonged lengths of stay of 5.4 and 6.8 days compared to the cohort average of 4.1 days.
In contrast, the thirteen low-volume SHTs (n=5,325; 32.5% of the cohort) reported only 13.2% of admissions (n=655) to NHR, with a markedly lower rate of 12.3 admissions reported to NHR per 100 patients. At several centres, admission rates were as low as 0.5 per 100 patients, which is unlikely to reflect true clinical burden.

The variation observed between centres more likely reflects differences in admission practices, local service models, the availability of ambulatory pathways and variability in data submission. This highlights considerable variability in reported activity and reinforces the need for more consistent and standardised data to compare service performance reliably.

Pregnancies

A total of 159 female patients (2.9% of the cohort) were recorded as having a pregnancy during the 2024–2025 period. In contrast, 4,730 (86.1%) were recorded as having no pregnancies, while 287 (5.2%) were classified as unknown. A further 316 patients (5.8%) had no recorded data for this field. The combined proportion of missing and unknown data (n=603; 11.0%).

Pregnancy Status	Number of Patients (n)	Percentage (%)
Yes	159	2.9%
No	4,730	86.1%
Unknown	287	5.2%
Not Recorded	316	5.8%
Total	**5,492**	**100%**

Table 9 - Pregnancies in Sickle cell patients in 2024-2025

For males in the year 2024-2025, 34 (0.7%) are recorded as fathering a child, 3,882 (81.5%) were recorded as not fathering a child, 504 (10.6%) were classified as unknown, and 341 (7.2%) males had no recorded data for this field.

Disease-Modifying Therapies (Transfusion and Hydroxycarbamide)

Regular transfusion therapy was recorded in 1,721 of 16,332 patients (10.5%), of whom 1,379 (80.1%) received red cell exchange and 334 (19.4%) received simple top-up transfusions. Hydroxycarbamide (HC) was prescribed to 2,663 patients (16.3%), representing a substantially larger treatment group. A total of 109 patients (0.7%) were recorded as receiving both therapies at a cohort level. There was substantial inter-centre variation in treatment utilisation. Transfusion use ranged from 3.1% (5/159) in some centres to 22.7% (156/688) in others. Hydroxycarbamide use ranged from 0.6% (1/159) to 17.7% (92/520) across centres.

Analysis of hydroxycarbamide eligibility and uptake showed that 5,841 patients (35.8%) were recorded as eligible, 5,476 (33.5%) were recorded as having been offered treatment, and 3,708 (22.7%) were documented as currently receiving therapy. However, 6,692 patients (41.0%) had no recorded data for eligibility or treatment status, and an additional 685 (4.2%) and 366 (2.2%) were recorded as unknown for eligibility and treatment respectively. When restricted to patients with known eligibility, treatment uptake appears relatively high; however, when considering the full dataset, overall coverage remains substantially lower.

Analysis of inpatient activity showed higher healthcare use among patients receiving disease-modifying therapies. Those on hydroxycarbamide had slightly higher admission rates (0.57 vs 0.48 per patient) and similar bed day use (2.13 vs 2.09) compared with those not on treatment. A more pronounced difference was seen in patients on regular transfusion programmes, who had lower admission rates (0.37 vs 0.63) and bed day use (2.12 vs 2.08) than those not transfused. This data is potentially affected by incomplete reporting of admissions data to NHR.

Patients receiving hydroxycarbamide or regular transfusion showed higher inpatient utilisation than those not on these treatments. This pattern is expected, as these therapies are generally offered to individuals with more severe or clinically complex disease, who consequently require more hospital care. The interpretation of these findings is limited by the substantial proportion of missing treatment data, particularly for hydroxycarbamide, where information was unavailable for 6,695 patients

SHT	Total Patients	Transfusion		Hydroxycarbamide		Both	
Birmingham Women's and Children's Hospital NHS FT and Sandwell and West Birmingham Hospitals NHS Trust	1609	82	5.1%	102	6.3%	6	0.4%
King's College Hospital NHS Foundation Trust	1402	128	9.1%	30	2.1%	1	0.1%
Barts Health NHS Trust	1401	210	15.0%	25	1.8%	1	0.1%
Guy's and St Thomas' NHS Foundation Trust	1364	240	17.6%	63	4.6%	6	0.4%
Manchester University NHS Foundation Trust	1019	35	3.4%	169	16.6%	7	0.7%
Lewisham and Greenwich NHS Trust	781	53	6.8%	53	6.8%	3	0.4%
North Middlesex University Hospital NHS Trust	717	73	10.2%	87	12.1%	12	1.7%
St Georges Healthcare NHS Foundation Trust	688	156	22.7%	6	0.9%	1	0.1%
Imperial College Healthcare NHS Trust	656	144	22.0%	36	5.5%	3	0.5%
Oxford University Hospitals NHS Foundation Trust	593	59	9.9%	48	8.1%	12	2.0%
Leeds Teaching Hospitals NHS Trust	553	46	8.3%	29	5.2%	5	0.9%
London Northwest University Healthcare NHS Trust	549	38	6.9%	15	2.7%	1	0.2%
Barking Havering and Redbridge University Hospital Trust	537	52	9.7%	36	6.7%	2	0.4%
University College Hospitals NHS Foundation Trust	520	116	22.3%	92	17.7%	16	3.1%
University Hospitals of Leicester NHS Trust	455	35	7.7%	33	7.3%	7	1.5%
Whittington Health NHS Trust	448	18	4.0%	9	2.0%	0	0.0%
Nottingham University Hospitals NHS Trust	369	49	13.3%	29	7.9%	2	0.5%
Homerton Healthcare NHS Foundation Trust	368	14	3.8%	1	0.3%	0	0.0%
University Hospitals Bristol & Weston NHS Foundation Trust	345	26	7.5%	28	8.1%	6	1.7%
Croydon Health Services NHS Trust	337	19	5.6%	14	4.2%	0	0.0%
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	313	38	12.1%	15	4.8%	3	1.0%
Addenbrooke's Hospital Cambridge (Cambridge University Hospitals NHS Foundation Trust)	266	12	4.5%	8	3.0%	2	0.8%

Royal Liverpool University Hospital (Liverpool University Hospitals NHS Foundation Trust)	251	21	8.4%	18	7.2%	2	0.8%
University Hospital Southampton NHS Foundation Trust	196	15	7.7%	11	5.6%	4	2.0%
Sheffield Teaching Hospitals NHS Foundation Trust	177	18	10.2%	25	14.1%	6	3.4%
University Hospital of Wales (Cardiff and Vale University Health Board)	159	5	3.1%	1	0.6%	1	0.6%
Sheffield Children's NHS Foundation Trust	115	5	4.3%	7	6.1%	0	0.0%
NULL	144	14	9.7%	3	2.1%	0	0.0%

Table 10 - Disease Modifying therapies across SHTs (anonymised) for Sickle cell patients

Management of Iron Overload

Chelation

Among the 1,230 patients marked as receiving regular transfusion on their annual review, iron chelation therapy was documented in 243 patients (14.1%). Chelation was more frequently recorded in patients receiving simple transfusion (93/317; 29.2%) compared to those receiving exchange transfusion (150/1,228; 12.2%). Deferasirox monotherapy accounted for the majority of treatments (190 patients; 87.1%), followed by desferrioxamine (34; 14.0%), deferiprone (8; 3.3%) and combination therapy (11; 4.5%). A further 44 patients receiving chelation had no corresponding transfusion record, indicating likely data gap in records. The proportion of patients recorded as receiving chelation appears low for a transfused population and likely reflects incomplete data capture rather than true absence of therapy.

Category	Red Cell Exchange (n=1,379)	Simple Top-up (n=334)	Total (n=1,713)
Deferasirox (monotherapy)	109 (7.5%)	81 (20.5%)	190 (10.3%)
Desferrioxamine (monotherapy)	26 (1.8%)	8 (2.0%)	34 (1.8%)
Deferiprone (monotherapy)	7 (0.5%)	1 (0.3%)	8 (0.4%)
Combination therapy	8 (0.6%)	3 (0.8%)	11 (0.6%)

Table 11 - Iron chelation therapy in Sickle cell patients

MRI Monitoring

Cardiac MRI monitoring was analysed across the dataset to assess imaging for iron overload monitoring. A total of 200 patients were recorded as having undergone cardiac MRI during the reporting period. Only a small proportion of patients undergoing regular transfusion and on chelation had recorded cardiac MRI during the reporting year, suggesting incomplete reporting or variation in monitoring practices.

Transfusions and antibodies

There are 1721 sickle cell patients having regular transfusions recorded on the NHR (1379 automated red cell exchange, 21 manual exchange and 334 having top-up transfusions). Amongst sickle cell patients, there were 437 new allo-antibodies identified in the period 2024-25. The most common antibodies to develop were anti-C, Pan-reactive antibody, anti-S and anti-E. The most common allo-antibodies overall were anti-C, anti-S, anti-E, and anti-jkb. Blood in the UK for sickle cell patients is matched for Rh blood group systems (C/c, E/e). In these cases, antibody formation may represent antibodies due to blood products transfused overseas, exposure through pregnancy, or Rh variants that may not be seen in the general donor population.

Antibody	New antibodies (2024-5)	Total
Anti-A1	0	7
Anti-Bga	0	1
Anti-c	0	16
Anti-C	38	191
Anti-Ce	4	32
Anti-Ch	0	1
Anti-Ch/Rg	0	1
Anti-Cob	0	4
Anti-Cw	5	48
Anti-D	16	86
Anti-Doa	0	3
Anti-Dob	0	1
Anti-e	21	159
Anti-E	25	162
Anti-f (ce)	2	8
Anti-Fya	23	117
Anti-Fyb	3	8
Anti-Fy3	5	50
Anti-Fy5	0	1
Anti-G	0	1
Anti-Goa	0	3
Anti-HI	2	12
Anti-HrB	1	2
Anti-Hy	0	1
Anti-I	0	3
Anti-Jka	4	41
Anti-Jkb	24	108
Anti-JMH	1	1
Anti-Jra	0	1
Anti-Jsa	1	4
Anti-Jsb	1	3
Anti-K	7	60
Anti-Kna	1	2
Anti-Kpa	8	82
Anti-Le(a+b)	1	2
Anti-Lea	12	70
Anti-Leb	3	27
Anti-Lua	9	46
Anti-LW(ab)	1	1
Anti-M	18	100
Anti-McCa	0	1
Anti-N	3	16
Anti-s	1	9
Anti-S	30	158

Anti-Sla	1	1
Anti-U	4	11
Anti-V	0	2
Anti-V/VS	0	1
Anti-VS	0	2
Anti-Vw	0	1
Anti-Wra	0	4
Anti-Xga	0	1
Anti-Yta	0	1
CR1-related antibody	9	25
e-related antibody	0	3
IgG + IgM Anti-A	0	1
IgG + IgM Anti-B	0	1
IgG Anti-A	0	2
IgG Anti-A x A1 Cells	0	1
IgG Anti-A x A2 Cells	0	1
IgG Anti-B	0	3
IgM Anti-A	0	2
IgM Anti-A x A1 Cells	0	1
IgM Anti-A x A2 Cells	0	1
IgM Anti-B	0	2
Kell-related antibody	0	1
Knopps-related antibody	5	8
Pan-reactive antibody	31	
Specificity not determined	111	370
Unassigned antibody identity	6	44
Total	**437**	**2,380**

Table 12 - Antibodies recorded for Sickle cell patients

Comorbidities

Among 16,332 patients, 4,440 (27.2%) are recorded as having at least one comorbidity in total. In 2024-2025 749 patients were recorded as having at least one comorbidity. The most frequently documented complication in the NHR is simple painful crisis (n=2,496; 21.1% of comorbidities recorded), followed by acute chest syndrome (n=835; 7.1%), COVID-19 infection (n=574; 4.9%), and avascular necrosis (n=455; 3.9%). Other complications included Priapism (n=213; 1.8%), Parvovirus (n=209; 1.8%), pulmonary embolism (n=169; 1.4%), pneumonia (n=168; 1.4%), asthma (n=165; 1.4%%), retinopathy (n=160; 1.4%), Pulmonary hypertension (n=133; 1.1%), chronic pain syndromes (n=119; 1.0%), ischaemic stroke (n=113; 1.0%), Leg ulcers (n=113; 1.0%), Acute Osteomyelitis (n=109; 0.9%) and Hepatitis B (n=102; 0.9%). The median number of comorbidities per patient was 2, with a subset of patients demonstrating higher multimorbidity. However, the relatively low proportion of patients with any recorded comorbidity suggests lack of documentation rather than true prevalence and limits the ability to accurately quantify disease burden across the cohort.

Comorbidity	**Comorbidities**
Simple painful crisis	2496
Acute chest syndrome	835
COVID-19	574
Avascular necrosis	455
Priapism	213
Parvovirus	209
Pulmonary embolism	169

Pneumonia	168
Asthma	165
Retinopathy	160
Pulmonary hypertension	133
Chronic Pain	119
Ischaemic stroke	116
Leg Ulcers	113
Acute Osteomyelitis	109
Hepititus B	102
Other complications (miscellaneous)	5679

Table 13 - Total comorbidities recorded on the NHR

Serious Adverse Events (SAEs)

A total of 521 serious adverse events have been recorded on the NHR in total. Death was the most frequently recorded event (n=226; 43.4%), followed by ischaemic stroke (n=116; 22.3%). Additional events included Delayed HTR - Not thought to be associated with antibody: hyperhaemolysis (n=40; 7.7%), haemorrhagic stroke (n=34; 6.5%), Cardiac failure (n=32; 6.1%), Delayed HTR - Associated with a new antibody (conventional DHTR) (n=28; 5.4%), pneumococcal infection (n=28; 5.4%) and Delayed HTR - Associated with previous antibody (n=10; 1.9%). Intrauterine death was recorded in 7 patients (1.3%).

Deaths

During the 2024–2025 reporting period, 70 deaths were recorded among patients with sickle cell disease. The gender of these patients were 36 Females and 34 males. Of the 8 deaths for patients aged under 17 (11.4%) there were 6 males and 2 Females.

Surgery and Procedures

Among active patients, the most frequently recorded surgical procedures were cholecystectomy (n=304), hip replacement (n=178) and splenectomy (n=166). ENT interventions included 108 adenotonsillectomies, 64 tonsillectomies, and 23 adenoidectomies. Patients undergoing transplantation included 42 allogenic sibling bone marrow transplants, 22 haploidentical transplants, 9 matched unrelated donor transplants, 3 other family-donor transplants and 22 renal transplants. Additional procedures included retinal surgery (n=30), shoulder replacement (n=20), permanent indwelling cvc > 4 weeks (15), Resection of mass (10) and knee replacement (n=9). These findings reflect the cumulative burden of disease related complications and long-term organ damage.

Data Completeness and Limitations

The interpretation of these findings is affected by gaps in data across several key areas. Annual reviews were not recorded for 37.2% of patients, impacting Hydroxycarbamide and pregnancy data. Recording of MRI monitoring and iron chelation also appears incomplete and there are some inconsistencies between transfusion and chelation data. In addition, the wide variation in admission rates between centres may partly reflect differences in data submission rather than true clinical variation.

These limitations make it difficult to draw firm conclusions about treatment coverage, clinical outcomes and patterns of healthcare use. Improving the completeness and consistency of data collection across centres will be important for more reliable analysis in future reports.

Chapter 5: Transcranial Doppler (TCD) Screening in Sickle Cell Disease Quality Assurance Programme

Background

TCD screening for stroke risk in paediatric SCD remains a core NHRV2 data-field supporting the national quality assurance via this program. The 2023/2024 annual report focussed on overall enrolment trends, achieving provision of TCD screening across the Network, appointing lead TCD practitioners who are responsible for ensuring consistent TCD delivery across their HCC. This included standardised TCD protocols and ensuring sufficient TCD practitioners to support the Service.

Provision of TCD screening across the Network

All TCD results are logged directly into the NHRV2 at HCC level and are available for identifying trends and inconsistencies across the Network. A total of 2941 TCD scans were performed in the 12 month review period, compared to 2597 in the previous review period representing a 12% increase in scans. Some errors in HCC allocation were noted which will be referred for QA review by the relevant HCC. The breakdown of scans across the Network is summarised in the Table below in terms of TCD mode, STOP category and non-diagnostic scans.

TCD Screening by Haemoglobinopathy Coordinating Centre

Sickle Cell Disease — National Haemoglobinopathy Registry 2024–2025

HCC	Patient Status		TCD Result Category						Total Scans
	Imaging	Non-Imaging	Normal	Conditional	Abnormal	Non-diagnostic	Compliance	Attenuation	
South East London & South East	693	6	577	63	7	38	13	25	**699**
East London & Essex	186	192	328	29	2	4	0	4	**378**
North East & Yorkshire	242	100	251	51	22	10	8	2	**342**
West London	330	1	296	13	3	9	4	5	**331**
North Central London & East Anglia	63	197	220	19	4	11	2	9	**260**
North West	252	1	235	7	2	5	2	3	**253**
West Midlands	30	215	230	5	2	3	2	1	**245**
East Midlands	175	2	159	10	3	3	0	3	**177**
Wessex & Thames Valley	77	87	133	10	4	18	6	12	**164**
South West	87	0	69	13	0	5	1	4	**87**
Unspecified	3	0	3	0	0	0	0	0	**3**
London and South East	1	0	1	0	0	0	0	0	**1**
North	1	0	1	0	0	0	0	0	**1**
Total	**2,140**	**801**	**2,503**	**220**	**49**	**169**	**38**	**68**	**2,941**

Table 14 - TCD screening by HCC

Key observations from the data include:

- There was a reduction in practising TCD practitioners from 70 to 65, which may contribute to waiting list pressures.
- Most patients were scanned with imaging TCD (73%)
- The fraction of scans classified with elevated TCD velocities across the Network was; 220 conditional STOP and 49 abnormal STOP.
- At HCC level two centres showed higher abnormal STOP classifications, this figure may be influenced by new referrals and patients on transfusion that may have persistently abnormal values.

- 169 scans were non-diagnostic due to either patient compliance or attenuation of ultrasound through skull bone – these patients were referred for MRA if persistently non-diagnostic.

Scans with anomalies from 01/04/2024 – 31/03/2025

Table 15 summarises anomalous data entry where scans classified as normal STOP were entered with velocities above 170cm/s TAMV. This occurred in 13 patients and requires QA review to ensure high velocities are correctly identified and categorised.

TCD Scan Quality — Scans Outside Velocity Limits by HCC

Sickle Cell Disease — NHR 2024–2025 | Total scans: 2,653 | Overall out-of-limits rate: 6.1%

HCC	Scans Outside Limits			Total Scans	% Outside Either Limit
	Above upper limit	Below lower limit	Outside both limits		
West Midlands	4	39	0	246	17.5%
East London & Essex	3	39	0	348	12.1%
Wessex & Thames Valley	0	12	0	136	8.8%
South East London & South East	1	30	0	620	5.0%
East Midlands	0	7	0	169	4.1%
West London	1	11	0	310	3.9%
North Central London & East Anglia	1	8	0	231	3.9%
North East & Yorkshire	3	2	0	266	1.9%
North West	0	1	0	252	0.4%
South West	0	0	0	72	0.0%
London and South East	0	0	0	1	0.0%
North	0	0	0	1	0.0%
Midlands	0	0	0	0	0.0%
London, South Central & South West	0	0	0	0	0.0%
Unspecified	0	0	0	1	0.0%
Total	**13**	**149**	**0**	**2,653**	**6.1%**

Red = ≥10% outside limits | Amber = 5–9.9% outside limits

Table 15 - Scan quality

Summary

All TCD data is being reviewed locally and is showing promising trends in TCD velocities across the cohort. However, full quality assurance, particularly erroneous data entries, TCD modality impact and inter-operator variability, remain pending before final TCD data interpretation. Overall, this registry offers a solid foundation for future benchmarking, pending refinements including completion of QA assessments at Network and HCC level.

Chapter 6: Rare Inherited Anaemias (RIAs)

Introduction

The systematic inclusion of RIAs in the NHRv2 continues to evolve, with this reporting period focusing particularly on iron burden monitoring, transfusion management, and therapeutic interventions. As with the previous report, RIA abbreviations used throughout this chapter include:
DBA — Diamond Blackfan Anaemia
CDA — Congenital Dyserythropoietic Anaemia (types I, II, III, IV, and unclassified)
CSA — Congenital Sideroblastic Anaemia
HS — Hereditary Spherocytosis (transfusion-dependent only)
HPP — Hereditary Pyropoikilocytosis
HSt — Hereditary Stomatocytosis
PKD — Pyruvate Kinase Deficiency
G6PD — Glucose-6-Phosphate Dehydrogenase Deficiency

As of 31st March 2025, 754 patients with RIAs were registered on the NHRv2, representing a significant increase from the 508 patients reported in 2021-2022. This 48.4% growth reflects improved case ascertainment and enhanced engagement with the registry across specialist centres. A significant number of patients with diagnoses that should not be reported on the NHR (eg Fanconi anaemia, aplastic anaemia, thrombotic thrombocytopenic purpura) needed to be removed before data analysis was carried out to ensure only appropriate diagnoses were considered.

Patient Demographics and Distribution

Total Patient Numbers and Registration Growth

Despite the increase in registered RIA patients, the total figure of 611 active patients likely represents underreporting when compared to estimated UK prevalence figures. For context, patient support groups such as DBA UK estimate 150–200 DBA patients nationally, and the Congenital Anaemia Network (CAN) reports approximately 30–40 known CDA patients in the UK.

Distribution by Diagnosis

Analysis of the 611 active patients shows the following diagnostic distribution:

Diagnostic Category	Number of Patients	Percentage
Bone Marrow Failure / Congenital Syndromes	158	25.9%
Unspecified / Diagnosis Pending	100	16.4%
Red Cell Enzyme Disorders	114	18.7%
Red Cell Membrane Disorders	75	12.3%
Unstable Haemoglobins	55	9.0%
Congenital Dyserythropoietic Anaemias	55	9.0%
Congenital Sideroblastic Anaemias	39	6.4%
Methaemoglobinaemia	12	2.0%
Iron Disorders	3	0.5%
Total	**611**	**100%**

Table 16 - RIA patients by major diagnostic category

The largest diagnostic category remains bone marrow failure syndromes and congenital conditions, dominated by Diamond Blackfan Anaemia (DBA). DBA continues to be the single most common specific diagnosis in the RIA cohort, consistent with the 2021–2022 findings. A large proportion (16.4%) are reported as having an "unknown" inherited anaemia, a

reduction from the 24.6% recorded in the 2021–2022 cohort. Currently, genetic diagnosis is not a mandatory field, so it is not known whether these are individuals in whom genetic and phenotypic testing has been carried out but no diagnosis could be reached, or individuals in whom all available and appropriate tests have not yet been performed.

Sub-Classification of Major Categories

Sub-Type	Number of Patients	Percentage
Diamond Blackfan Anaemia	156	98.7%
ADA2 Deficiency	1	0.6%
Thiamine-Responsive Megaloblastic Anaemia (TRMA)	1	0.6%

Table 17 - Bone marrow failure / congenital syndromes (158 patients)

Sub-Type	Number of Patients	Percentage
Pyruvate Kinase Deficiency	98	86.0%
G6PD Deficiency	7	6.1%
Glucose Phosphate Isomerase Deficiency	4	3.5%
Pyrimidine 5' Nucleotidase Deficiency	3	2.6%
Glutathione Synthetase Deficiency	1	0.9%
Hexokinase Deficiency	1	0.9%

Table 18 - Red cell enzyme disorders (114 patients)

Sub-Type	Number of Patients	Percentage
CDA Type I	22	40.0%
CDA Type II	12	21.8%
CDA Type III	2	3.6%
CDA Type IV	1	1.8%
CDA Unclassified / Other	18	32.7%

Table 19 - Congenital Dyserythropoietic Anaemias (55 patients)

Sub-Type	Number of Patients	Percentage
Hereditary Spherocytosis	53	70.7%
Hereditary Stomatocytosis	8	10.7%
Hereditary Elliptocytosis	6	8.0%
Transfusion Dependent Membrane Disorders	4	5.3%
Hereditary Pyropoikilocytosis	3	4.0%
South East Asian Ovalocytosis	1	1.3%

Table 20 - Red cell membrane disorders (75 patients)

Geographic Distribution

RIA patients are registered across 27 Specialist Haemoglobinopathy Teams (SHTs) in England. The distribution shows expected concentration in major tertiary centres with dedicated inherited anaemia expertise:

SHT	Number of Patients
Birmingham Women's and Children's Hospital NHS FT and Sandwell and West Birmingham Hospitals NHS Trust	80
Manchester University NHS Foundation Trust	51
Oxford University Hospitals NHS Foundation Trust	48
Barts Health NHS Trust	44
University College Hospitals NHS Foundation Trust	43
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	40
Royal Liverpool University Hospital (Liverpool University Hospitals NHS Foundation Trust)	33
Nottingham University Hospitals NHS Trust	29
University Hospitals Bristol & Weston NHS Foundation Trust	26
Leeds Teaching Hospitals NHS Trust	23

Table 21- Top 10 SHTs by active RIA patient numbers (2024-2025)

The concentration of patients in London centres accounts for 184 active patients (24.4% of the total cohort), reflecting both population distribution and the location of highly specialised services. The largest contributors are UCLH (43), Barts (44) and London North West (15), alongside Imperial, Whittington, Guy's and St Thomas', St George's and King's. There is marked variation between centres in data completeness. Some SHTs have comprehensive medication and imaging data for >80% of their patients; others have minimal data beyond basic demographics. This likely reflects local data manager time allocation rather than actual differences in clinical care.

Age Distribution

The age distribution of RIA patients demonstrates the lifelong nature of these conditions:

Age Group	Number of Patients	Percentage
Under 5	100	16.4%
5 to 10	69	11.3%
11 to 16	76	12.4%
17 to 20	40	6.5%
21 to 29	71	11.6%
30 to 39	88	14.4%
40 to 49	57	9.3%
50 to 59	55	9.0%
60 to 69	39	6.4%
70 plus	12	2.0%
Not recorded	4	0.7%
Total	**611**	**100%**

Table 22 - Age distribution of active RIA patients

Ethnic Distribution

RIAs affect all ethnic groups, unlike the more ethnically restricted distributions seen in sickle cell disease and thalassaemia. The ethnic distribution was:

Ethnic Group	Number of Patients	Percentage
White	269	44.0%
Asian / British Asian	92	15.1%
Black / African / Caribbean / Black British	53	8.7%
Other Ethnic Group	184	30.1%
Mixed / Multiple Ethnic Groups	13	2.1%
Total	**611**	**100%**

Table 23 - Ethnic distribution of active RIA patients

Annual reviews

Structured annual review data specific to RIAs remains limited. The current annual review form is optimised for sickle cell disease, with many fields not relevant to RIAs. An RIA-specific annual review proforma is needed. Of the entire group of 754 patients, only 308 had an annual review recorded. However, not all 754 patients were marked as “active” for the period of 2024-2025. There were 611 active RIA patients (81% of the cohort), of which only 296 have a completed annual review (48.4%). This is concerning for the 315 active patients who have no completed 2024–2025 annual review.

The status of active/inactive was not evenly distributed amongst the RIA subgroups:

- **Congenital Dyserythropoietic Anaemias:** 91.7% active (OR 2.73, p = 0.026).
- **Bone Marrow Failure / Congenital Syndromes:** 87.3% active (OR 1.82, p = 0.013).
- **Unspecified / Diagnosis Pending:** 66.7% active (OR 0.36, p < 0.0001).

The rest of the RIA subgroups were neither over- nor under-represented in the active/inactive groups. Overall, patients with a confirmed congenital diagnosis (CDA, DBA/BMF) were more likely to stay in active specialist follow-up, whereas the "Unspecified / Diagnosis Pending" group was disproportionately inactive, suggesting that further investigations in this group did not confirm a likely RIA and follow up was discontinued.

Clinical Management

Transfusion Therapy

Transfusion support remains a cornerstone of management for many RIA patients. The 2024-2025 data reveals:

- 89 regularly transfused patients (14.6% of all RIA patients)
- 48 patients receiving ad hoc transfusions (7.9% of all RIA patients)
- Total patients receiving any transfusion support: 178 patients (22.4%)

Diagnoses with at least three regularly transfused patients are shown. Percentages are calculated among patients with a recorded Yes/No long-term transfusion status; patients with blank or unknown status are excluded.

Diagnosis	Regularly Transfused Patients	Percentage of Diagnosis
Diamond Blackfan Anaemia	38	50.0%
Pyruvate Kinase Deficiency	12	22.2%
Congenital Sideroblastic Anaemia	11	28.2%
Unstable Haemoglobin	6	23.1%
Congenital Dyserythropoietic Anaemia	5	35.7%
Unexplained Anaemia	6	25.0%
Hereditary Spherocytosis	4	28.6%

Table 24 - Regular transfusion by diagnosis

Regularly transfused patients

Regular (long-term) transfusion was recorded for 89 patients, representing 31.2% of the 275 patients with a documented transfusion status of Yes or No and 14.6% of 611 active patients. Diamond Blackfan Anaemia accounted for the largest proportion of patients, with 38 regularly transfused patients (50.0% of those with a recorded status), followed by Pyruvate Kinase Deficiency (12 patients, 22.2%) and Congenital Sideroblastic Anaemia (11 patients, 28.2%). The high proportions seen in the Diamond Blackfan Anaemia and Congenital Sideroblastic Anaemia groups are consistent with the transfusion-dependent phenotypes typical of these conditions. Smaller numbers of regularly transfused patients were seen across Congenital Dyserythropoietic Anaemia, Unstable Haemoglobin, Unexplained Anaemia and Hereditary Spherocytosis.

These figures should be interpreted in the context of incomplete data capture: long-term transfusion status was not recorded for 336 active patients (55.0).. Percentages by diagnosis are therefore calculated among patients with a documented status rather than all patients with that diagnosis, and the true population prevalence of transfusion dependence cannot be determined from these data.

New Antibodies

There were 3 new allo-antibodies identified in 2024-5, in two patients. The most common allo-antibodies identified overall in this cohort are anti-E and anti-K.

Red cell antibody	Count 2024-5	Total
Anti-c	0	2
Anti-C	0	6
Anti-Cw	0	1
Anti-D	0	4
Anti-E	0	7
Anti-Fya	0	1
Anti-G	0	1
Anti-K	2	4
Anti-Kpa	1	4
Anti-Lua	0	2
Anti-S	0	1
Anti-Wra	0	1
Specificity not determined	0	9
Total	**3**	**52**

Table 25 - Red cell antibodies

MRI Monitoring of Transfused Patients

Of the 92 regularly transfused patients, 61 were recorded as eligible for cardiac MRI (T2*) iron assessment. Of these, 54 (88.5%) had received a scan in the reporting period, indicating good adherence to cardiac iron-overload surveillance in this group. A further 18 transfused patients were recorded as not eligible, and eligibility was unknown for 13. BSH guidelines recommend annual liver iron assessment and 1–2 yearly cardiac assessment for all regularly transfused patients; however, the NHRv2 captures only cardiac MRI status, so liver iron monitoring cannot be assessed from these data. As highlighted in the thalassaemia and SCD chapters, where scans are not recorded it is not possible to determine whether patients did not have their scans, had scans requested but did not attend, or had their scans but the data has not been entered into the NHRv2.

Imaging Modality	Number of Patients	Number of Scans	Patients with Earlier Scans
Ferriscan (Liver Iron)	25	29	21 (84.0%)
Cardiac T2*	27	28	21 (77.8%)
Liver T2*	10	10	6 (60.0%)
Other Iron Imaging	2	2	0 (0%)

Table 26 - Iron Burden Imaging in regularly transfused patients

Cardiac Iron Burden Assessment

Severity Category	Cardiac T2* Range (ms)	Number of Patient Scans	Percentage
Severe	< 10 ms	3	10.7%
Moderate	10–19 ms	2	7.1%
Mild	20–34 ms	15	53.6%
Normal	≥ 35 ms	8	28.6%
Total		**28**	**100%**

Table 27 - Cardiac T2* Results and severity categories

The mean cardiac T2* in the cohort was 28.4 ms (median 27.7 ms), with 82.1% of patient scans demonstrating normal or mild cardiac iron loading. However, 3 patient scans (10.7%)

had severe cardiac iron loading (T2* < 10 ms), indicating significant cardiac risk and need for treatment intensification.

Liver Iron Burden Assessment

Severity Category	LIC Range (mg/g dry weight)	Number of Patient Scans	Percentage
Normal	< 3 mg/g dw	7	24.1%
Mild	3–7 mg/g dw	8	27.6%
Moderate	7–15 mg/g dw	10	34.5%
Severe	> 15 mg/g dw	4	13.8%
Total		**29**	**100%**

Table 28 - Ferriscan liver iron concentration

Mean liver iron concentration was 10.9 mg/g dry weight (median 6.3 mg/g dw), with 48.3% of patient scans demonstrating moderate to severe liver iron loading requiring chelation therapy.

Iron Chelation Therapy

Of 611 total active RIA patients in 2024-2025, 233 patients (38.1%) are documented as receiving medications in the NHRv2. Among these 233 patients with medication data, 108 patients (46.4%) are receiving iron chelation therapy.

Chelation Regimen	Number of Patients	Percentage
Deferasirox monotherapy	78	72.2%
Desferrioxamine monotherapy	16	14.8%
Deferiprone monotherapy	5	4.6%
Combination therapy (Deferasirox + Desferrioxamine)	7	6.5%
Combination therapy (Deferasirox + Deferiprone)	2	1.9%
Total	**108**	**100%**

Table 29 - Iron chelation regimens (2024-2025)

Ad Hoc Transfusion Monitoring

Of the 48 patients registered as ever receiving ad hoc transfusions, 10 received an adhoc transfusion in the 12 months. the transfusion burden was a mean of 1.1 units per patient in 12 months. Of those 10, none had any iron burden imaging.

High Ferritin Without Imaging

Analysis of ferritin data across all RIA patients identified 67 patients since 2019 with ferritin values > 1000 µg/L. Of these:

- 29 patients (43.3%) had no liver MRI imaging recorded
- 18 patients (26.9%) had no cardiac MRI imaging

Diagnosis	Ferritin > 1000	No Liver Imaging Ever	No Cardiac Imaging Ever	No Imaging at All
Diamond Blackfan Anaemia	20	5	2	0
Pyruvate Kinase Deficiency	13	8	6	6
Congenital Sideroblastic Anaemia	12	2	1	1
Unstable Haemoglobin	7	2	1	1
Transfusion Dependent Membrane Disorders	4	4	4	4
Unexplained Anaemia	4	1	0	0
Other diagnoses	7	7	4	4
Total	**67**	**29**	**18**	**16**

Table 30 - High Ferritin (> 1000 µg/L) without imaging by diagnosis

Splenectomy

Splenectomy remains an important therapeutic option for selected RIA patients, particularly those with red cell membrane disorders and some enzyme deficiencies. 48 patients (6.4% of all RIA patients) are recorded as having had splenectomy.

Diagnosis	Number of Splenectomies	Percentage of Diagnosis
Pyruvate Kinase Deficiency	28	57.1%
Unstable Haemoglobin	7	14.3%
CDA Type II	3	6.1%
CDA Type I	2	4.1%
Glucose Phosphate Isomerase Deficiency	2	4.1%
Other diagnoses	6	12.2%
Total	**48**	**6.4% overall**

Table 31 - Splenectomy by diagnosis

13 patients (27.1%) continue to require transfusions post-splenectomy.

Diagnosis	Patients Still Transfused	Total Splenectomies	Percentage
Pyruvate Kinase Deficiency	4	28	14.3%
Unstable Haemoglobin	3	7	42.9%
CDA Type II	2	3	66.7%
CDA Type I	0	2	0.0%
Glucose Phosphate Isomerase Deficiency	2	2	100.0%
CDA Type I	0	2	
Other	2	6	33.3%
Total	**13**	**48**	**27.1%**

Table 32 - Diagnoses in patients requiring post-splenectomy transfusions

Bone Marrow Transplantation

Haematopoietic stem cell transplantation (HSCT/BMT) represents definitive curative therapy for selected RIA patients. 9 patients (0.9% of all RIA patients registered) had received BMT, representing no increase from 9 patients reported in 2021-2022.

Diagnosis	Number with BMT	% of BMT patients
Diamond Blackfan Anaemia	7	77.8%
CDA Type II	1	11.1%
CDA Unclassified	1	11.1%
Total	**9**	**100%**

Table 33 - BMT by diagnosis

Diamond Blackfan Anaemia accounts for 77.8% of RIA patients receiving BMT (7/9), consistent with UK guidelines recommending matched sibling BMT as definitive treatment for severe, transfusion-dependent DBA.

Medications

Medication Category	Number of Treatments	Percentage
Vitamins/Supplements	151	62.7%
Chelation	121	50.2%
Antibiotics (prophylaxis)	47	19.5%
Immunosuppressants	27	11.2%
Gastrointestinal/PPI	34	14.1%
Hormones	19	7.9%
Cardiovascular	22	9.1%
Disease-specific (e.g. corticosteroids for DBA)	18	7.5%
Diabetes medications	11	4.6%
Pain/Symptomatic	28	11.6%
Other	43	17.8%

Table 34 - Medication categories in RIA patients

(all treatments recorded on the NHR)

Of 48 splenectomy patients, 42 (87.5%) were documented as receiving antibiotic prophylaxis, though this should be 100% per UK guidelines, suggesting under-recording or non-compliance.

Comorbidities and Complications

Unlike sickle cell disease where specific complications have dedicated data fields, RIA complications are captured in free-text notes, making systematic analysis difficult.

Endocrine Complications

- Growth hormone deficiency: 8 patients (primarily DBA patients)
- Hypothyroidism: 12 patients
- Diabetes mellitus: 11 patients (Type 1: 4; Type 2: 7)
- Hypogonadism: 7 patients

Bone Health

- Osteopenia/Osteoporosis: 18 patients
- Fractures: 6 patients

Cardiovascular Complications

- Cardiac dysfunction (reduced ejection fraction): 4 patients
- Arrhythmias: 3 patients
- Pulmonary hypertension: 2 patients

All cardiovascular complications occurred in patients with moderate to severe cardiac iron loading (T2* < 20 ms).

Hepatic Complications

- Liver fibrosis: 14 patients
- Cirrhosis: 3 patients
- Hepatitis C (historical transfusion-acquired): 4 patients

Infectious Complications

- Documented severe infections post-splenectomy: 6 patients
- Sepsis requiring ICU admission: 2 patients

Thrombotic Complications

- Deep vein thrombosis: 4 patients (3 post-splenectomy)
- Pulmonary embolism: 2 patients (both post-splenectomy)

Mortality

Mortality data showed 11 deaths recorded (1.5% of 754).

Diagnosis	Deaths	Total Patients	Mortality Rate
Diamond Blackfan Anaemia	4	177	2.3%
Congenital Sideroblastic Anaemia	2	46	4.3%
Pyruvate Kinase Deficiency	2	117	1.7%
CDA Type I	1	24	4.2%
Other diagnoses	2	390	0.5%
Total	**11**	**754**	**1.5%**

Table 35 - Mortality by diagnosis

Causes of death where documented included:

- Cardiac complications of iron overload: 3 patients
- Sepsis/infection: 3 patients (2 post-splenectomy)
- Multi-organ failure: 2 patients
- Unknown/not documented: 3 patients

Chapter 7: Psychology Report

Background

People living with Sickle Cell Disease (SCD), Thalassaemia, and Other Rare Inherited Anaemias (RIA) experience substantial, lifelong physical and psychosocial burden. Evidence consistently shows elevated risks of depression, anxiety, pain interference, neurocognitive difficulties, treatment adherence challenges and reduced quality of life. These factors are linked to greater unplanned health service utilisation (e.g. hospital admissions, inpatient bed-days). Integrating psychology into haemoglobinopathy pathways improves identification of need, supports coping with pain and complex treatment, facilitates navigation across the life course, and aligns with the NHS Long Term Plan objective to integrate mental and physical health, including for people with long-term conditions.

In England, specialised haemoglobinopathy services already recognise psychology as a core component, but provision remains variable and often under-resourced. National guidelines and service specifications describe what good standards of care should be: embedded psychology, and access across all age groups including support in coping with daily challenges, pain management, and neuropsychology. Nonetheless, evaluation of quality standards of care highlight gaps in capacity and access.

This report summarises psychology provision and other mental health needs across the active cohort (2024–2025), covering SCD, Thalassaemia, and Other RIA. It includes overall condition summaries, age differences, and secondary diagnosis analyses. Percentages are from known responses (Unknown excluded) and rounded to whole numbers.

Specialist Psychological Support

Overall, there was cohort of 19,402 patients across three condition groups: SCD (16,332 patients); Thalassaemia (2,308 patients); and Other RIA (754 patients). Specialist psychological and other mental health support information are presented in Table 36.

Required Psychology Support

A total of 1,279 individuals (7%) were recorded as requiring psychology support. A further 7,512 (39%) were recorded as not requiring support, while 10,611 (55%) had no information available. This pattern shows that although a small proportion of the cohort is identified as needing psychological input, over half of the cohort has no recorded assessment, which limits confidence in interpreting unmet need.

Received Psychology Support

Psychology support was recorded as received for 758 individuals (4%). Another 7,925 (41%) were recorded as not having received support, while 10,719 (56%) had no recorded information. The wide distribution of unknowns again makes it difficult to determine the true scale of service utilisation. However, the proportion receiving support is lower than the proportion identified as requiring it, suggesting unmet need among those whose need was recorded.

Required Other Mental Health Support

Other mental health support was required for 190 individuals (1%), with 8,317 (43%) recorded as not requiring this category of support. 10,895 individuals (57%) had no recorded information. The very low proportion requiring other mental health support, compared with

high unknown rates, indicates that these fields are likely under-reported rather than reflective of genuinely low need.

Outcome	Yes (N, %)	No (N, %)	Unknown (N, %)	Total (100%)
Required psychology support	1279 (7%)	7512 (39%)	10611 (55%)	19402
Received psychology support	758 (4%)	7925 (41%)	10719 (56%)	19402
Required other mental health support	190 (1%)	8317 (43%)	10895 (57%)	19402

Table 36 - Psychology - All patients

Overall Pattern

Across the cohort of 19,402 individuals living with these conditions, a consistent pattern emerges. Documented need for psychological support is markedly lower than expected, however this is accompanied by very high rates of missing or unknown data. More than half of all individuals have no recorded information on whether psychological support was required or received. This strongly suggests that psychological needs may be under-recognised, under-documented or both. Subsequent information presented excludes the "Unknown" responses.

Differences Between Condition Groups

Figure 7.1 shows that SCD has the highest number of patients recorded as needing psychology support (15%). Thalassaemia is next (12%), and Other RIA is lowest (8%). The same pattern appears in patients who received psychology support: SCD is highest (9%), followed by Thalassaemia (8%) and Other RIA (5%). When someone is recorded as needing support, around two-thirds to 70% go on to receive it across all three conditions i.e. 67% in SCD, 70% in Thalassaemia, and 65% in Other RIA.

Other mental health support is recorded much less often overall, with only 2% to 3% of patients across all three conditions shown as needing it (SCD 2%, Thalassaemia 3%, Other RIA 2%). However, the detailed breakdowns by secondary diagnosis and age below show that some types of patients have higher or lower needs than these overall figures suggest.

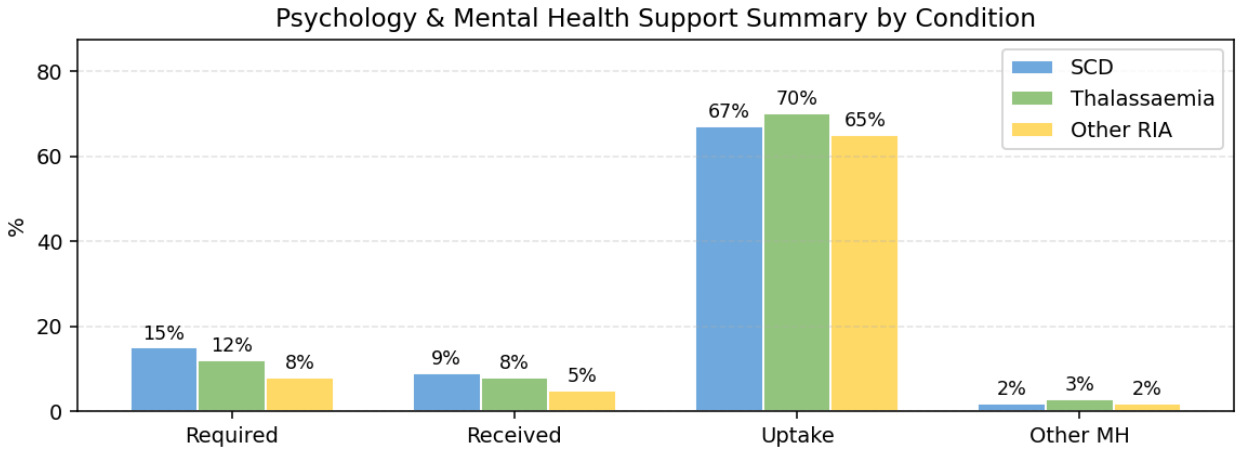

Figure 15 - Psychology support & mental health needs: Yes, percentage by condition

Difference Between Received and Uptake of Psychology Support

- Received means the percentage of patients who actually received psychology support, no matter whether they were marked as needing it or not.
- Uptake means the percentage of patients who were recorded as needing psychology support who then went on to receive it.

In short:

- Received = how many patients got support overall.
- Uptake = how many got support after being identified as needing it.

SCD, Thalassaemia, and Other RIA differ in important ways medically, socially, culturally, and in how services are organised. These differences can strongly influence how much psychological support patients need, how often need is recorded, and how consistently support is delivered.

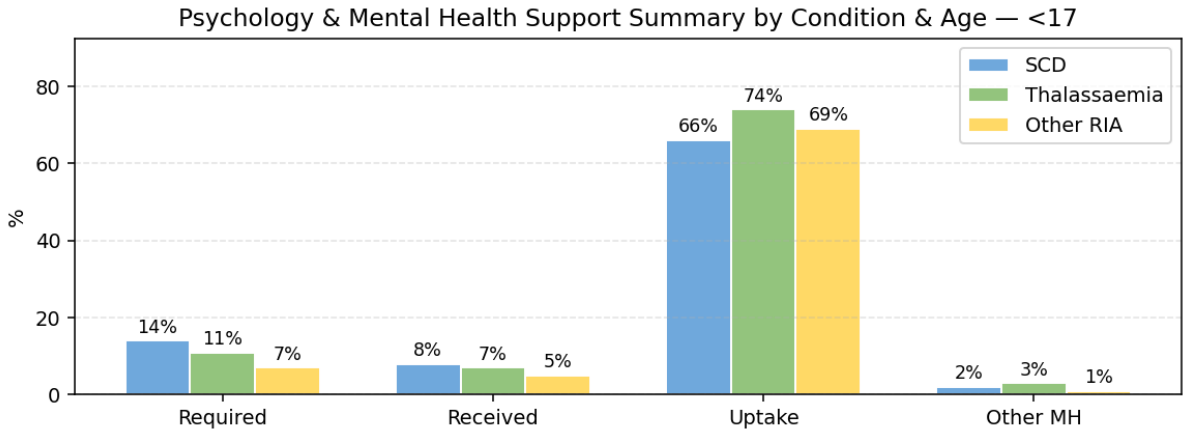

Figure 16 - Psychology support & mental health needs: Yes, percentage by condition & age group – children

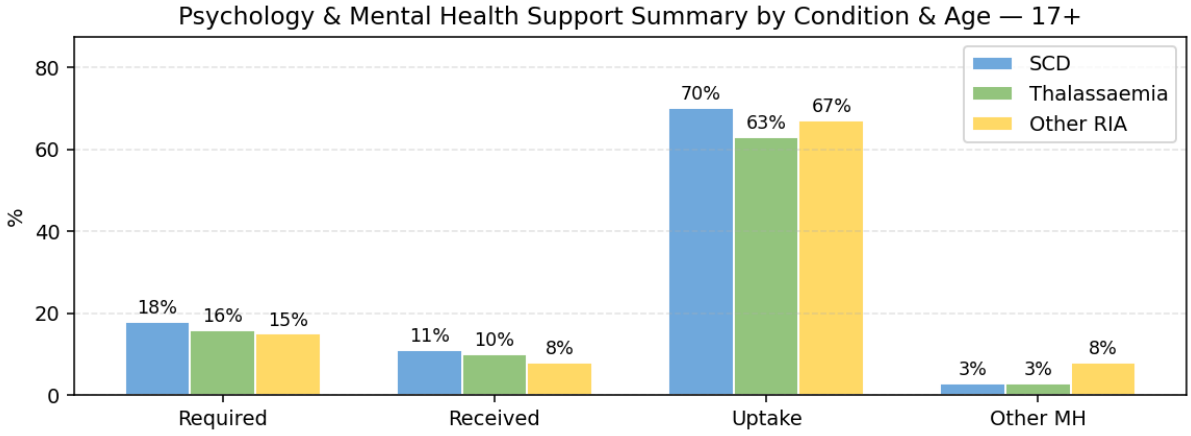

Figure 17 - Psychology support & mental health needs: Yes, by condition & age group – adults

Figure 16 - Psychology support & mental health needs: Yes, percentage by condition & age group – children and Figure 17 - Psychology support & mental health needs: Yes, by condition & age group – adults, show that adults have a greater level of recorded need and receipt of psychology support. Across all three conditions, patients aged 17 years and over have higher percentages for both “Required” and “Received” compared with those under 17 years. This means that adults are more likely to be identified as needing psychology support and are also more likely to be recorded as having received it.

Uptake of psychology support remains strong in both age groups. Once a need is recorded, roughly two-thirds to around 70% of individuals go on to receive psychology support, regardless of age. Among children, uptake is highest in the Thalassaemia group at approximately 74%. In adults, uptake is highest in the SCD group at around 70%.

Other mental health needs are recorded at low levels overall, but the rates are slightly higher in adults. This is particularly noticeable in the Other RIA group, where 8% of adults are recorded as needing other mental health support compared with only 1% of those under 17.

Sickle Cell Disease

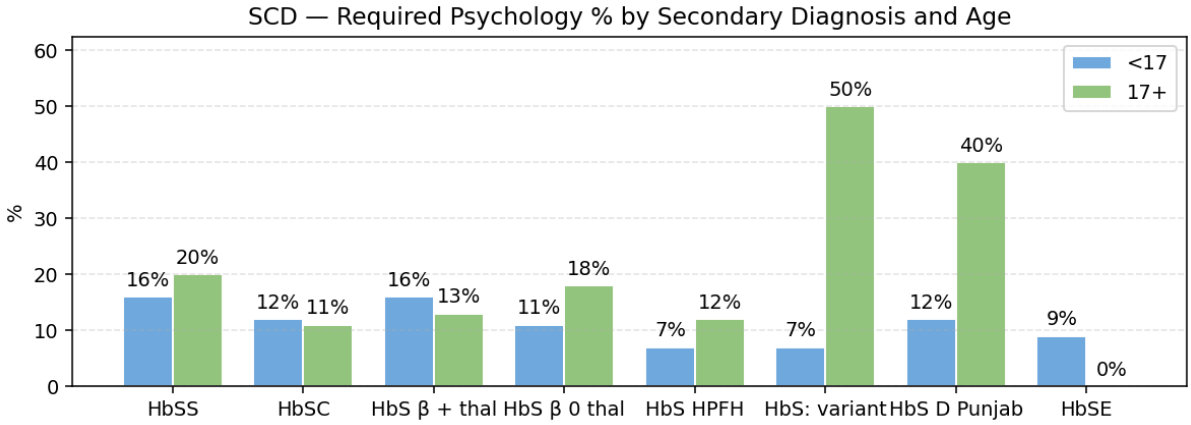

Figure 18 - SCD: Required psychology percentage by secondary diagnosis & age group

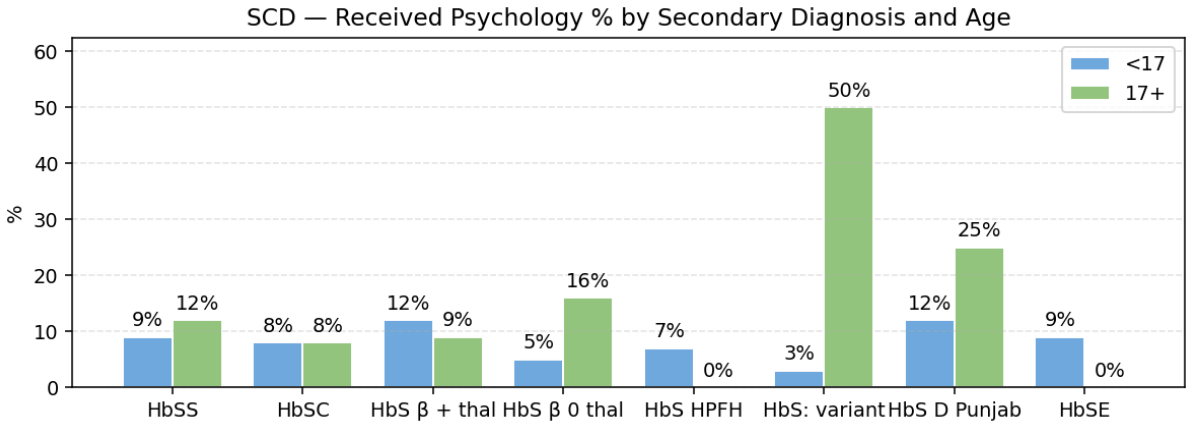

Figure 19 - SCD: Received psychology percentage by secondary diagnosis & age group

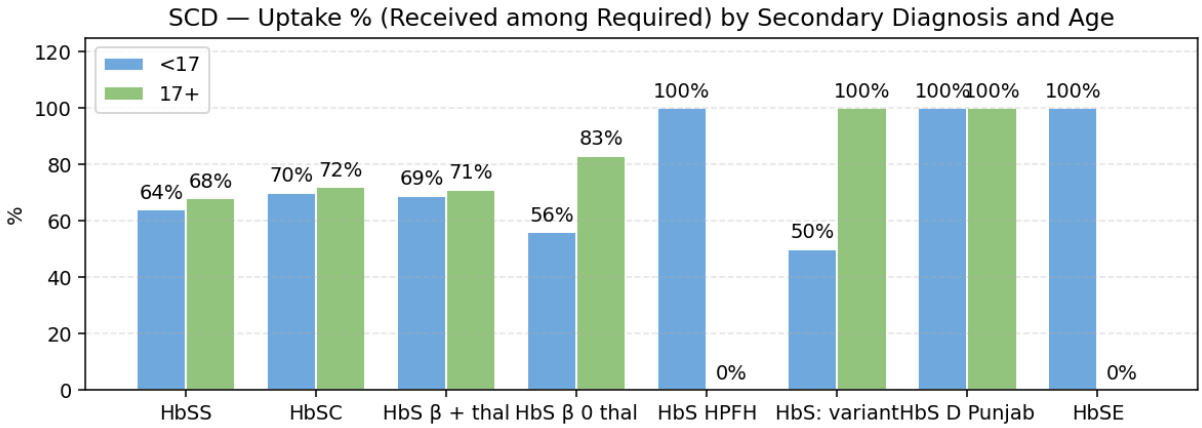

Figure 20 - SCD: Uptake of psychology percentage by secondary diagnosis & age group

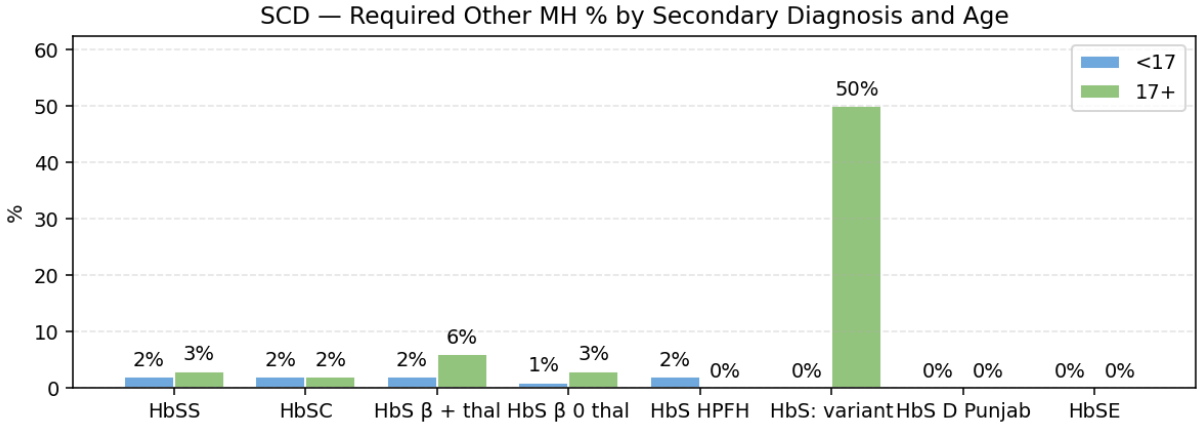

Figure 21 - SCD: Other mental health needs percentage by secondary diagnosis & age group

Figure 18 - SCD: Required psychology percentage by secondary diagnosis & age group, *Figure 19 - SCD: Received psychology percentage by secondary diagnosis & age group*, *Figure 20 - SCD: Uptake of psychology percentage by secondary diagnosis & age group*, and *Figure 21 - SCD: Other mental health needs percentage by secondary diagnosis & age group*, demonstrate that across the SCD group and predominant diagnoses of HbSS and HbSC, individuals with HbSS have the highest recorded need for psychology support. Their rates of "Required" are higher than those seen in patients with HbSC, and this is true in both children and adult groups. A similar pattern appears in the "Received" measure, where HbSS also shows higher levels than HbSC, although the difference is smaller. Uptake, meaning the proportion of patients who receive psychology support once they have been recorded as needing it, is consistently strong across both SCD diagnosis. Uptake typically falls between two□thirds and around 70%, with only minor differences between HbSS and HbSC.

Reviewing age differences within each secondary diagnosis, adults generally have higher recorded need than children. For example, adults with HbSS are more likely to be recorded as requiring psychology support than children with the same diagnosis. However, once this need is identified, uptake remains broadly similar across age groups. In both children and adults, around two-thirds of those recorded as needing support go on to receive it.

Overall, the key message for SCD is that HbSS carries a higher burden of recorded psychological need than HbSC, but most patients receive support once a need is recognised, regardless of diagnosis or age group. Other diagnoses did not have sufficient information.

Thalassaemia

Abbreviations for Figures:
β-Thal Major = Beta thalassaemia major (excluding HbE Beta thalassaemia)
HbH = HbH Disease
β-Thal Intermedia = Beta thalassaemia intermedia (excluding HbE thalassaemia)
Oth-Thal = Other Thalassaemia
Eβ-Thal-TD = E beta thalassaemia (transfusion dependent)
Eβ-Thal-NTD = E Beta thalassaemia (not transfusion dependent)

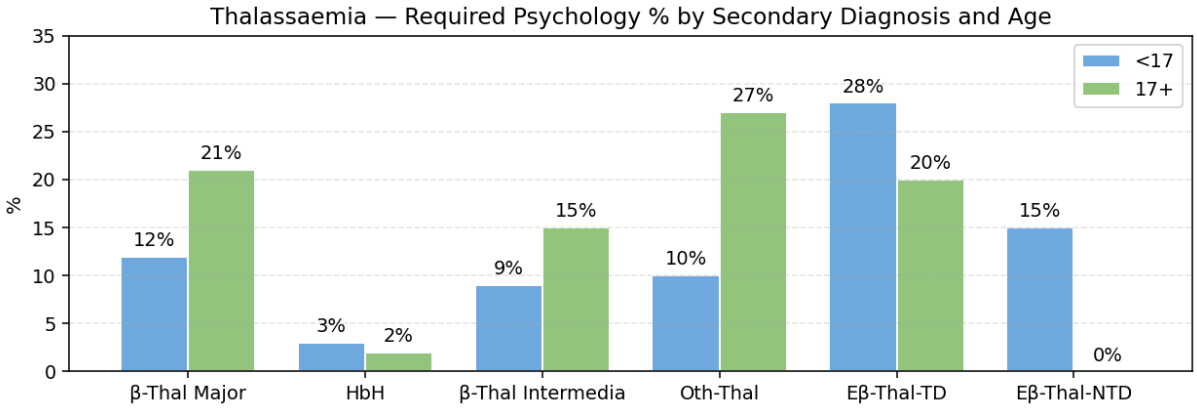

Figure 22 - Thalassaemia: Required psychology percentage by secondary diagnosis & age group

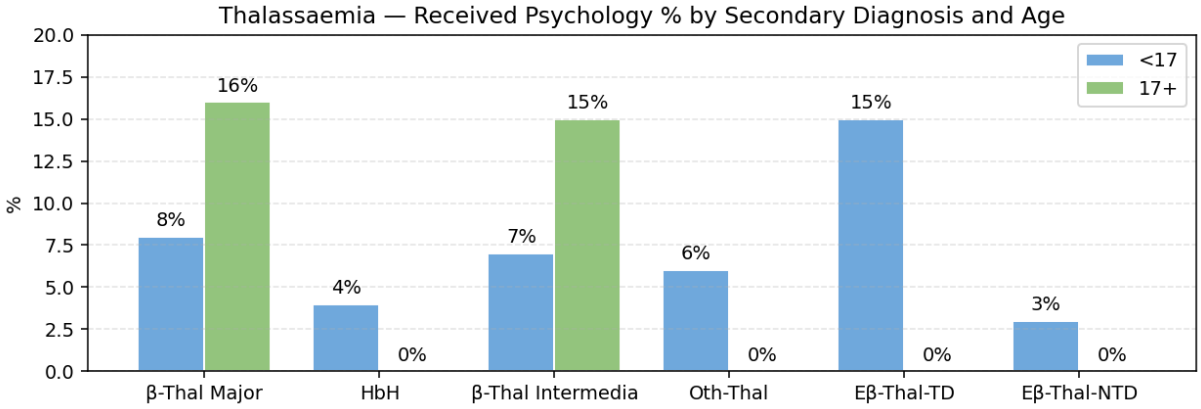

Figure 23 - Thalassaemia: Received psychology percentage by secondary diagnosis & age group

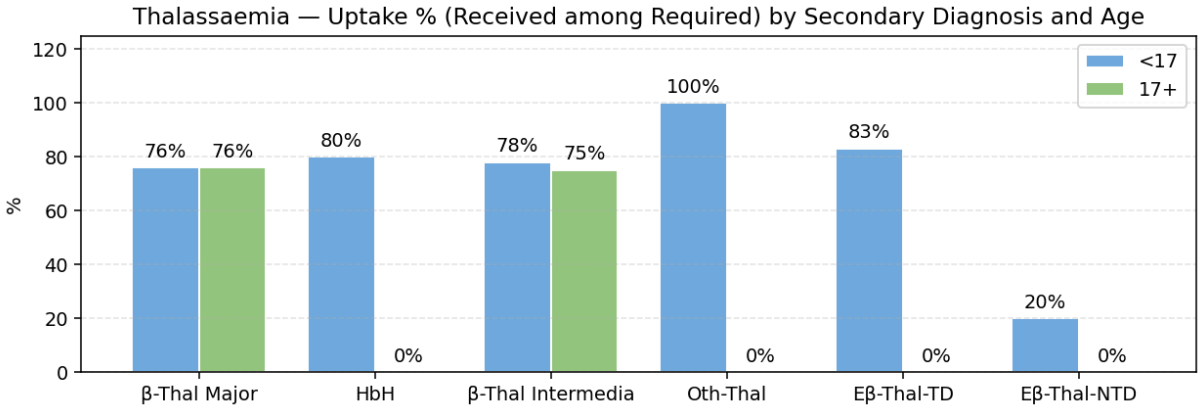

Figure 24 - Thalassaemia: Uptake of psychology percentage by secondary diagnosis & age group

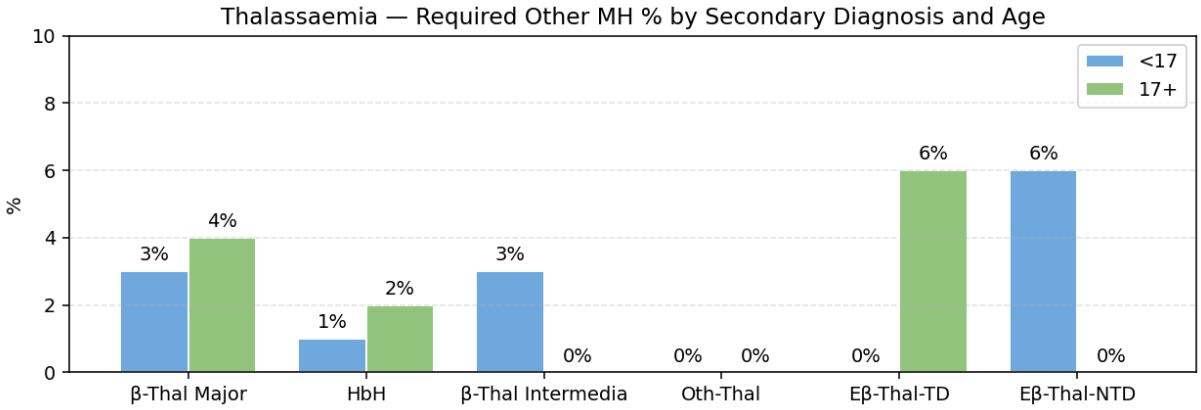

Figure 25 - Thalassaemia: Other mental health needs percentage by secondary diagnosis & age group

Figure 22, Figure 23, Figure 24 and Figure 25 reveal that across the Thalassaemia group, patients with β-thalassaemia major show the highest levels of recorded psychological need. Their “Required” rates are consistently higher than those seen in other diagnoses, such as β-thalassaemia intermedia, HbH disease, or E β-thalassaemia. This pattern is especially noticeable in adults, where β-thalassaemia major stands out clearly from the other groups.

Patients who received support shows a similar pattern, although the differences between diagnoses are smaller. In general, diagnoses with more intensive or complex treatment needs, such as β-thalassaemia major and Eβ-thalassaemia (transfusion-dependent), show somewhat higher levels of psychology support received. Uptake of psychology support is strong across almost all Thalassaemia diagnoses. Uptake is particularly high children, where several diagnoses show uptake levels close to, or even above, 70–80%. In adults, uptake remains good, although there is more variation between diagnosis, partly because the numbers in some secondary diagnosis groups are small.

Age-related differences also appear within Thalassaemia diagnoses. Adults tend to have higher rates of psychological need than children. This is especially true for β-thalassaemia major, where the adult “Required” rate is noticeably higher. However, as with SCD, once needs are identified, the uptake of support remains broadly strong in both age groups.

Overall, the key message for Thalassaemia is that β-thalassaemia major carries the greatest psychological burden, particularly in adulthood. E β-thalassaemia (transfusion-dependent) stands out more among younger patients. Despite differences in need across diagnoses and age groups, most patients who are identified as requiring support do go on to receive it, especially among children.

Other Rare Inherited Anaemias

Conditions without sufficient data were excluded.
Abbreviations for Figures:
DBA = Diamond Blackfan Anaemia
PKD = Pyruvate Kinase Deficiency

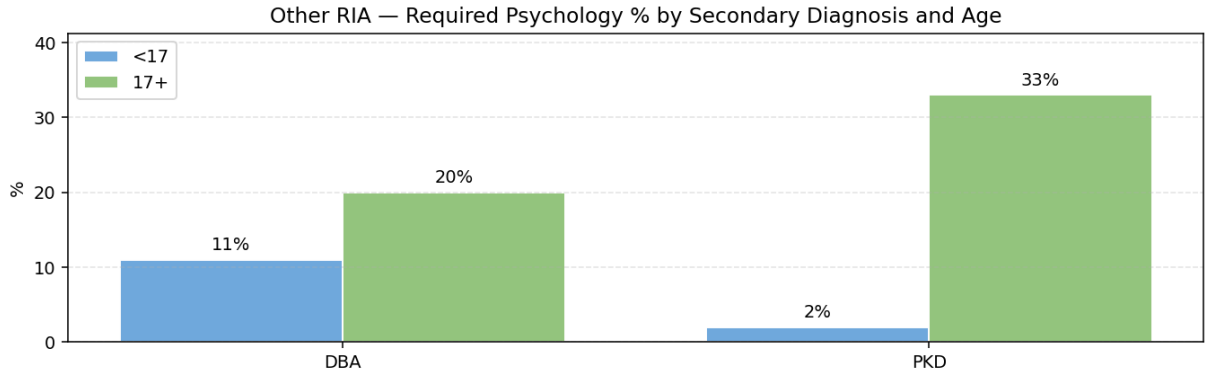

Figure 26 - Other RIA: Required psychology percentage by secondary diagnosis & age group

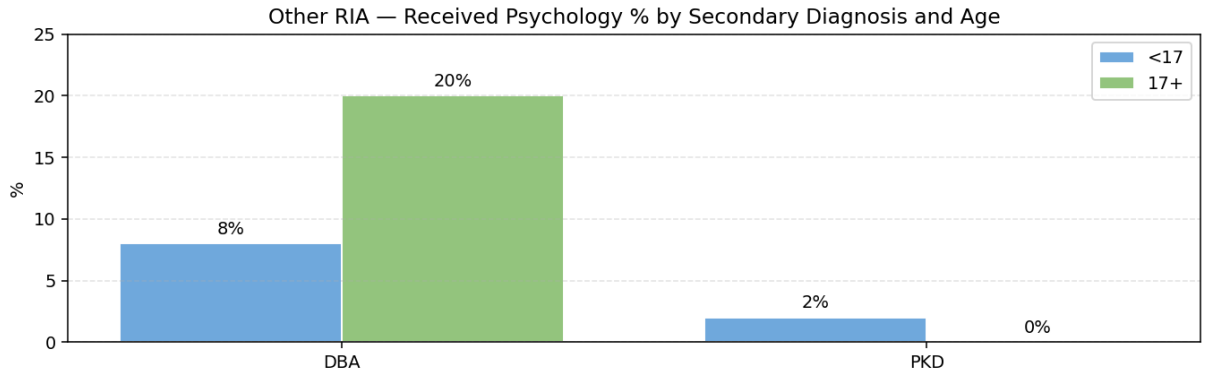

Figure 27 - Other RIA: Received psychology percentage by secondary diagnosis & age group

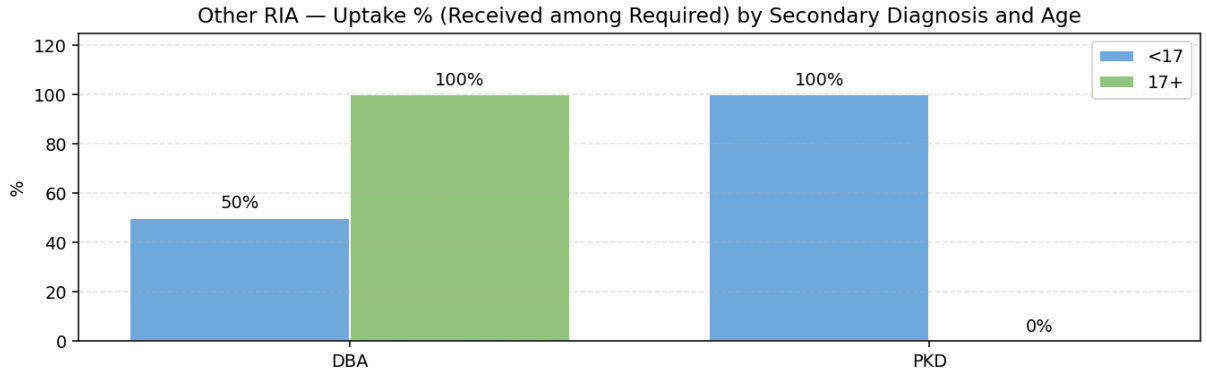

Figure 28 - Other RIA: Uptake of psychology percentage by secondary diagnosis & age group

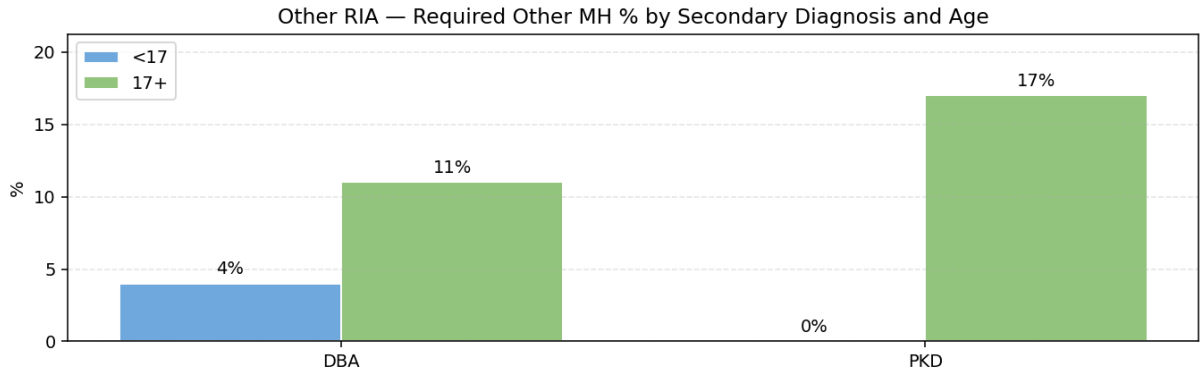

Figure 29 - Other RIA: Other mental health needs percentage by secondary diagnosis & age group

The group of conditions referred to as Other Rare Inherited Anaemias includes many different and very uncommon blood disorders. Each condition affects only a small number of people; therefore, it is difficult to identify clear patterns in psychological or mental health needs. To make the information meaningful, we included only those diagnoses where at least one of the four measures, Required, Received, Uptake, or Other Mental Health support, was above zero in both children and adults. When this rule was applied, only two diagnoses met the criteria: Diamond Blackfan Anaemia and Pyruvate Kinase Deficiency. All other diagnoses showed zero percent for every measure in at least one age group, which means there was no recorded activity at all.

For both Diamond Blackfan Anaemia and Pyruvate Kinase Deficiency, the percentages for needing psychology support and for receiving it were very low in both age groups. The numbers behind these percentages were extremely small, so even a single recorded case could noticeably change the results. Where a requirement was recorded, some individuals did receive support, but again the numbers involved were minuscule, and the uptake figures should be interpreted cautiously. Other mental health needs were also recorded at very low levels, although this is more likely due to limited documentation than a genuine lack of psychological or emotional needs among patients.

Overall, these findings mainly reflect the effect of very small cohorts and inconsistent recording rather than the true level of psychological support required. Owing to the data containing so few recorded entries, it is difficult to draw firm conclusions about the needs of people with these rare conditions.

The key message is that only a small number of diagnoses show any recorded activity across age groups. Recorded need for psychological or mental health support appears low, but this almost certainly reflects under-recording rather than an absence of need. These percentages are highly sensitive to single cases because the cohorts are small, and the most important issue is incomplete data. For these reasons, the findings should be interpreted with caution.

Summary

Across the three conditions, our findings show that psychological and mental health needs are most clearly recorded in Sickle Cell Disease and Thalassaemia, where there is consistent evidence of both identified need and follow-through to support once that need is recognised. SCD carries the highest documented levels of psychological need, while Thalassaemia demonstrates particularly strong uptake among those identified as requiring support. By contrast, recorded activity for Other RIA is very limited, largely due to small patient numbers and incomplete documentation rather than an absence of genuine need.

Taken together, these outcomes indicate that psychological support is being delivered when needs are captured, but there are important gaps in recognition and recording, especially for smaller and more diverse rare anaemia groups, highlighting the value of improving routine assessments and data completeness across all conditions.

Chapter 8: Research in the NHRv2

Facilitating research to benefit current and future patients is an important objective of the National Haemoglobinopathy Registry. Our focus is that all research should be patient-centred and for patient benefit. We have patient representatives who sit on our Data group to guide our practice.

Terms of Reference

Within the Terms of Reference of the steering committee, we have specifically set out to:-

- Review data from the registry and write the annual report produced from this data.
- Review all data requests and research proposals and make recommendations regarding feasibility.
- Make recommendations on approval of data requests to the data holder (as of writing, this is NHS England).

Use of Data

Data collected within the NHRV2 could be used in a variety of ways.

Local Audits

Anonymised information is used routinely by all hospitals to help ensure that current treatment standards are being met (eg. How many patients who could have hydroxycarbamide are offered the chance to have it?). Only be comparing results across the country can we be sure that we are offering the best care we can to each patient and learn what is not being done well and what needs to improve. This is an important way that hospitals can improve care and is done routinely for all types of illnesses across the NHS.

Anonymised information could also be used by the NHS to help plan resources (e.g. Are staffing levels adequate to support the patient load?).

Resource Utilisation and Commissioning

Information about medications or blood use could be used by the NHS or the blood transfusion service to help understand where blood or medicines are being used and how to make sure that we are getting best use of these resources. Information on certain drugs is already collected this way by the NHS, to make sure that we can get the best value for money and make sure that everyone who should be able to have a drug has the opportunity to access it.
Similar information could also be used by scientific researchers or drug companies. This could help them to plan manufacturing capacity or to work out if there are enough patients with a particular condition taking a particular medicine to allow a scientific study to be set up.

Generalised Data Queries

Generalised anonymised information might be used in research projects perhaps as a comparison to other general information available within the NHS – for example, how many people with sickle cell eye problems are there in NHS England? This sort of information does not require specific consent from each patient but does need to be scrutinised by the data committee to ensure that the data being released is appropriate and that only the minimal data needed to answer the question is released. This is the case even when the data is anonymised.

Research Studies

Information could be used for specific research programmes. This sort of information requires the researcher to apply for Research Ethics Committee approval for their own project, stating what data will be requested from the NHRV2. This is also anonymised data.

How to make a request for data

If you have a research project or other project and would like to use information from the NHRV2, there is an application process.

1. You should have a fully worked up project proposal.
2. Go to the National Haemoglobinopathy Registry home page (https://NHRv2.mdsas.com/). There are several icons available.
3. The **NHRV2 interactive report** will allow you to see (and manipulate) high level data such as number of patients in the registry who are female, or number of patients registered to each different haemoglobinopathy coordinating centre or specialist haemoglobinopathy team. You might find the data you require here without needing to make an application.
4. The **NHRV2 data field list** icon should allow you to see what information might be available if the data you need is not instantly available to you on the interactive report. For example, we collect information about haemoglobinopathy diagnosis, but not about whether other family members are affected, so if you wanted that information, you could not get it from the NHRV2.
5. The **Data request process** icon will take you to the data sharing policy (this includes time frames for release of data) and request criteria, and also an email address for more information. Data requests are all scrutinised both by the data holder and the NHRV2 steering committee. We check if we have the information requested, if we can release it and whether consent is required. We can arrange to interview data requestors during one of our meetings to discuss data use.

Data requests approved 2024/2025

Request	Details	Who made the request?	Purpose	Notes
Number of people with sickle cell registered as having stroke before the age of 18 years.	Year of stroke; type of stroke (ischaemic vs haemorrhagic)	NHS England	NHS service provision	
People with thalassaemia in NHRV2	Pseudonymised* demographic data; resource use; co-morbidities; transfusion history; immunisation history	Arden and Greater East Midland Commissioning Support Unit on behalf of NHS England	Health Needs assessment for thalassaemia patients in England	
Gender breakdown of people with sickle cell in NHRV2	Registrations of people by males females or other	The Sickle Cell Society		This information is publicly available (it may not have been easily accessible at the time of the request but is now).

Table 37 - Data requests approved 2024/2025

*Pseudonymised data: This allows patient information held in the NHRV2 to be matched up to information held in other databases without providing names or full addresses. For example, it could be used to cross-reference people with thalassaemia in the NHRV2 with requests for genotyped blood made to the transfusion service.

Data was also requested by members of this committee to write this report as displayed in previous chapters.

Chapter 9: Novel treatments in red cell disorders

Contents

Introduction

Novel treatments includes both curative and non-curative treatments; this has been a rapidly evolving landscape in haemoglobinopathies in recent years.

In **sickle cell**, the available novel treatments has diminished recently (and - in particular - since the last report). Crizanlizumab was available to eligible patients from early 2022 to early 2024 when it was withdrawn by EMA/MHRA on poor efficacy grounds. Voxelotor was available to eligible patients from summer 2021 to late 2024 when it was withdrawn by Pfizer on safety grounds. Sibling bone marrow transplant (haematopoietic stem cell transplant) was approved for adults meeting certain criteria in 2020. It was already available to children with SCD. Gene therapy was approved for sickle cell aged 12+ in January 2025 but was not in active clinical UK use during the period of this report.

In **thalassaemia**, sibling bone marrow transplant (haematopoietic stem cell transplant) was approved for adults who are transfusion-dependent and meeting certain criteria in 2023. It was already available to children with thalassaemia. Gene therapy was approved for transfusion dependent thalassaemia aged 12+ in August 2024 but was not in active clinical UK use during the period of this report.
In addition, rituximab and eculizumab can be used for the prevention and management of **delayed haemolytic transfusion reactions** (DHTR) in patients with haemoglobinopathies. This chapter focuses on those treatments both currently *available* and in *clinical use* in the UK i.e. stem cell transplant, rituximab and eculizumab (i.e. not crizanlizumab, voxelotor or gene therapy). For these treatments, there are *no* mandatory fields in the NHR and we therefore sound a particular note of caution about data reliability.

Bone marrow transplant – sickle cell

Background

Bone marrow transplant / haematopoietic stem cell transplant (HSCT) using sibling donors has long been available for *children* with sickle cell meeting eligibility criteria. In 2020, sibling HSCT became a funded option for adults with severe sickle cell who met eligibility criteria in Table 38. There was a delay in starting the adult transplant programme due to the COVID19 pandemic, but patients are now being transplanted across the country. The eligibility criteria have not changed.

1. Eligibility: does patient at least meet ONE of the following criteria: • Clinically significant neurologic vascular event or deficit lasting > 24 hrs and confirmed radiologically. • History of >2 acute chest syndrome despite optimum treatment with hydroxycarbamide (HC) or transfusion therapy. • History of >3 severe pain crises or other acute complications per year despite the institution of supportive care measures (optimum treatment with HC or transfusion therapy). Other acute complications would include acute hepatopathy or splenic sequestration or acute priapism. • Administration of regular transfusion therapy, either by simple transfusion or exchange transfusion with the aim to prevent severe sickle complications by maintaining a low HbS %. • Patients assessed as requiring transfusion but with red cell alloantibodies / very rare blood type, rendering it difficult to continue or commence chronic transfusion. • Patients requiring HC/transfusion for treatment of SCD complications who cannot tolerate either therapy due to significant adverse reactions • Established and related end organ damage relating to sickle cell disease, including but not limited to progressive sickle neuro-vasculopathy and hepatopathy.
2. Eligibility: does patient meet ALL the following criteria: • Karnofsky score > 60 • Cardiac function: LVEF >45% or shortening fraction >25%. • Lung Function: FEV1, FVC and DLCO >50% • Renal function: EDTA GFR > 40 ml/m2/1.73m2 • At least one first-degree relative willing to act as a donor and confirmed as fully matched sibling donor. • Agrees to refer case to NHP for consideration of allo transplant

Table 38 - Eligibility criteria for stem cell transplant for patients with SCD

Who is eligible for bone marrow transplant?

Using currently available NHR data, it is not possible to discern patients who meeting the inclusion and exclusion criteria for bone marrow transplant (=haematopoietic stem cell transplant, HSCT). However, we can probe a little: one transplant eligibility criterion is regular transfusion therapy. 1889/18968 (10.0%) of patients with sickle cell are documented on a transfusion programme (according to the annual review record).

Who is having a bone marrow transplant?

Information on transplant has been stored in three places on the NHR by users:

- Demographic information under “Diagnosis” in “Other diagnosis” (free text)
- Treatment information (free text)
- Surgical and other procedures
    - Four options for transplant type (this is mandatory):
        - Allogenic bone marrow transplant - sibling
        - Allogenic bone marrow transplant - haploidentical
        - Allogenic bone marrow transplant - matched unrelated donor
        - Allogenic bone marrow transplant - other family donor
    - Date and transplant centre can be stored (non-mandatory)

Therefore, depending on where the information is stored, we have variable transplant information.

Demographics of those having a transplant

96/18968 (0.5%) patients with sickle cell are recorded as having had a transplant on the NHR.
Sex: 53/96 (55%) female, 43 (45%) male.
Sickle genotype: 90 HbSS, 4 HbSC and 2 HbSβ^0 thalassaemia.
Age and prior sickle genotype of transplant patients are represented in Figure *30*

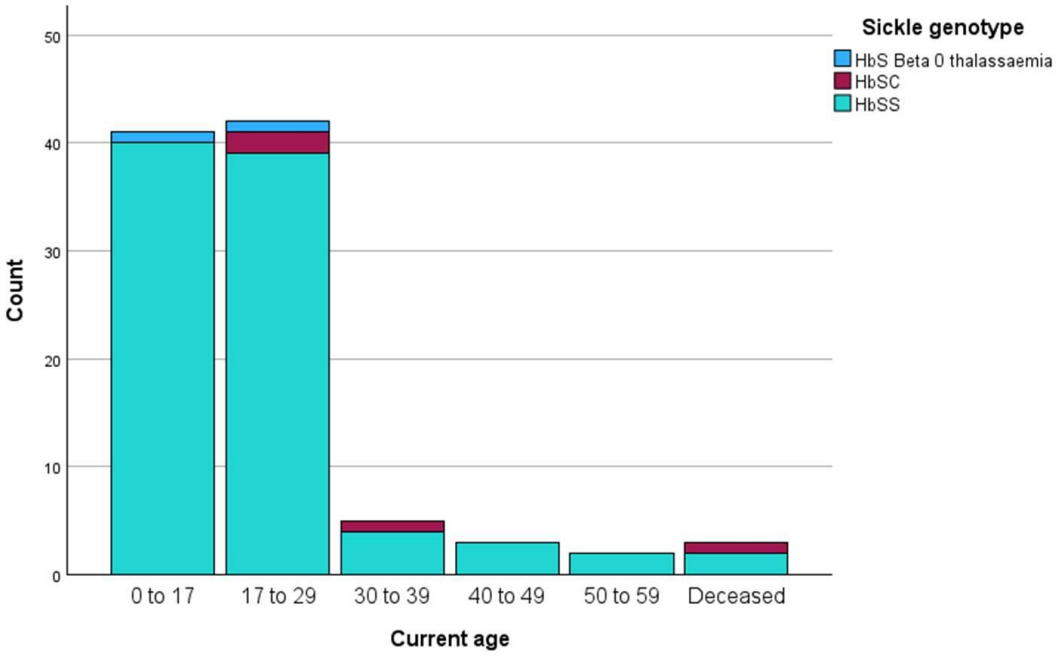

Figure 30 - Sickle transplants: current age and prior sickle genotype

Ethnicity is recorded for all patients and displayed in Figure *ethnicity*. 77/96 (80.2%) were recorded as Black African, Black Caribbean or Black British.

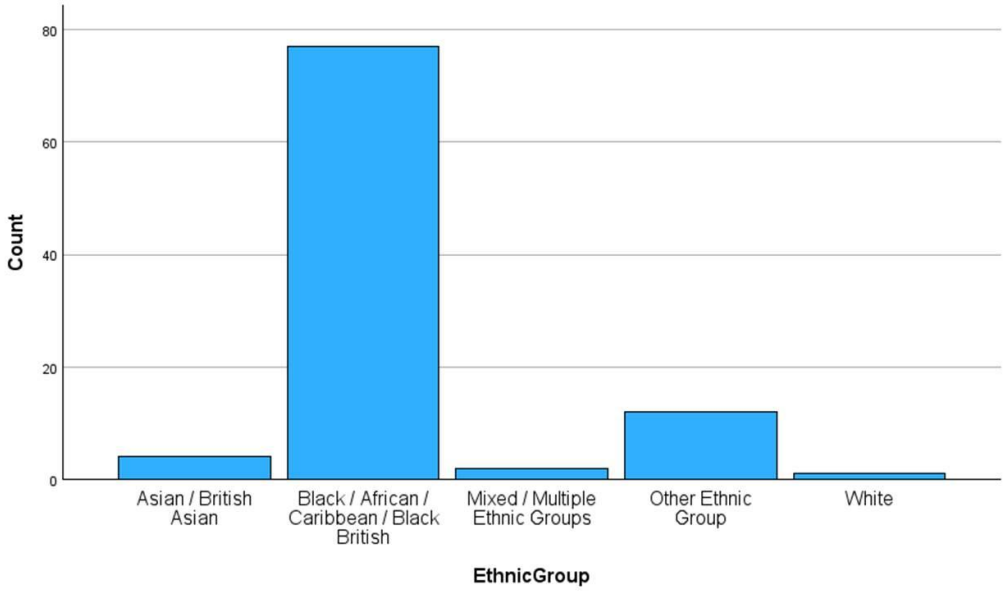

Figure 31 - Sickle transplants: ethnicity

For current haemoglobinopathy coordinating centres (HCC) the patients are represented in Figure 32. - Sickle transplants: current HCC

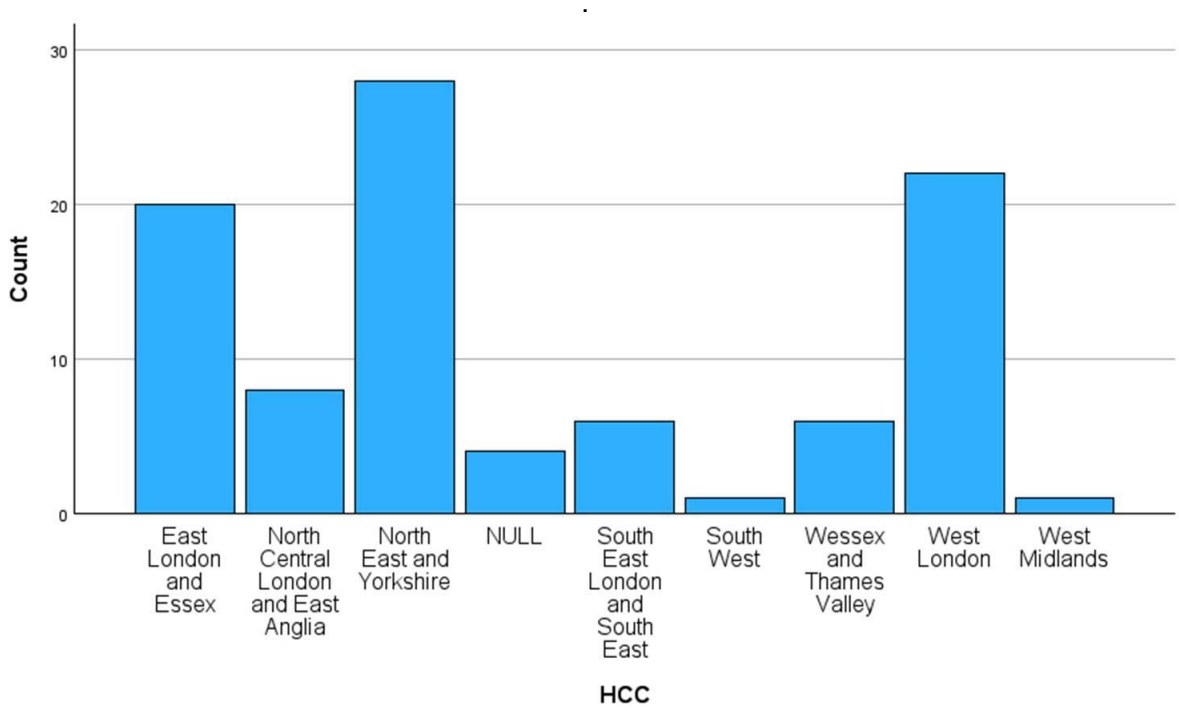

Figure 32 - Sickle transplants: current HCC

Transplant type

Transplant type is recorded in Figure 33.

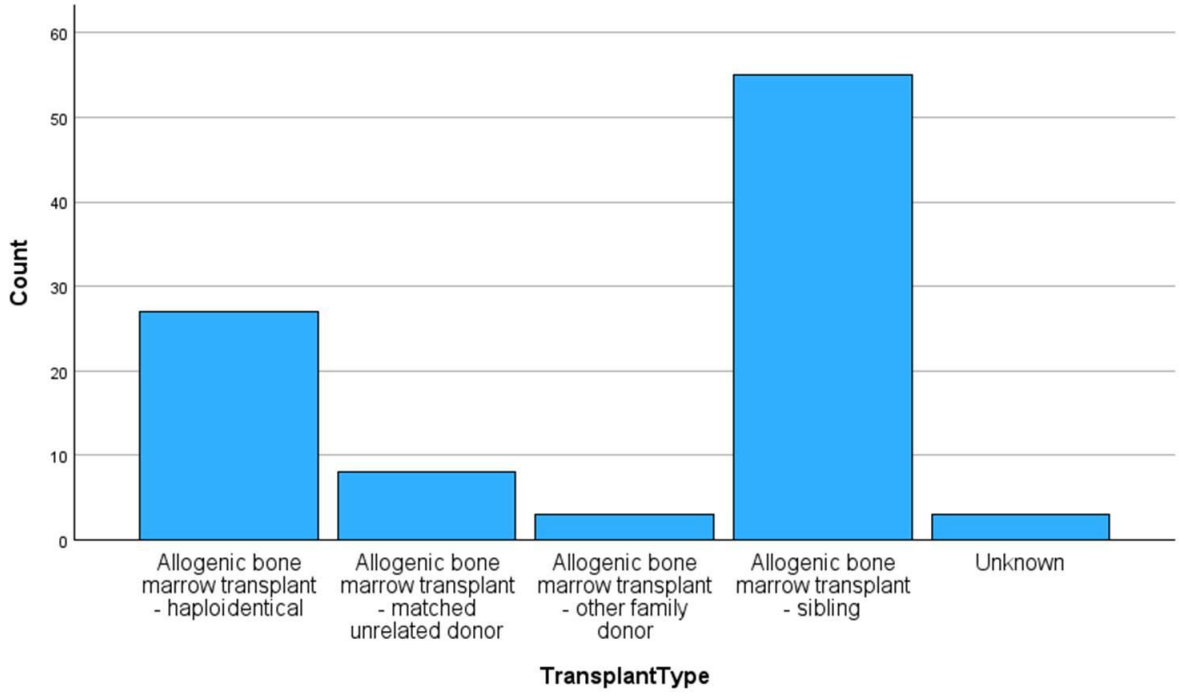

Figure 33 - Sickle transplants: transplant type

Centres doing transplants

Transplant site is recorded in Figure 34.

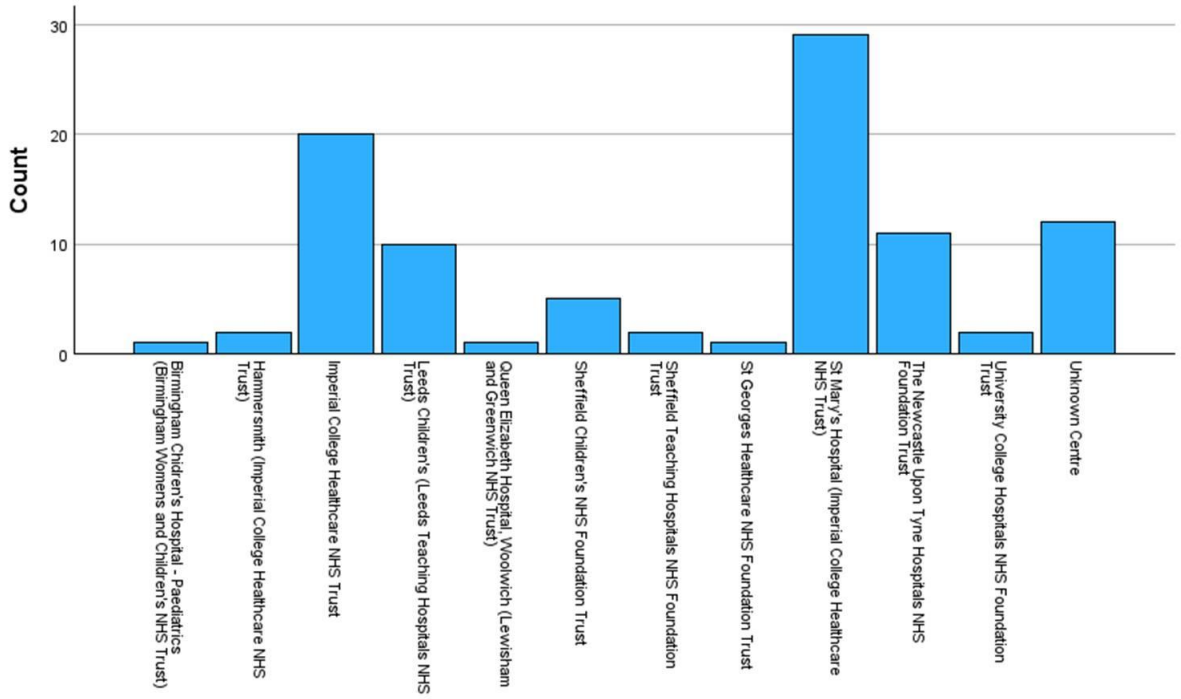

Figure 34 - Sickle transplants: transplant centre

Transplant dates

85/95 transplant cases have a transplant date available. 17 of those were undertaken in the year of the annual report 2024/25.

Transplant outcomes

Transplant outcomes are not recorded in the NHR. We do have mortality data (but we do not have data on whether death was a result of a transplant or not). Three of 96 patients who have had a transplant are recorded as having died.

Who is referred for bone marrow transplant?

In the NHR annual review page, the question is asked: “Was the patient referred for HSCT or Gene Therapy?”, see Table 39 for results:

Referred for HSCT or GT?	N (%)
No	7170 (70.1%)
Yes	156 (1.5%)
Unknown	2250 (22.0%)
Question unanswered at annual review	655 (6.4%)

Table 39 - Sickle patients referred for stem cell transplantation or gene therapy at annual review

While this is better completed than previous years, there are still 37.2% of patients with no annual review recorded. Of the 7326 individuals where there is a definite No or Yes answer,

156 patients (2.1%) have been referred for haematopoietic stem cell transplant or gene therapy.

Bone marrow transplant – thalassaemia

Background

Bone marrow transplant / haematopoietic stem cell transplant (HSCT) using sibling donors has long been available for *children* with transfusion-dependent thalassaemia (TDT) meeting eligibility criteria. In November 2023, sibling HSCT became a funded option for adults with TDT who met eligibility criteria. There has been a delay in starting the UK adult transplant programme due to decision making about appropriate transplant protocols for this cohort, as well as the near-simultaneous agreement of funding for gene therapy for TDT. Adults have not yet started to be transplanted on the NHS. The adult criteria are listed in Table 40.

Inclusion criteria Patients who are aged 18 years and over and who meet the below criteria should be considered for allo-HSCT: • Diagnosis of transfusion dependent thalassaemia AND • Comprehensive organ assessment including but not limited to cardiac, liver, renal assessment AND • Agreement at National Haemoglobinopathy Panel (NHP) AND • At least one first degree relative willing to act as a donor and confirmed as a fully matched sibling donor.
Exclusion criteria • Current cardiac iron overload T2* < 20 milliseconds • Glomerular Filtration Rate < 40 ml/min/1.73m² • Current pregnancy or breastfeeding

Table 40 - Eligibility criteria for stem cell transplant for TDT patients

Who is eligible for bone marrow transplant?

Using currently available NHR data, it is not possible to discern patients who are meeting the inclusion and exclusion criteria for bone marrow transplant. There are two key variables we can look at in the NHR to look at who is transfusion dependent:

- **Diagnosis**: Transfusion-dependence could be roughly inferred from the three NHR diagnoses:
    - Beta thalassaemia major (excluding HbE Beta thalassaemia)
    - E beta thalassaemia (transfusion dependent)
    - Alpha thalassaemia Major
    - Of 2766 patients with thalassaemia, 1446 are transfusion dependent using this interpretation.
- **Transfusion programme**:
    - The annual review also collects data on whether patients on a regular transfusion programme.
    - 1170 are recorded as being on a transfusion programme.

There is current work underway to modify the thalassaemia diagnoses on the NHR so transfusion-dependence will be more definitive in the future.

Who is having a bone marrow transplant?

Information on transplant has been stored in two places on the NHR by users:

- Demographic information under “Diagnosis” in “Other diagnosis” (an NHR free text data field)
- “Surgical and other procedures”
    - Four options for transplant type (this is mandatory):
        - Allogenic bone marrow transplant - sibling
        - Allogenic bone marrow transplant - haploidentical
        - Allogenic bone marrow transplant - matched unrelated donor
        - Allogenic bone marrow transplant - other family donor
        - Gene therapy
    - Date and transplant centre can be stored (non-mandatory)

Therefore, depending on where the information is stored, the transplant data available is variable.

Demographics of those having a transplant

65/2766 (2.3%) patients with thalassaemia are recorded as having had a transplant on the NHR. Two patients are recorded as having two transplants. For those two patients with more than one transplant, first transplant data is recorded below.

Sex: 27/65 (42%) female, 38 (58%) male.

Thalassaemia type: 58 Beta thalassaemia major, 3 Beta thalassaemia intermedia, 2 E Beta thalassaemia (transfusion dependent), 1 E Beta thalassaemia (not transfusion dependent), 1 other thalassaemia.

Current age and prior thalassaemia genotype of transplant patients are represented in Figure 35.

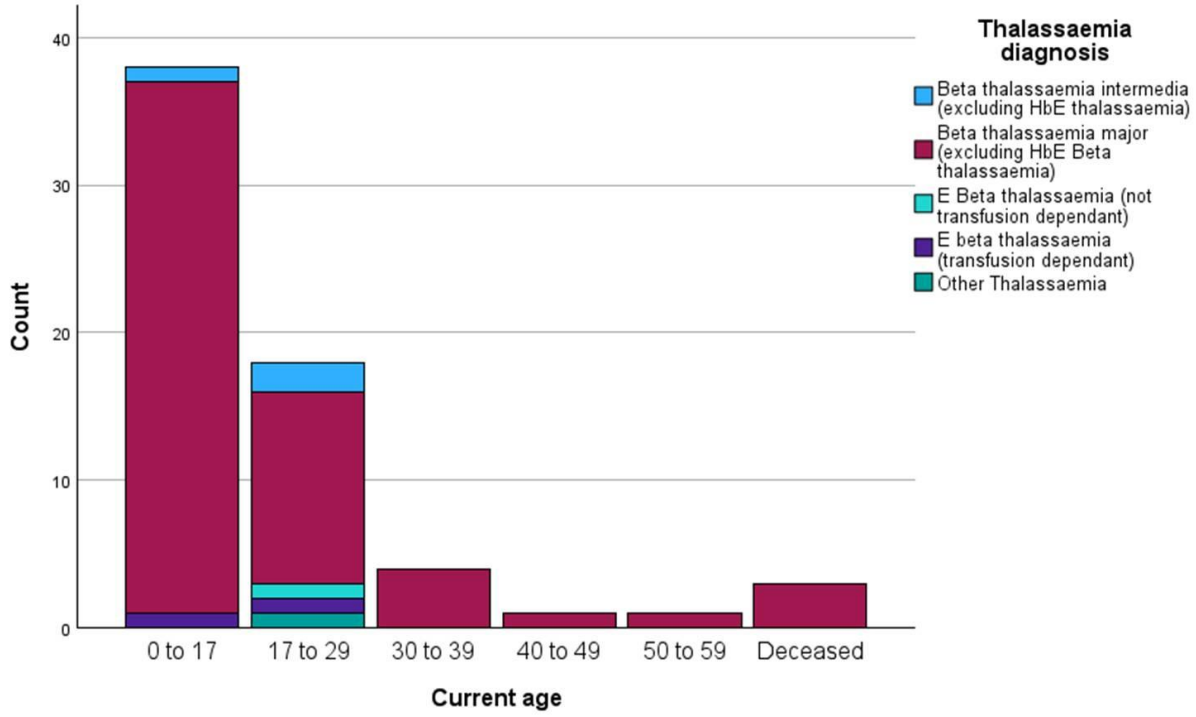

Figure 35 - Thalassaemia transplants: current age and prior thalassaemia diagnosis

Ethnicity is recorded for all patients and displayed in Figure *36*.

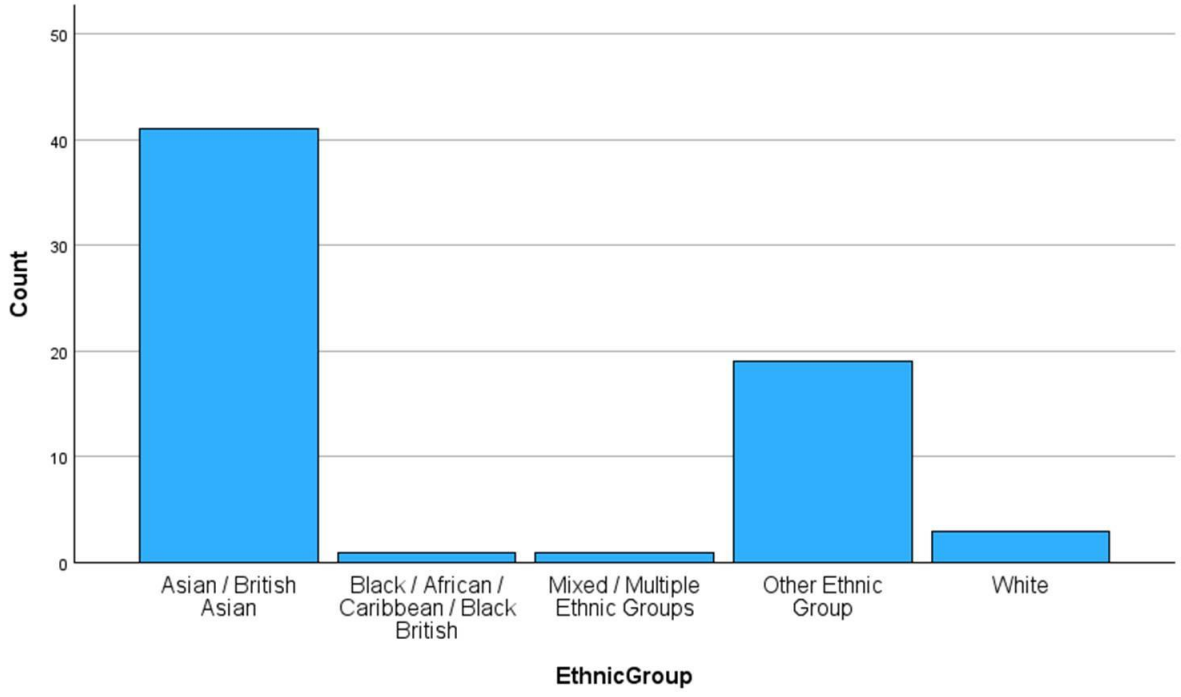

Figure 36 - Thalassaemia transplants: ethnicity

Transplant type

Transplant type is recorded in Figure 37

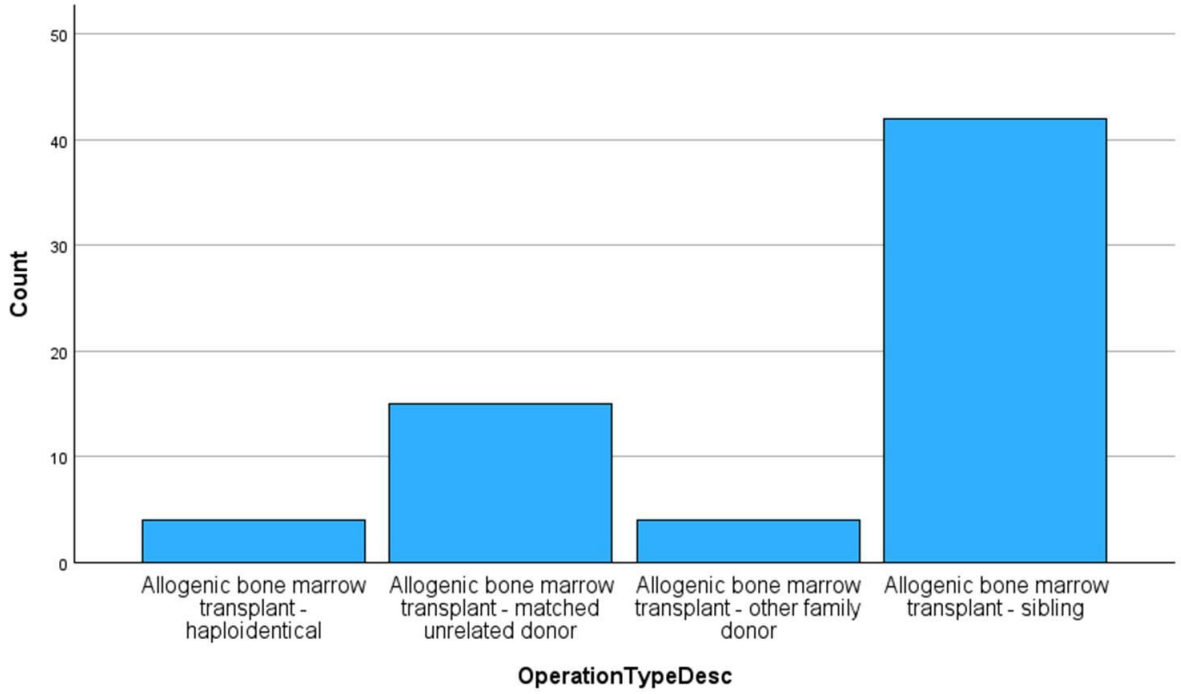

Figure 37 - Thalassaemia transplants: transplant type

Centres doing transplants

Transplant site is recorded in Figure 38.

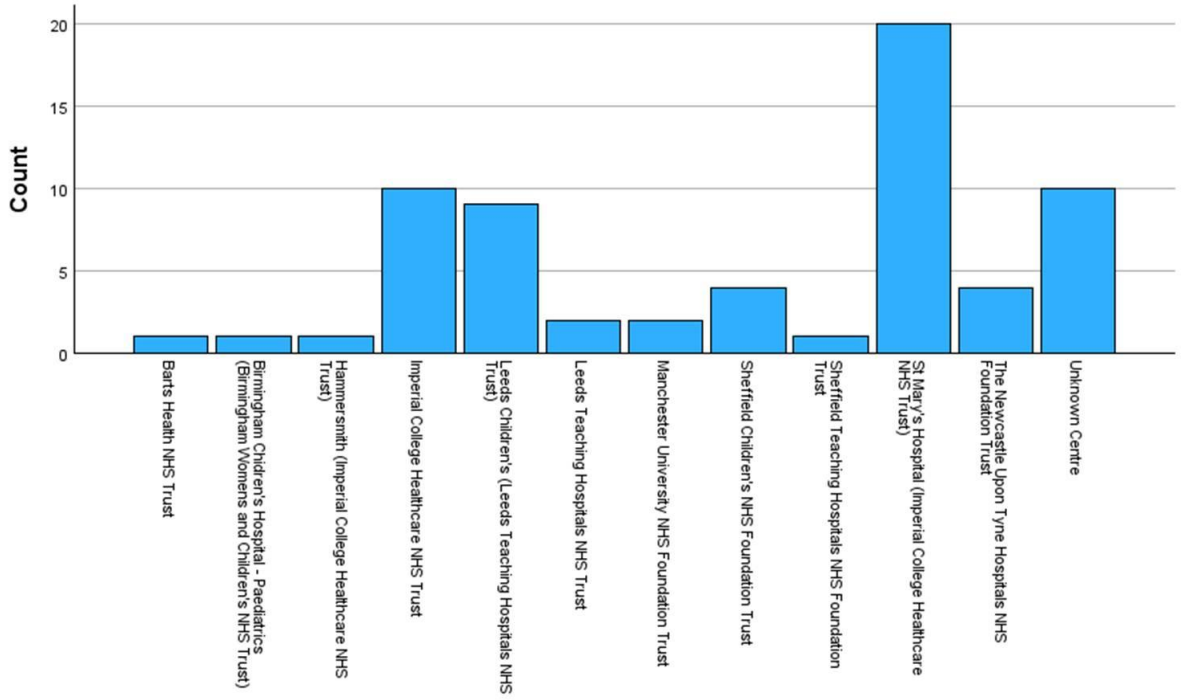

Figure 38 - Thalassaemia transplants: transplant centre

Transplant dates

60/65 transplant cases have a transplant date available. 5 of those were undertaken in the year of the annual report 2024/25.

Transplant outcomes

Transplant outcomes are not recorded in the NHR. We do have mortality data (but we do not have data on whether death was a result of a transplant or not). Three of 65 patients who have had a transplant are recorded as having died.

Eculizumab and rituximab for delayed haemolytic transfusion reactions (DHTR) in haemoglobinopathies

There is no specific place to record eculizumab and rituximab for DHTR. It is not an option in the “Treatments” section, however, DHTR is recorded as a “serious adverse event, SAE”. Within the SAE, users can record free text comments about the DHTR event. Some users add comments like treatments used, including eculizumab/rituximab but this is too unreliable to record here.

Data quality considerations

- Decisions around storing HSCT and gene therapy data on NHR (and whether to duplicate work done by BSBMT).
- Decisions around recording eculizumab and rituximab use for DHTR in haemoglobinopathies on the NHR.
- Rituximab or eculizumab needs a way to record on NHR
- Challenges with recording data – especially outside of the annual review e.g. having a curative treatment, having a DHTR and requiring rituximab/eculizumab
- Data cut given by MDSAS: we have used all data accrued so far but future reports will probably be best to consider fixed financial years (once annual reviews completed).

Chapter 10: Data quality considerations

Background to data quality

Data challenges remain due to the history of a legacy NHRv2 system, the speed of development of NHRv2, and the limited resources for data entry.

The 2025 attempt to populate the Specialised Services Quality Dashboard (SSQD) by direct export from the NHRv2 crystallised the NHRv2 data quality concerns. Remediation work to address data issues to make will be resource-intensive and will need national coordination. Data interpretation must be made recognising these data concerns, which reduces the certainty of the conclusions and highlights areas for improvement. Some of the data challenges have been noted in the individual chapters where there are specific issues, but here we will collate generic data challenges and identify work to be done.
The current system for data entry is managed in regions in most cases by SHT and HCC data managers (non-clinical administrators) but there is currently no formal method for data monitoring / data assurance. Ratified standards for data entry and data assurance are in development, which together with remediation of data centre by centre, will result in a dependable registry.

Data challenges

- Data completeness: no assessment to see if all cases present (e.g. non-NHRv2 estimations of UK RIA prevalence suggest NHRv2 RIA numbers are very low),
- Basic demographics errors, e.g. diagnosis, sex.
- Duplication (triplication/quadruplication/…) of cases on NHRv2. This occurs because it was not originally mandatory to have a legitimate NHS number. For new cases added, can further checks be made if names are very similar (one digit out) or same DOB to an existing record? Need to review existing duplicates – can these be identified centrally to prompt local clinician to review?
- Allocation of patients to an HCC remains an issue and interferes with governance and management of patients by region. It also impairs data analysis as does not allow comparisons between HCCs: many patients are unallocated or are aligned to the wrong one; some patients are erroneously allocated a thalassaemia rather than sickle HCC. Whilst some patients, e.g. students, may move between centres frequently, much of this is caused by the lack of an agreed handover process when patients move permanently.
- Comprehensive clinical information is not entered for many centres e.g. full medical history, transfusion history, red cell antibodies, medications. The data entry demands of the NHRv2 have grown significantly since data manager resource was specified, meaning many centres struggle for complete data. An agreed set of “minimum essential data” would improve consistency, whilst an expanded bulk upload facility would allow completeness, especially for centres with large cohorts. In 2025, the NHRv2 became the main tool for deriving SSQD which means some data points (e.g. chelation) will probably be completed going forward. This is worth reviewing.
- In the case of rare inherited anaemias, number of patients on NHRv2 is far lower than that predicted by well-established estimates of incidence for these conditions.
- Annual review is focused on sickle cell rather than thalassaemia or RIA so many fields not relevant in non-sickle red cell conditions.
- Admissions numbers in annual reviews would be better populated via SUS data: this could cover the actual annual review year, cover admissions outside the patients’ home centre, reduce the workload on data managers, and has been shown by audit to be more accurate.

- Timing of data entry might differ between centres: centres will have different processes for entering data: some might enter it in real time and other centres do it in batches e.g. focusing on data entry at end of the financial year (along with completing the annual reviews). For future annual report analysis, it might be better to have a 1 April data cut each year to align with the existing annual process.
- There remains confusion about handling of patients who have undergone HSCT or cellular therapies: should they be followed up via the EBMT registry, the NHRv2 or both? Clinical experience shows many patients will remain under the care of both haemoglobinopathy and transplant teams, in which case fields for the required data will need to be developed in the NHRV2.
- Amongst other data, ethnicity is often not available when a patient is first registered, and there is little to prompt users to review demographics in existing patient records. A new suite of data quality tools has the potential to help with this significant issue.
- There are challenges with recording data – especially outside of the annual review. This specifically includes adverse events, death and novel therapies which are recorded separately on the chart. These events may be less well recorded than an annual review as they will be done in an ad hoc manner, possibly in batches in some centres.
- Rapid evolution of the NHRv2 data fields over recent years cause difficulties in interpreting data over the longer term.

Recent developments

- Microsoft Power BI reporting provides cohort level data at HCC and SHT levels and powerfully reveals some data anomalies, such as patients allocated to the wrong HCC
- The new proof-of-concept bulk data upload function features excellent data quality tools which reduce the need to audit every single patient in the cohort.
- Rationalisation of diagnoses, particularly for rare inherited anaemias, is addressing a structural issue with data quality.
- User-led initiatives to introduce consistency of data entry across a number of HCCs, and the correction of existing data, has the potential to be rolled out nationally.
- A number of fields duplicated between annual review and medications / novel therapies, SAE and patient status have been addressed where appropriate.

Future developments

- National SOP for data management
- Comprehensive user training
- Expansion of bulk upload facility
- Review of SSQD measures to eliminate grey areas, e.g. “eligible patients”
- Coordinated national review and correction of cohort data

Issues

- Limited resource: many centres and some HCCs have no data manager. It remains possible for trusts to appropriate what little funding there is into other services. The required effort to correct existing data is not currently possible.
- Uncertainty around ongoing funding for the NHRv2 limits progress on enhancements that would improve data entry efficiency and accuracy, and would support a data maintenance cycle.

- Much of the information entered manually into the NHRv2 already exists within national datasets such as SUS, ONS or PDS. Direct integration could streamline workflows and improve accuracy.

Chapter 11: Conclusion and Next Steps

Key Priorities Emerging from this Report

- National data quality remediation programme, including duplicate resolution and mandatory HCC allocation.
- Investment in dedicated data managers at all SHTs to address critical recording gaps.
- Development of an RIA-specific annual review proforma.
- Systematic cause-of-death recording and mandatory HCC-level mortality review and linkage to ONS
- Improved psychology needs assessment and documentation across all three condition groups.