PATIENTS & NURSING STAFF

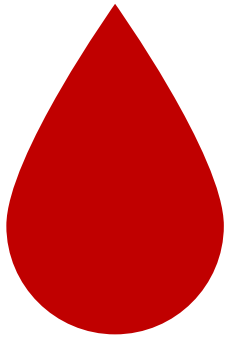
Understanding the long-term effects of blood transfusion

Dr Pooja Mahapatra

ST7 Haematology Registrar

Objectives

- Overview on benefits of transfusions
- Potential long-term effects of transfusion
- Transfusion-transmitted infections
- Monitoring of long-term effects of iron overload
- When to consider iron chelation

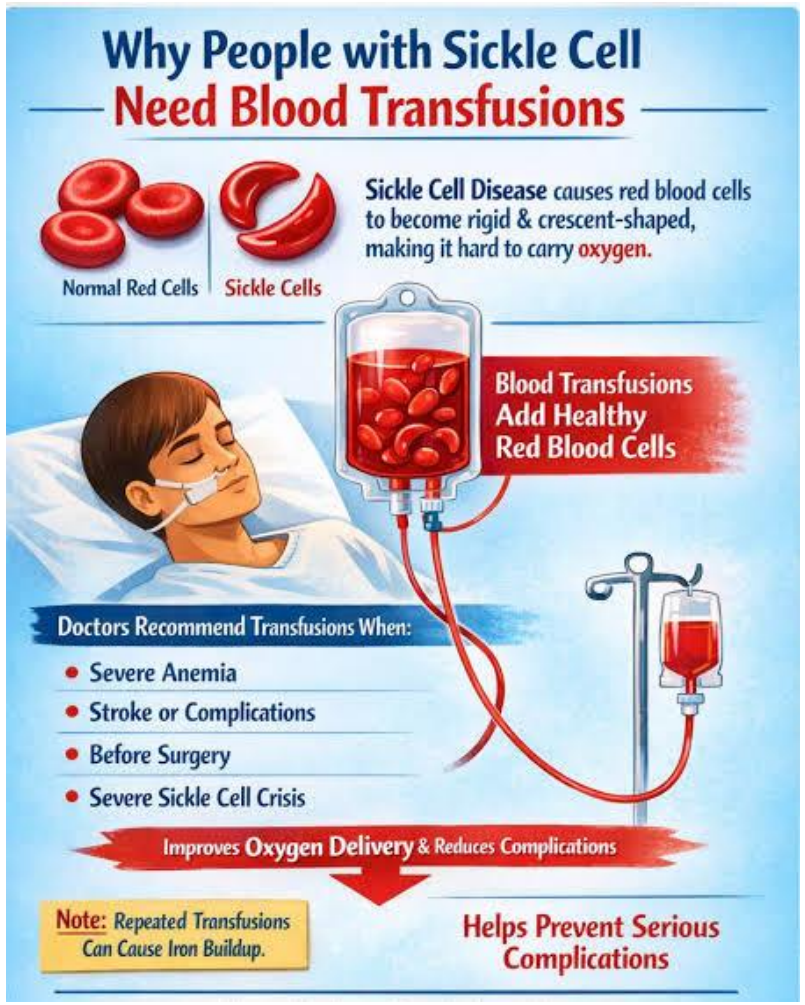


Transfusions can improve:



Overall Quality of Life

Transfusions in Sickle Cell Disease



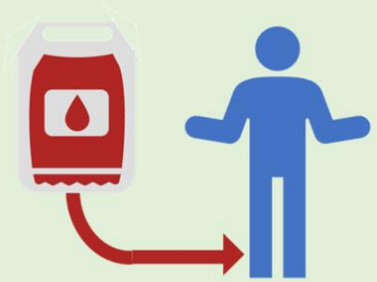
https://share.google/uhEK1JJERx4EQlLFD

Transfusions in Sickle Cell Disease

Top-Up transfusions

Advantages
- Possible peripheral venous access.
- Requires the fewest red cell units.

Disadvantages
- Hyperviscosity and circulatory overload
- Iron overloading.

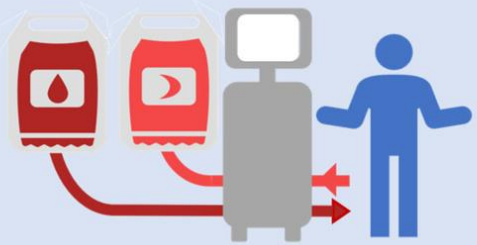


Vs

Red cell exchange

Advantages
- Can be done peripherally but may need central line.
- Minimizes blood volume shifts through continuous removal and replacement.
- Accurate control of HbS, haematocrit, overall fluid balance.
- Lowest treatment frequency.

Disadvantages
- Specialized device and training.
- The most red cell units per treatment



https://onlinelibrary.wiley.com/doi/full/10.1111/vox.13757

Risk versus benefit





Individualised to each patient

https://www.rcemlearning.co.uk/foamed/blood-transfusion-part-2/

24 HOURS TO 14 days

Delayed reactions: symptoms may appear later

Delayed haemolytic reaction

The immune system reacts to transfused red cells. Possible signs include tiredness, fever, jaundice, dark urine, back pain or a falling haemoglobin.

Alloimmunisation

The body makes antibodies against red-cell antigens. This can make it harder to find compatible blood for future transfusions.

What patients should do

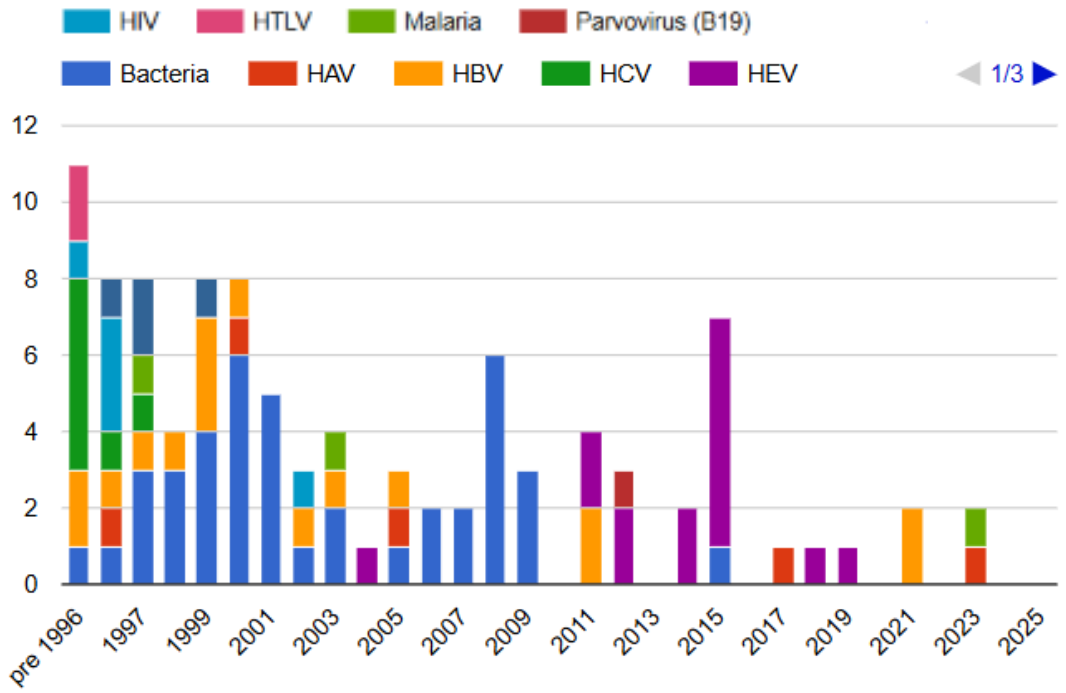
After a transfusion, report new fever, chills, unusual pain, yellow skin/eyes, dark urine, reduced urine or feeling suddenly unwell. Mention when last transfused, history of reactions and red cell antibodies

What staff should consider

Check transfusion history and antibody records; involve the transfusion laboratory/haematology team and arrange investigations as clinically indicated.

Transfusion-Transmitted Infections (TTI)

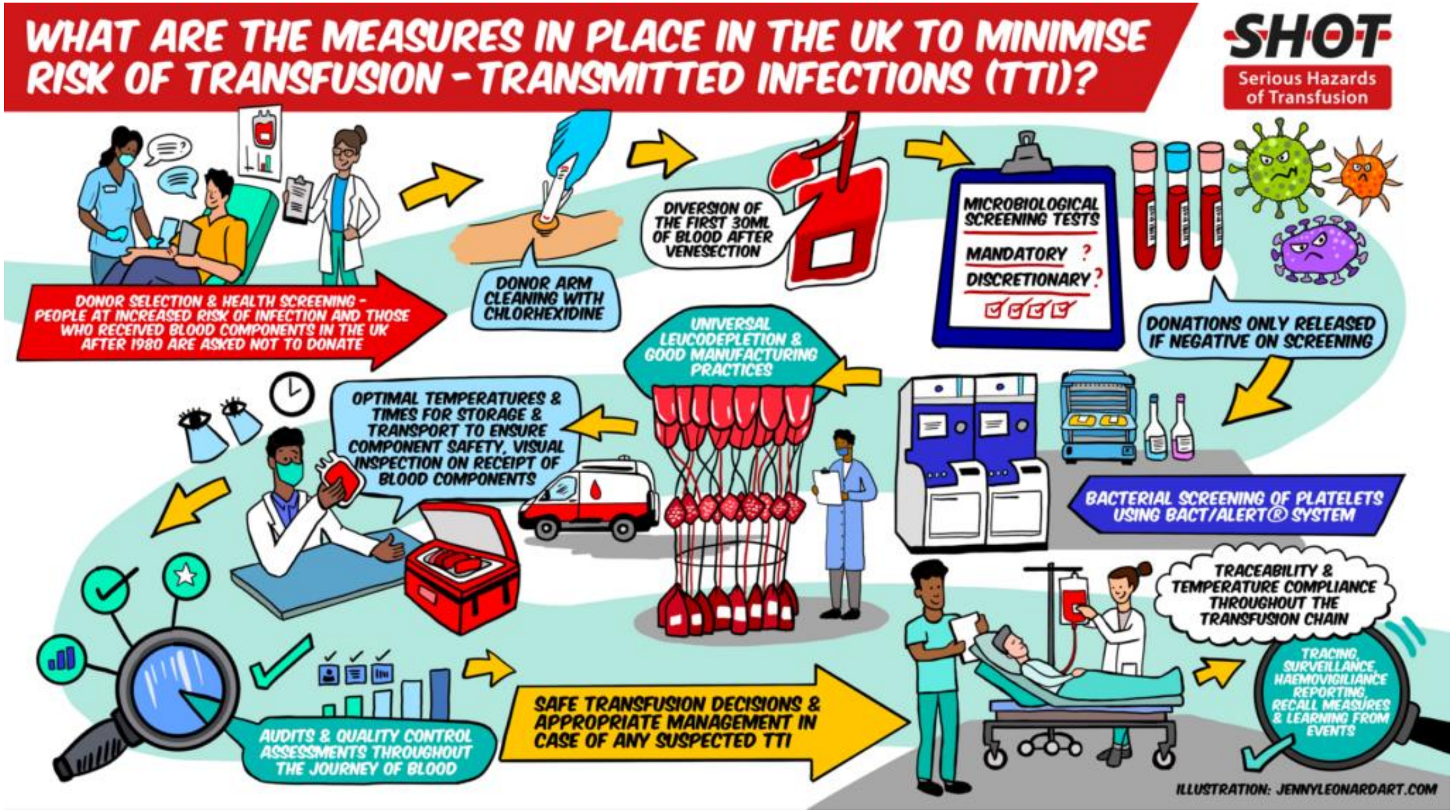
Number of recipients with confirmed TTI, by year of transfusion, and infection in the UK



Risk of transmitted infection from blood donation extremely low.

Potential risk of acute HBV, HCV and HIV entering blood supply undetected currently **<1 in 1 million donations**

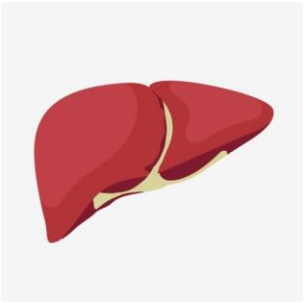
https://www.shotuk.org/resources/number-of-recipients-with-confirmed-probable-transfusion-transmitted-infections-tti/



https://www.shotuk.org/resources/transfusion-transmitted-infection-risk-reduction-measures/

REPEATED RED-CELL TRANSFUSION

The longer-term issue: iron overload



Each red-cell unit

Contains **200-250mg iron**. The body has no active way to remove the excess iron and only loses 1-2mg each day.

Iron accumulates

Over many transfusions, iron may collect in the liver, heart and hormone-producing organs. Role of iron metabolism and immunity.

Organ effects

If untreated, significant overload can damage organs and affect health.

Monitoring and treatment can reduce the risk of harm

- Blood tests such as ferritin help track iron trends (but can also be affected by inflammation).
- MRI scans are sometimes used to measure stored iron in the liver and heart
- Iron-chelating medicines help the body remove excess iron but be aware of side effects and importance of monitoring whilst on these treatments

Patient prompt

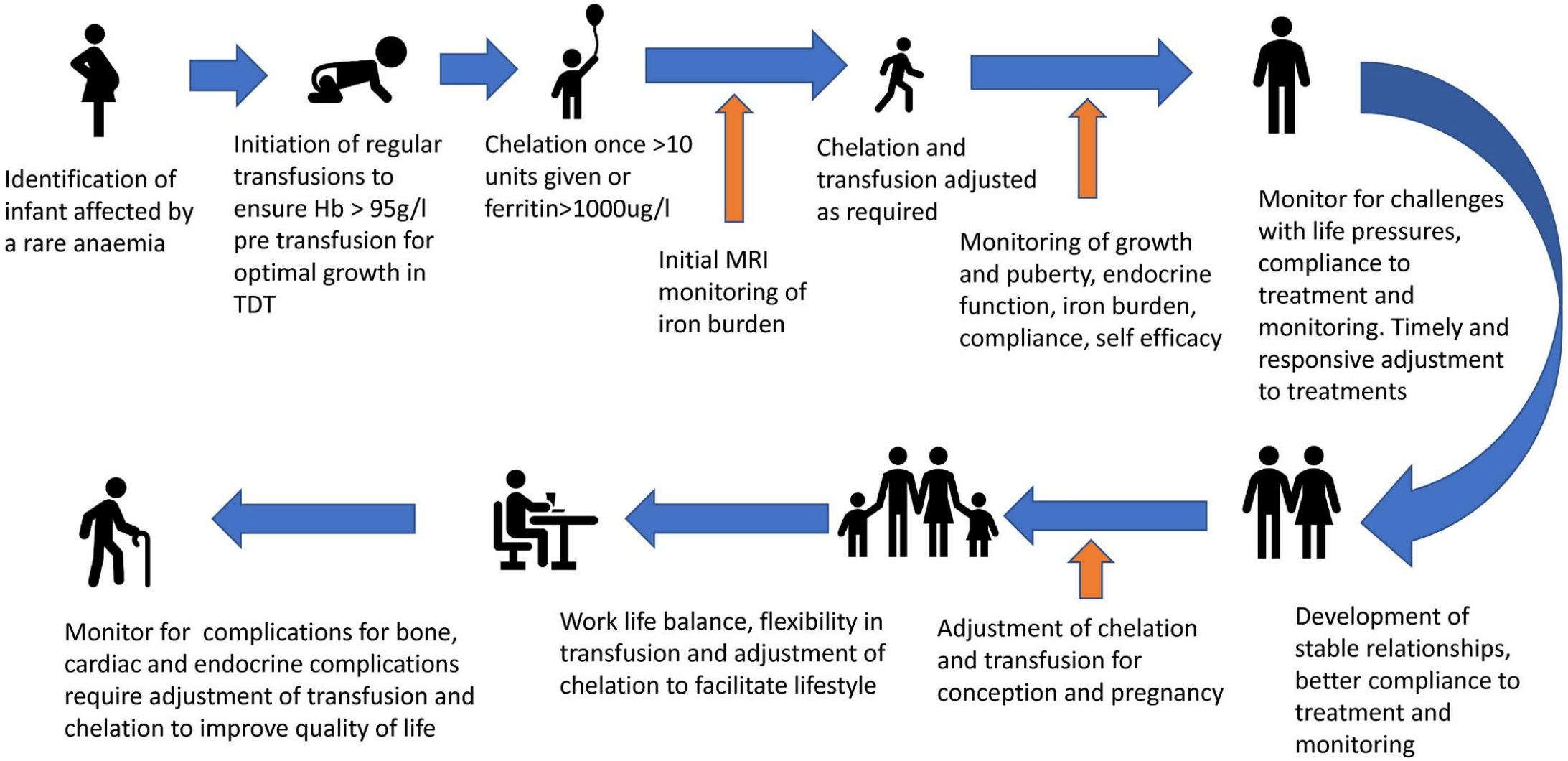
Ask: “How is my iron being monitored, and do I need chelation?”

Target Ferritin <1000ug/l - Transfusion-dependant thalassaemia/SCD top up transfusions
<800 ug/l - Non-transfusion dependant or high liver iron

https://doi.org/10.1111/bjh.17839

British Society for Haematology

Balancing transfusions and iron chelation



https://doi.org/10.1111/bjh.17839

The big picture

Most transfusions go well

Many people have no side effects. Mild fever, chills or an itchy rash can occur.

Repeated transfusions add risks

Over time, iron can build up and antibodies to donor red cells can increase.

Quality of life

Individualising frequency of transfusions and long-term side effects including iron chelation to optimise patient quality of life



PATIENT TAKE-HOME

When to seek help—and what to remember

Call 999 for emergency symptoms

Severe difficulty breathing, chest pain, collapse, or swelling/tingling of the mouth or throat. Tell the operator you recently had a transfusion.

Seek urgent advice for delayed symptoms

Fever/rigors, jaundice, dark or reduced urine, unexplained muscle/back pain, vomiting or feeling significantly unwell. Contact NHS 111/urgent clinical team and mention the transfusion.

Three questions worth asking at your next appointment

- Do I have any red-cell antibodies that the team needs to know about?
- How are we monitoring iron levels and organ health?
- Who should I contact day or night if I feel unwell after a transfusion?

Always follow your local transfusion policy and your own specialist team's advice.

References



- Dierick K, Rodriguez-Grande B, Navarro-Aragall A-G, Beraud M. Quality of life in people with sickle cell disease treated with automated red blood cell exchange. Vox Sang. 2025; 120: 4–12
- British Society for Haematology (2023). Guideline on the investigation and management of acute transfusion reactions. https://b-s-h.org.uk/
- www.shotuk.org/
- NHS Blood and Transplant. Transfusion FAQs. https://www.nhsbt.nhs.uk/what-we-do/blood-services/blood-transfusion/transfusion-faqs/
- British Society for Haematology (2023). Guideline on the investigation and management of acute transfusion reactions. https://b-s-h.org.uk/
- Shah, F.T., Porter, J.B., Sadasivam, N., Kaya, B., Moon, J.C., Velangi, M., Ako, E. and Pancham, S. (2022), Guidelines for the monitoring and management of iron overload in patients with haemoglobinopathies and rare anaemias. Br J Haematol, 196: 336-350. https://doi.org/10.1111/bjh.17839