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Review of Transfusion 2024

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Foreword

The Transfusion 2024 strategy, developed by NHS Blood and Transplant in 2019, was a critical step in transforming service provision for safer transfusion care. With patients at the centre of the strategy, much progress was made, most notably in research and innovation. Without the pressures of the pandemic and with improved cross system governance, greater change could have been realised. Variable quality and outcomes in transfusion practice remain, which is evidenced by patient experiences, blood stocks shortages and data on serious hazards of transfusion. The 2024 Infected Blood Inquiry included a key recommendation to review progress of the Transfusion 2024 strategy. This review, led by NHS England is in direct response to that recommendation and is a collaboration between patient groups, our partners NHS Blood and Transplant (NHSBT) and National Blood Transfusion Committee (NBTC). We would like to thank all who contributed to this review for their time, especially those who had loved ones impacted by previous transfusion practice. Evidence based transfusion care is critical for thousands of patients, we must improve systems collectively to ensure patients always get the right blood at the right time and the special gift of life saving blood is used to optimal effect.

Professor Dame Sue Hill, Chief Scientific Officer, NHS England

In line with recommendation 7b of the Infected Blood Inquiry (2024), this document provides a review of the Transfusion 2024 strategy. It sets out the priorities for future strategies to consider, when working collectively with partners to improve patient outcomes and to support scientific and technological advances in transfusion care.

The development of the Transfusion 2024 strategy, followed several initiatives which highlighted the need for improvements in transfusion care. The Better Blood Transfusion initiatives (1998, 2002, 2007) and the Patient Blood Management initiative (2012) identified key concerns and challenges in achieving best practice in transfusion. The National Blood Transfusion Committee (NBTC) which reports into NHS England, provided a structure to promote good transfusion practice by providing information and advice to hospitals and blood services in England. In 2019, a symposium identified opportunities for advancing transfusion practices, which led to the Transfusion 2024 strategy. This was a 5 year plan setting out priorities for clinical and laboratory transfusion practice, enhancements in transfusion safety, measures to ensure the appropriate use of blood and the effective organisation of transfusion services at both national and local levels.

Whilst Transfusion 2024 has driven progress by NHS Blood and Transplant (NHSBT) using a programmatic approach in key areas to deliver change, critical gaps remain, particularly in governance, research and long term strategic commitments. Further work is needed nationally, to ensure effective implementation and alignment across the system and to deliver sustainable evidence based improvements in transfusion care. Work to drive further improvements will be taken forward in a new Transfusion Transformation Action Plan planned for 2026.

Transfusion 2024 key actions and areas for delivery

The Transfusion 2024 strategy included 15 key actions structured into 4 areas:

- A: Patient blood management
- B: Transfusion laboratory safety
- C: Information technology
- D: Recommendations for research and development

The review process.

The review panel included a collaborative of volunteer patients and family members, expert representatives from professional bodies and societies, professionals with multidisciplinary backgrounds and healthcare system leaders. The review considered the progress in each of these four areas and made recommendations for the future. Further progress has been made since completion of the review in September 2025.

Review of area A – patient blood management

Key actions

A.1 Develop a tool for patient blood management self-assessment by hospitals

A.2 Resources to support clinical transfusion practice; NHSBT patient blood management team, national clinical audit, and blood stocks management systems

Develop and implement a national competency framework for transfusion practitioners

A.3 Inclusion of transfusion in national patient quality and safety initiatives

Review of progress

Action A1: Self-assessment – develop a transfusion practice self assessment tool for hospitals to allow benchmarking as an initial step towards external accreditation.

Further details: Develop a tool for self-assessment by hospitals / trusts with a plan for pilot and rollout. To include compliance of NICE Excellence Quality Standards for Transfusion. [Key responsibility NBTC]

The intended tool for self-assessment is known as the National Comparative Audit, which has approximately 80% compliance in hospitals, is available for benchmarking against other hospitals and work is ongoing to align into the Model Health System, a national benchmarking system. It has shown there are many gaps in transfusion practice, such as use of tranexamic acid as well as the use of iron, patient information and consent. An NBTC working group focussing on patient blood management ascertained the appropriate next steps would be to use the NICE transfusion quality standards to drive improvement and benchmarking.

Improvements to patient consent could be realised by inclusion within the NICE Quality Standards. The review panel agreed that patients could benefit from and be better informed of the risks of transfusion and also on the evidence behind the use of tranexamic acid, in case of blood transfusion. The panel was mostly satisfied with this deliverable, with the implementation of a tool for assessment of alignment to NICE Quality Standards. It went on to ask for more focus in aligning hospitals closer to NICE guidelines in their practice. Additionally, the panel agreed this area has a potential high clinical preventative impact, empowering patients to make informed consent, to have sight of and understand the evidence base behind interventions, which can reduce blood loss and the need for transfusions.

The QS138 insight tool was thought to have a much lower level of use and compliance with an estimated 20% of hospitals using the system with less impact than the National Clinical Audit, at the time of review.

Further work is needed to promote best practice in quantitative and qualitative terms across the healthcare system e.g. triangulation of the "Model Hospital" and "Getting it Right First Time" datasets to improve visibility of transfusion within monitoring and quality framework across the NHS. Upload of data to the Model Health System is ongoing to support areas such as business planning and strategy development, as well as allow hospitals to benchmark themselves against their peers.

At the time of review ~99% of hospitals were manually inputting details of their stock levels and wastage data into the NHSBT blood stocks management scheme. This data could be included within the Model Health dataset to better support appropriate usage of blood, which would result in improved practice and reduced costs for hospitals. This is yet to happen; with work initiated to develop the system. The panel agreed that a further focus was needed on automation to move it forward and to make this important data visible to trust and system leaders, acknowledging it was an area noted in the IBI recommendations.

Action A2: Resources to support clinical transfusion practice

Further details: NHSBT to review and strengthen support for clinical transfusion practice (including patient blood management teams, the National Comparative Audit programme and Blood Stocks Management Scheme). [Key responsibility NHSBT]

A review of clinical transfusion practice to aid improvement in clinical competence has started and will assist with educational curricula for clinical staff from multiple disciplines (medical, nursing and scientific). This was completed by the NHSBT Transfusion 2024 programme and a system to support users in this area, signposting healthcare workers to available clinical training to improve practice (detailed in section B1). Further work is required to align educational resources with clinical competency improvement with hospital clinical practice and to monitor improvement over time. Leadership of clinical practice has been supported by the NHSBT and it has championed joint NHSBT/trust patient blood management consultant posts. These individuals provide clinical expertise and essential leadership within hospitals, but they are few and far between, with insufficient numbers in England. An aim is to strengthen and widen this structure. There is a further need to drive improvement in governance, with anecdotal feedback from transfusion laboratories that several hospitals have divested from their transfusion committee structures, which is problematic for future governance and clinical oversight. Overall, the panel agreed this deliverable has been partially delivered and the completion of it would have high impact.

Further details: Define minimum recommended levels of transfusion practitioner staffing. [Key responsibility NBTC]

Improvements are needed in the training of professionals in the many disciplines which support good transfusion care, including transfusion practitioners, medical, nursing, scientific, laboratory and other areas. Hospital surveys carried out by NHSBT's patient blood

management team has provided data on transfusion practitioner levels, showing variability of job roles and staffing numbers between trusts and overall inadequate staffing across the system. Surveys have been carried out at an undergraduate level for medical training, but it is recognised there is more to do, with the medical school curriculum. A proposal has been made to complete a similar survey with nursing staff to determine if there is appropriate transfusion medicine content on the courses and to work with the institutes to develop resources which will benefit student and lecturers and ultimately the patient. A knowledge assessment survey has been designed and introduced nationally across the UK, to identify what additional transfusion resources are required to support practitioners working in hospitals for safer transfusion practice. Further modelling and scoping is needed in the future to define what is required to identify gaps and to better support transfusion practitioners. This modelling has not yet been completed due to the scale of the issue. Many trusts operate with a single transfusion practitioner; there is a lack of supporting frameworks to enable their voices to be heard at a high enough level. It is important trusts to support transition practitioners more appropriately, manage blood stocks and blood safety within a clear operational framework which promotes regular oversight of supply, stock, audit and training. The panel commented on the value of transfusion practitioners and how they promote safe practice and the impact of reducing the gap between trusts where these roles are not in place. More uniform provision of transfusion practitioners within the system can improve patient safety via defined oversight of supply, stock, audit and training of multiple staff groups in local hospital settings, driving the changes and improvements needed. Further work is needed to complete this deliverable, to establish the optimal number of transfusion practitioners for services; completion could have a high impact on patient safety by enabling local improvements in practice.

Further details: Develop a documented competency framework for transfusion practitioners with plan for pilot and implementation. [Key responsibility NBTC]

A transfusion practitioner professional development framework is in development, with options for funding under review, after which work will begin on framework development and establishment. Collaboration with transfusion practitioners and key stakeholders identified that a professional development framework which incorporates competency and forward looking development steps over the professional life course would have an impact on the role, not just today but in the future. The NHSBT Transfusion 2024 team secured funding to support the development of the framework developed with the wider transfusion practitioner community. The professional development framework is due to be published in 2026. To ensure the success of the framework, plans include workshops for transfusion practitioners, laboratory managers and other key staff, with a need to review and update the framework regularly. This deliverable was not completed at the time of the review.

Action A3: Inclusion of transfusion in national patient quality and safety initiatives. Aim to include where feasible data in national databases of diseases / outcomes for which transfusion is regularly used.

Further details: Review the feasibility for inclusion of transfusion data in databases including major surgery, cardiac surgery and major joint replacement

Blood and Transplant Research Units (BTRUs) have been established, funded by the National Institute for Health and Care Research (NIHR) and NHSBT. The data driven transfusion practice at the BTRU has been established for a five year period (2022-2027) and is collating data from larger datasets for analysis. The National Haemoglobinopathy Registry is being supported to compile the data of multi transfused patients into one area, so it is accessible to clinicians, linked to NHSBT's red cell immunohematology service, which supports the testing required for cross matching these patients. This will facilitate decisions to transfuse and the ordering of blood for affected patients. The panel commented that the registries played an important part in patients treatment and care. The panel also observed that genotyping initiatives should be further supported by these registries. The panel wanted to capture the recommendation for the increased ambition to align both blood typing results from genotyping and antibody methodologies into a single database and to establish a centralised national database of all patients and their red cell groups, as a matter of priority. This would ensure better matching of blood and therefore improved patient care. Improvements in digital systems are possible and should be driven to enable rapid blood typing and matching and alignment with newer technologies. The review panel noted the anecdotal perception that there was an acceptance of delays for digital system improvement, including for blood typing and matching; that this was an unwarranted approach which would increase risk to patients and should therefore be challenged with further effort to drive the changes needed. Peri-operative care and anaemia were highlighted as areas which needed further attention and improved data to improve patient service. Overall, the panel agreed this deliverable has been partially met and by completing the deliverable it would be of very high impact, and that England could learn from other countries which have good systems in operation.

Review of Area B – Transfusion Laboratory Safety

The key actions

B.1 Scientific and technical education and training, including development of the consultant clinical scientist role

B.2 Laboratory staffing: capacity planning

B.3 Integrated services: red cell Immunohaematology remote interpretation pilot

B.4 Pathology networks: defined standards for laboratory transfusion practice

B.5 Regulatory/compliance alignment: a unified standard MHRA/United Kingdom Accreditation Service (UKAS)

B.6 Adverse event reporting: Collaboration between Serious Hazards of Transfusion (SHOT) and MHRA to improve reporting

Review of progress

Action B.1 Scientific and technical education and training including development of the consultant clinical scientist role

Further details: B.1a. Review scientific training pathways and programmes to strengthen transfusion content and review mode of delivery. Review and strengthen NHSBT provision of scientific and technical training, including access and funding mechanisms. Provision of training resources for all laboratory staff to ensure appropriately skilled and knowledgeable workforce.

The B1a action was to review scientist training pathways and programmes to strengthen transfusion content and review mode of delivery of training. The 2022 UK transfusion laboratory collaborative survey highlighted challenges faced by hospital transfusion laboratories when training and mentoring new biomedical scientists, identifying a lack of self-directed learning tools available. The NHSBT Transfusion 2024 team worked alongside an education working group to develop a free digital webpage, hosted on the NBTC website, where high quality transfusion education and training resources are signposted, categorised and continually refreshed to provide online support and ease training burdens. This Transfusion Training Hub links to over 500 resources and has been promoted nationally and internationally, featuring in various publications and transfusion education events. It has been a huge success, receiving over 30,000 views in its first year.

The deliverable within this action was to produce a review of transfusion scientist training. The NHSBT Transfusion 2024 team has reviewed biomedical science undergraduate course content for the inclusion of transfusion, with variability noted. A survey was developed and circulated to all Institute of Biomedical Science accredited universities which provide undergraduate biomedical science degree courses in the UK. Results from the survey highlighted a lack of standardisation of transfusion content delivered, for the time

dedicated to teaching transfusion and about the inclusion of practical sessions as well as the availability of transfusion expertise to help deliver the content. Results and recommendations from the survey were shared with the Institute of Biomedical Science, SHOT, UK Transfusion Laboratory Collaborative, NBTC, the National Transfusion Laboratory Managers and the NHSBT Transfusion 2024 programme board. A collaborative plan has been developed to look at disparities and develop recommendations in conjunction with the Institute of Biomedical Science and to develop tools to enable universities to deliver appropriate levels of transfusion education. Following recommendations from the survey, backed up by findings in the UK Transfusion Laboratory Collaborative 2022 survey, where the level of graduates' transfusion knowledge was deemed 'poor', an undergraduate provision working group was established. This group, led by a Transfusion 2024 subject matter expert, has representation from 15 universities across the UK and the Institute of Biomedical Science, working collaboratively to develop good quality teaching resources. The resources will be standardised, pitched at the correct level and will not only meet the Quality Assurance Agency standards, by which universities gain their Institute of Biomedical Science accreditation), but it will also satisfy recommendation 7d from the Infected Blood Inquiry. A transfusion knowledge gap assessment survey was carried out by the NHSBT Transfusion 2024 team. The survey was looking to see what the gaps were, if any, in transfusion knowledge across all staff working within and closely linked to transfusion laboratories The results showed many knowledge gaps at several levels from those first starting within the laboratory, after completion of undergraduate biomedical scientist courses to those in more senior clinical medical posts. The lack of training budgets, low staffing levels and the high turnover of staff compounded training issues. The system currently relies heavily on a biomedical scientist model of scientific expertise and operational service delivery. There is a need to drive further scientific advancement, by increasing adoption of other scientific roles within the system. Transfusion 2024 undertook a review of the Scientist Training Programme (STP) and Higher Specialist Scientific Training programme (HSST) clinical scientist training course curricular. These training pathways had highly comprehensive content regarding haematology and transfusion safety, with gaps in blood service delivery. However, a need was identified to provide a more flexible provision for HSST training to allow for flexible career opportunities and access. Increasing support and contingency for those currently working within laboratories to access STP training was also identified. More importantly a need was identified to improve the focus on retaining STP and HSST graduates within the NHS system through appropriate capacity planning and role clarity for clinical scientists and consultant clinical scientists. It is essential to retain highly skilled scientists in the NHS. The clinical input from a system with increased clinical scientist leadership and scientific expertise was identified as driving improvement of current practice, by enabling increased clinical scientific expertise and supporting the reduction in national medical experts. A plan has been formulated to develop bitesize education pieces to help address some of the

knowledge gaps and support the future workforce. A review of career frameworks has taken place to identify gaps, including the following roles/programmes and has highlighted the need for an integrated approach to career progression rather than reliance on separate career pathways:

- Higher Specialist Scientific Training programme (HSST)
- Consultant Clinical Scientists
- Certificate of completion of training medics.

This area is considered highly complex, especially considering the large number of stakeholders and has been partially delivered. There has been good engagement to date, but significant action is required to make further progress.

Further details: B.1b Participate in NHSE Healthcare Science Workforce Partnership Board.

There have been multiple interactions with NHSBT professionals and the National School for Healthcare Science and associated governance groups. Even though this action was noted as complete, it is critical any future workforce board created includes NHSBT representation.

Further details: B.1c Agree funding with National Commissioning Group (NCG) / Health Education England (HEE) with support of NBTC. Discuss and agree with affiliated bodies.

Under action B.1b a review was undertaken to strengthen the NHSBT provision of scientific and technical training, including access and funding mechanisms. At the time of review, it was noted that an agreement had been made to move from annual national commissioning to a multi-year cycle enabling planning over a longer period, thought to be potentially beneficial for training model provision. Funding for training and trainee posts remains challenging and complex to resolve. Training offers are not in place for all key staff groups involved in the transfusion care pathway and without sufficient funding for the required trainee posts, this could take up to 5 years to complete. This action was considered reliant on funding to enable appropriate completion over a multi-year period. During this period Health Education England transitioned into NHS England. The commissioning of NHSBT to deliver transfusion education and training needs to be maintained and developed for the future. Overall, the panel agreed this has been partially delivered amid a high level of complexity with significant impact.

<u>Action B.2 Laboratory staffing: capacity planning</u>

Further details: B.2a Ensure adequate staffing and skill mix to cover the laboratory workload and complexity at all times, to maintain the Quality Management System effectively and to meet regulatory requirements.

The review group noted this objective was highly complex to deliver and reliant on complete and accurate workforce data, which is an issue within the system. It was acknowledged there was difficulty in getting system level data to demonstrate laboratories are adequately resourced or overstretched, with multiple data sources being collated as snapshots by the Royal College of Pathology, the Institute of Biomedical Science and UK Transfusion Laboratory Collaborative. This had been partially delivered, with more needing to be done to adequately monitor and address adequate staffing levels within laboratories, with capacity planning, workforce modelling and minimal safe standard levels needed. Concern was noted regarding the number of laboratory staff expressing they do not feel psychologically safe, due to their workload. The deliverable is not within the scope of NHSBT for completion.

Action B.3 Integrated services: Red cell immunohaematology remote interpretation pilot

Further details: B.3a Undertake pilots of integrated transfusion services between NHSBT red cell immunohaematology services and hospital transfusion laboratories including development of the consultant clinical scientist role.

Clear progress had been made with the completion of pilots for integrated transfusion services between NHSBT red cell immunohaematology and hospital transfusion laboratories and through the roll out of a referral support tool to hospital transfusion laboratories, named Red Cell Immunohaematology (RCI) Assist. This supports hospital transfusion laboratories staff to make decisions on whether a blood sample need to be sent for further specialist testing to NHSBT red cell immunohaematology laboratories. Feedback from a pilot found the referral tool resolved many local issues and supported upskilling of staff. Wider roll out of Red Cell Immunohaematology Assist happened in 2025. This action had a positive impact on transfusion safety, made important progress and was on course for completion.

Further details: B.3b Develop and implement a strategy for consultant clinical scientists to take a leadership role in transfusion.

Workforce surveys during the development of the Transfusion 2024 strategy showed a proportion of hospital laboratory managers and medical haematologists were due to retire in the coming years. NHSBT championed the role of HSSTs by supporting a limited number of trainees and consultant clinical scientist posts able to assist at the laboratory clinic interface. It takes five years to complete HSST training. A strategic approach to workforce design is needed to ensure sufficient trainees are in place and there are sufficient numbers of consultant clinical scientist roles available to graduates within both NHSBT and the NHS. The panel also noted there were insufficient numbers of HSST trainees and clinical scientists within haematology. It suggested there may be opportunities to support workforce gaps in this area from comparatively well staffed immunology departments. A strategy has yet to be developed to address this issue along with the insufficient support to ensure appropriate

levels of staffing are in place now and for the future. This action has not been strategically driven or funded to deliver the changes needed and more action in red cell immunohaematology could be harnessed with defined and funded leadership. The panel also remarked that delivery of this should not be overly complex. It does require the right stakeholders to lead in this area, supported by appropriate funding and should be a key focus area for the future strategy. The panel agreed this has not yet been delivered and should not be overly complex to do so, whilst the impact would be high for patient safety.

Action B.4 Pathology networks: defined standards for laboratory transfusion practice

Further details: B.4a NHSE Specialist Advisory Committee to promote the implementation of regional transfusion networks with defined standards.

Standards for Pathology Networks have been drafted in collaboration with the UK Transfusion Laboratory Collective, the NBTC Laboratory Managers Group, the Institute of Biomedical Science and representatives from SHOT, with a particular focus on IT standards. The panel noted there was a need for greater alignment and work with the NHS pathology networks, clinical scientist, consultant clinical scientists and the Association of Clinical Biochemistry. This was not delivered at the time of review however it has acknowledged subsequent progress has been made.

Further details:. Hospital Blood Data Integration Project. Inclusion and review of blood usage / wastage data across networks to optimise appropriate use and stockholding e.g. of group O, D negative red cells.

NHSBT has worked with hospitals to develop a solution to integrate blood stock and wastage data from hospital Laboratory Information Management Systems (LIMS) into a central platform in NHSBT. A proof of concept pilot will test the IT solution and the aim is to eventually roll it out to every hospital, to support better stock management and enable better benchmarking. Pilots were initiated in 2025, with work ongoing to confirm data sets. The current tool to capture this data is not automated, making it prone to error and adds to hospital laboratory workloads. The recent amber alert has raised the profile of the need for this data to be provided in a consistent manner to ensure visibility of stock across the whole supply chain i.e. from NHSBT to hospitals. NHSBT systems need improvement to articulate demand and supply, usage and wastage and stockholding to improve national system resilience via an integrated, intelligent, data driven supply chain system. An additional complexity of this project is the variance in Laboratory Information Management Systems (LIMS) across hospitals and the fact that there is a need to work with multiple LIMS suppliers to enable the solution. As pathology networks become better connected, this project may become easier to implement as systems align on a regional level. Surveys show a lack of IT expertise and capacity within hospitals presents an additional barrier which needs to be

addressed. This project is aligned with deliverable C1 noted later in this document. The panel said there was opportunity to share data on good practice via transfusion laboratory managers and to ensure they were integrated into the delivery of this work. The panel agreed that at the time of review this has not been delivered with pilots yet to be initiated in an environment of moderate to high complexity, despite being of high importance. This work has subsequently moved forward within the IBI work on the Model Health dashboard for national alignment and the digital transformation working group.

Action B.5 Regulatory/compliance alignment: A unified standard by MHRA/UKAS

Further details: B.5 Medicines and Healthcare products Regulatory Agency (MHRA) and the UK Accreditation Service (UKAS) to support collaborative working and reduce the compliance burden for transfusion laboratories.

UKAS is the only accreditation body recognised in UK legislation and its standards are essential for laboratories, alongside absolute compliance with the MHRA for regulatory product standards and Blood and Safety Quality Regulations which form part of UK legislation. A percentage of laboratories are inspected every year, with laboratories complaining that dual inspection systems are in place. NHSBT was unable to implement a unified standard as the deciding bodies the MHRA and UKAS, have differing roles; with the MHRA focusing on regulatory product standard and UKAS on service accreditation. The MHRA is committed to reviewing where there are discrepancies between the MHRA and UKAS outcomes. The panel agreed this had been taken as far as is feasible. It would be beneficial to further review the differing actions undertaken in completing the roles of MHRA with its focus on regulatory standards, of UKAS on service accreditation standards and legislation on safety quality regulations and to determine if further refinement or collaboration is possible to reduce any areas of duplication for service inspections. The deliverable is therefore not within the scope of NHSBT for completion.

Action B.6 Adverse event reporting: Collaboration between SHOT and MHRA to improve reporting

Further details: B.6. Promote a just culture, ensuring continuity of professional independence for SHOT. Facilitate and support collaboration between SHOT and MHRA

The UKTLC culture survey was completed and the results escalated to Trust senior managers for review. Recorded actions taken because of this report has been minimal, despite survey results showing the culture in transfusion laboratories is adverse and reflective of an understaffed workforce with a lack of recognition for work complexity and pressure. One in five of transfusion laboratory staff reported feeling psychologically unsafe in the workplace. Both a top down approach with focus from DHSC and with NHS England

flagging issues to trust senior leadership: and a bottom up level approach where Hospital Transfusion Committees (HTCs) have a stronger voice within the hospital system are recommended to improve transfusion laboratory culture. SHOT is a UK wide independent organisation funded by NHSBT and by devolved countries via a UK wide forum. Initiated in 1996, it co-ordinates evaluation of reports on serious hazards of transfusion. Reporting to SHOT is now aligned with the MHRA's SABRE (Serious Adverse Blood Reactions and Events) system. Through this reporting, SHOT collates data and produces highly educational reports; most hospitals report to SHOT. The panel considered SHOT reporting to be excellent with continued need for improved collaboration with the MHRA to ascertain areas for local action and unification with NHS reporting systems, where possible. The panel agreed the culture issues highlighted within hospital laboratories remain a concern, recognising there are limitations on what can be done at lower levels other than for staff to persist in raising issues when they occur. To improve progress in culture, the panel recommended improving communication and participation with regional transfusion committees, ICBs and Trust engagement, pathology directors and wider stakeholders. The panel agreed this has been partially delivered in an environment of moderate to high level complexity. The importance of this deliverable, especially when looking at ensuring positive change to transfusion laboratory culture, was rated as very high, However, to address culture takes continued investment and time.

Review of Area C – Information technology

The key actions

C.1 Transfusion IT

a. Defined standards for hospital transfusion IT within Pathology networks
b. Pilot electronic requests for NHSBT reference laboratory tests
c. Design a blueprint for managing inventory and define an approach for roll out to hospitals
d. Develop standards for routine collection of data on blood utilisation (Blood and Transplant Research Unit

C.2 Electronic blood management systems (vein to vein electronic tracking).

Review of progress

Action C.1 Develop a blueprint for hospitals and IT suppliers to jointly improve safety and efficiency of transfusion laboratory IT. This should include enhancing IT connectivity between hospitals and NHSBT and promoting interoperability; and collection of data to monitor clinical laboratory transfusion practice and facilitate benchmarking.

Further details: C.1a Inclusion of defined standards for hospital transfusion IT within Pathology Networks.

The SHOT UK collaborative reviewing and reforming IT processes in transfusion group (SCRIPT) is an IT group aligned to SHOT, which has undertaken a survey of hospital LIMS. Survey findings demonstrate great variability in LIMS and a general lack of IT support for transfusion in hospitals. It has also highlighted that less than a third of hospitals had electronic blood management systems at the time of review. As a result, hospitals are not utilising the full benefit of their systems, due in part to the lack of IT and transfusion requirement expertise and standards. NHSBT aims to work with Pathology Networks to introduce robust IT standards supporting transfusion going forward. The NHSBT Transfusion 2024 Programme has been increasing its engagement with NHSE Pathology Transformation and the regional NHS Pathology Networks. The British Society for Haematology (BSH) has developed IT guidelines and LIMS specification for procurement. These have been published but are not linked with an implementation mechanism. NHS England's Digital Diagnostic Capability (DDC) programme has enabled transfusion to have a larger presence in the national discussion of LIMS procurement specifications. Currently there is not a defined unified hospital IT standards. NHSBT intends to work with NHS Pathology Networks and the NHSE Pathology Transformation Programme to drive this forward. Mandating these standards should be a key part of forward looking strategic aims. The panel noted that, whilst progressing, transfusion systems had not been a national directive to date and that evolution

of hospital transfusion systems aligned to scan for safety, should be an area of focus. Improvements in digital systems were viewed as essential for patient care, yet complex and costly to deliver, with a requirement to integrate with existing systems. It highlighted the need to align the digital agenda with safety for improved data analysis on patient outcome. As an additional long term benefit, implementation of standard IT transfusion systems would bring a significant cost saving to the NHS, if a broader systems approach is taken to IT system procurement and implementation. The panel agreed at the time of review that little progress had been made on this action, with partial delivery in some areas. The panel also commented that, whilst this is a complex issue, the key to progression is an overall prioritisation to drive change, with one panel member suggesting this should be addressed as a “priority with urgency.”

Further details: C.1b Pilot electronic requests for NHSBT reference laboratory tests.

The NHSBT Transfusion 2024 pilot for e-requesting and e-reporting for Fetal RhD genotyping has been completed successfully. This IT solution is now proceeding to rollout in hospitals. Rollout is complex considering the variance in digital maturity in organisations with different LIMS suppliers, digital capabilities and processes with intention is to ensure roll out to 70 hospitals. An e-requesting and e-reporting system for red cell immunohaematology tests will be piloted. It was noted that it will be more complex due to the large number of tests to be incorporated. There was a stated aim to pilot this over 2025, with eventual implementation in all hospitals which use the tests. The panel agreed this deliverable was partially delivered, with expansion needed with it being essential to reduce transcriptional errors and enable digital requesting and reporting of tests and results. This area should be prioritised for implementation to aid NHS laboratories.

Further details: C.1c Design a blueprint for managing inventory and define an approach for rollout to hospitals.

The overarching priority for the NHSBT Transfusion 2024 Hospital Blood Data Integration Project was to enable consistent blood stock data monitoring on a daily basis. This was to enable better data analysis and benchmarking of practice of blood and components usage with alignment to the Model Health System. Hospitals currently manually input stock data into NHSBT’s blood stock management system, "VANESA". The system is outdated and retrospective data received is out of date and does not provide a current snapshot of stocks, usage or wastage. There is a further need to expand the data set captured. The requirement to input manually is a barrier for hospitals to provide consistent data and is prone to human error. An outline business case has been developed and approved and a solution has been designed to move the data into a platform on an automated daily feed. NHSBT is working with hospitals in a network based approach to pilot the project. Post pilot, a business case will be required to progress further. Implementation of an integrated blood stocks management system could reduce the burden on hospitals for blood ordering and enabling

automation to replenish stock. Following recent amber alerts, blood stock management is a priority for NHSBT and the NHS. There remains a need to drive change in this area of national importance. The panel agreed this deliverable is only partially complete and is of high importance, with consideration given to different approaches for faster delivery. NHSBT systems need improvement to articulate demand and supply, usage and wastage and stockholding to improve national system resilience by an integrated, intelligent, data driven supply chain system.

Further details: C.1d Develop standards for routine collection of blood utilisation data with feedback to clinical teams.

This action falls within the NIHR Blood Transfusion Research Unit's work on reviewing complex data collected for patient outcome by utilising the IT infrastructure in 3 hospitals as part of a proof of concept study. The pilot is in the early stages of development, with considerable time needed to complete the pilot before potential wider rollout. There are different electronic patient record systems across hospitals which is a major barrier to implementation. However, considerable impact could be made if priority was given to hospitals which employ specific IT systems, such as the two most frequently used electronic health record systems in the NHS in England. The panel discussed the need for consistent patient level data, which can be achieved by coding to the Observational Medical Outcomes Partnership (OMOP) Common Data Model to influence clinical practice. The definition of OMOP data standards for transfusion has been piloted at one hospital as part of the HaemMatch research programme. The panel agreed this had not been delivered but remains of high importance.

Action C2: Electronic blood management systems

Further details: C.2a Develop a plan to drive the implementation of electronic blood management systems from donation to recipient group and screen sample, to blood collection, to administration of blood and monitoring of transfused patients.

It was acknowledged that some centres of transfusion excellence had developed and implemented IT supported electronic blood management systems for years. However, a survey showed less than a third of hospitals had electronic blood management systems in place in 2024. Without suitable electronic blood management systems in place, samples sent to the laboratory for typing have greater rejection rates and two nurses are needed to check the blood bag corresponds to the correct patient at the bedside. The evidence base has improved with data from projects through the NIHR Blood Transfusion Research Units and the Barts Health Charity, demonstrating the positive health economic impact of implementing electronic blood management systems. This lack of progress in the implementation of electronic blood management systems in hospitals was highlighted by the Infected Blood Inquiry for which funding is a key barrier. This area is of vital importance for

safety, will release nursing time and be economically beneficial overall. A strategic commissioning focus and investment are needed to implement this approach in all services.

Review of Area D – Recommendations for Research and Development

Key Actions

D.1 Data Driven Transfusion Practice

D.2 Component development

D.3 Donor and Patient Typing

D.4 Transfusion Research

Review of Progress

The most progress has been made in this area. NHSBT should be commended for the development of the NIHR Blood Transfusion Research Units and the transformative work that has been undertaken.

Action D1: Data Driven Transfusion Practice. Determine the feasibility of applying big data and machine learning to obtain real time data on the whole transfusion process from donor to patient.

Further details: Seek funding to support collection and analysis of large datasets on how blood and components are being used to facilitate benchmarking of NHS hospitals and predictions of blood component demand.

NIHR Blood Transfusion Research Units are reviewing patient data resources which are already available on blood component use, with particular focus on areas such as anaemia. Use of this data will not only help inform predictions on blood component demand but also help to influence better transfusion practice and patient benefit through blood usage and patient outcome data. The Blood Transfusion Research Units has worked with the NHSBT Blood Stocks Management Scheme to review whether any improvement can be made in the reporting of usage and wastage data back to hospitals to get better engagement. Positive feedback has been received from hospitals on this. There has been great progress since the writing of these recommendations in 2019, as at the time a lot of this data was unavailable. It was felt that this was a hugely ambitious and challenging project due to the amount of data and that further alignment to IBI recommendations on benchmarking data sources would still be beneficial. The Blood Transfusion Research Units report to NIHR on research activity for oversight. The mechanism for feeding back results and key messages to the wider NHS system was seen as an area which could be improved. Few system partners were aware of the work or results, limiting adoption, with one panel member asking, “how will this go back

to clinical practice?" It was acknowledged that this area of work had progressed since 2019 and more time was required for completion alongside further investment to increase delivery speed. There needs to be further focus on the use of large data sets and how that data can be used to improve usage and wastage of blood: as well as improve patient outcomes as digital integration aspects of the IBI recommendations and use of the federated data platform are taken forward. The activities were considered limited in scope due to the allocated resource, with demonstration of economic impact required to obtain substantial future investment. The panel agreed this had been partially delivered, is highly complex and important for influencing future transfusion practice and blood stocks.

Action D2: Component development. Continue support for component development aligned to patient needs.

Further details: Work with Regional Transfusion Committee (RTC) chairs to identify new components for clinical trials. Agree pathway for component development over the next five years. Ongoing close partnership between hospitals and NHSBT towards completion of UK trials on COVID-19 convalescent plasma.

The convalescent plasma work has made great progress within the NHSBT components development laboratory since 2019, including two convalescent plasma trials completed and published. The RECOVERY trial – UKRI looked at convalescent plasma use for hospitalised patients and the Randomised, Embedded, Multi-factorial, Adaptive Platform Trial for Community Acquired Pneumonia (REMAP-CAP) looked at convalescent plasma use for patients in intensive care. These trials provided most of the evidence for the use of convalescent plasma during COVID-19. The COVIC-19 trial, a collaborative trial which looked at patients who had impaired immunity due to cancer or organ transplantation and the early use of convalescent plasma in that patient group was completed. In addition, there was a trial looking at patients who had impaired immunity in hospital or in intensive care. The Study of Whole Blood in Frontline Trauma (SWIFT) trial sought to further understand the use of whole blood in trauma patients, working in collaboration with air ambulance services across England. Further component work is under development, such as the use of spray dried plasma, which may be used outside a hospital setting, as it does not need to be frozen and development of a universal (that could help to many patients) component for transfusion (plasma or platelets). NHSBT is working closely with the NBTC and hospitals to determine what components might be useful. A transfusion research network has been formed to support greater hospital participation in clinical trials of new components. Funding for this network was established in 2026 and will be presented to a UK Forum for endorsement, to implement as business as usual. The panel agreed that "great progress had been made in this area" with good engagement and awareness of the work to wider audiences.

Action D3: Donor and patient typing. Model optimal donor and patient typing and implement the most cost effective systems, including genotyping, to meet the needs of chronically transfused patients and those difficult to provide with compatible blood.

Further details: Define and develop a pilot of genotypically matched blood for multi-transfused patients. To include a health economic analysis of clinical benefits.

The piloting of genotypically matched blood has made considerable progress. It enables provision of extended blood typing and more personalised blood matching using algorithms which can reduce adverse reactions through the provision of better matched blood. In 2019, genotyping was available but was not in routine use. Translating genomic advances to improve patient care was needed and progress has been made to genotype all haemoglobinopathy patients and a substantial number of donors. NHS England and NHSBT's national programme to use blood group genotyping to provide an extended blood type on the entire national cohort of patients with sickle cell disorder, thalassaemia and rare anaemias (approximately 20,000 patients) is well underway. Funded by NHS England, samples are gathered from more than 50% of all patients nationally. Data is being analysed with initial findings suggesting patients with an extended blood type provided by genotyping will have a direct improvement in clinical care, further informed blood type records, and improved blood matching and allocation in the future. A clinical pilot is currently in the design phase, with 40 patients at a single hospital, looking at the feasibility of rolling out a larger multi-centre study to determine the benefits of genotypically matched blood, including health economic analysis. It may also enable bespoke blood matching in other clinical groups of patients to reduce alloimmunisation. Governance is in place within the existing algorithm to prevent unnecessary genotyping for certain blood groups, thereby preserving blood supply for the wider population which does not need the rarer blood types. The panel commented on the excellent progress made in this area so far and how this work could reduce alloimmunisation and wastage, helping preserve blood stocks. However, a programme of better matched blood for patients with sickle cell disorder cannot be delivered if the portion of blood donors typed for the most immunogenic blood group antigens (so called extended typing) is not increased from its current level.

Action D4: Transfusion Research

Further details: D.4 Relevant bodies to continue funding and providing advocacy for clinical transfusion research.

An options appraisal on the benefits of a clinical trials network in transfusion was completed, with the aim of speeding up the delivery of clinical trials of blood components and improving patient outcomes. A business case was developed against the preferred option from this appraisal to support the creation of the NHSBT Transfusion Research Network (TRN). A TRN manager has been recruited and recruitment for a patient and public involvement (PPI)

officer was underway at the time of this review. The development of the Network will follow recruitment, with further funding being sought from the UK Forum from 2026, to embed the project within NHSBT's routine work. The panel agreed this had been mostly delivered with options appraisal completed, with change in scope to implement the TRN.

Conclusions

Governance and commissioning

The review group considered the Transfusion 2024 Strategy to be well considered and timely in design with the areas identified, important for patient improvement and benefit. Improvements could have been made regarding alignment with healthcare system partners. Elements in terms of resource and investment by essential system partners, particularly the NHS and NHSE, was inequitable. In noting the role ICBs played in Strategic Commissioning and the scale of national change needed, the review group said the development of Transfusion 2024 could have benefitted with input, design and investment from system partners, particularly the NHS, albeit within a changing landscape of governance.

To address its areas of responsibility NHSBT provided a successful approach to managing change. However, the delivery of other strategic objectives, outside its remit and responsibilities, were unsupported; so progress in those areas was not maximised. As NHS England and ICBs are being restructured any recommendations made within this report should be considered within the future DHSC/ NHS operating model.

The Strategy was also significantly impacted by the COVID-19 pandemic, resulting in delays to aspects of the programme. The strategic programme was solely funded by NHSBT which may have also led to slower delivery in some areas. A key area needing attention was the strengthening of national transfusion governance and oversight, which included the NBTC. Also highlighted was improving procurement, cybersecurity, implementing IT interoperability of hospital systems and alignment and linkage to NHSBT digital systems. This was to enhance the safety of transfusion care for patients along with improved visibility and communication to system partners of activities and ongoing work. Oversight and strategic commissioning support from leaders in different areas of the national transfusion operating model within the NHS and NHSBT was viewed as crucial to future success. The success of the Transfusion 2024 strategy is attributed to the drive of those delivering and contributing over the years, including many stakeholders.

Workforce

The review group noted the importance of core values which guide culture and behaviour. Developing evidence for the culture shift needed in partnership with laboratory staff and leaders, educational/training effectiveness as well as improvement and behavioural science to maximise change, were highlighted as areas for further action. Capabilities and competencies of the workforce are necessary to achieve the full implementation of the strategy. Safer staffing levels were specifically highlighted in this review with the above aspects on culture also within the IBI for further attention, including for laboratory staff.

Key focus areas

Most of the blood is used by ‘big user organisations’. The review group noted future attention targeting those organisations would have the greatest impact. In England, 33/241 (14%) hospitals are in the ‘very high user’ group and account for 38% of total ABO red cell issues:45/241 (19%) hospitals are in the ‘high user’ group and account for 26% of total ABO red cell issues (Data from Blood Stocks Management Scheme (2025). An increased focus on improving health equity and the challenges impacting specific patient groups was highlighted by the review collaborative, ensuring the most vulnerable were protected and their care enhanced. Closer working relationships with patient representative bodies including the elderly, pregnant mothers, those with anaemia, malignancies, special educational needs and those reliant on regular transfusions were noted as beneficial future steps.

Research, technology and innovation

Research advances driven by Transfusion 2024, such as the creation of two additional Blood Transfusion Research Units in 2019, were seen as a great success, driving patient and donor centred advances. Use of technologies and algorithms to improve better blood matching, improved personalised allocation and sustainability of blood stocks. The development of component clinical trials systems offered great hope in further transforming the national blood donation and allocation system to meet future demands and save even more lives. Areas identified by the panel which were not detailed within Transfusion 2024, included implementing a national registry of transfusion, use of unified data platforms, big data and multiple data sources, genomics and novel technologies, learning from other international partners and systems and cyber security.

Clinical advancement and strategic shifts

Further advances are needed in long term clinical translation, the clinical interface with benefit patient groups (e.g. oncology, iron management, women’s health) and building an evidence base on long term outcomes and blood stocks sustainability. The shift to prevention and community based care with a focus on the prevention of anaemia was noted as a key area of focus to tackle pre-operative anaemia. The review group recommended transfusion safety be considered in the context of the 10 Year Health Plan with a focus on support for the shift from hospital to community; analogue to digital, and treatment to prevention. Future strategies could be more aspirational with a longer term view on improving laboratory and clinical systems. Modernisation to support effective change was seen as paramount for future work, enhanced by a more responsive approach to safety reporting using quality improvement via structured methodology to enhance patient care.

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