GS1 UK Healthcare Conference 2025

Enhancing traceability and patient safety in blood transfusion procedures

Martin Muir
Laboratory manager – blood transfusion
Royal Papworth Hospital NHS Foundation Trust

#bettercarecostsless

Enhancing Traceability and Patient Safety in Blood Transfusion

Mr. Martin Muir, M.Sc., FIBMS
Laboratory Manager, Blood Transfusion,
Royal Papworth Hospital NHS Foundation Trust

NHS
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Royal Papworth Hospital

- **Specialist Cardiothoracic hospital**

- 21,125 Elective admissions
- 4,737 non-elective admissions
- 3,143 Theatre surgical procedures
- 9,733 Cardiology procedures
- 128,330 outpatient appointments

Source: NHS75 staff “paint a pebble” initiative

Royal Papworth Hospital today

‘Bringing tomorrow’s treatments to today’s patients’

UK's leading heart and lung hospital, treating more than 50,000 patients each year.

UK’s first successful heart transplant in 1979, and world’s first heart-lung and liver transplant in 1986

Most heart and lung transplants of any UK centre and a record five transplants in 36 hours

98% of our patients said they would recommend us to their friends and family

First NHS Trust in England – Robotic thoracic surgery 2023

CQC rated outstanding 2019

Stroke detecting AI 2024

Care Quality Commission
Outstanding

Blood Transfusion Demand at RPH

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Supporting Cardiothoracic Surgery

Blood Component	Annual transfused units
Red cells	4930 (410 per month)
Platelets	1457
Fresh Frozen Plasma	1918
Cryoprecipitate	671
Prothrombin Complex Concentrates	200
Fibrinogen Concentrate	170

BSQR requirement to have traceability for all blood components for thirty years.

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Where we were in 2018

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Pre Electronic blood tracking – old Papworth Hospital

Crossmatch all pre-operative patients.
80% of units returned to stock
Frequent blood movement between Theatres and Laboratory
Paper blood movement records and paper Traceability tags

	2018
Red cells Issues	420 per month
Wastage %	5.6
O Neg % Requests	13.8
Traceability	99.125%

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Move to new Royal Papworth 2019

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Achieved in a weekend

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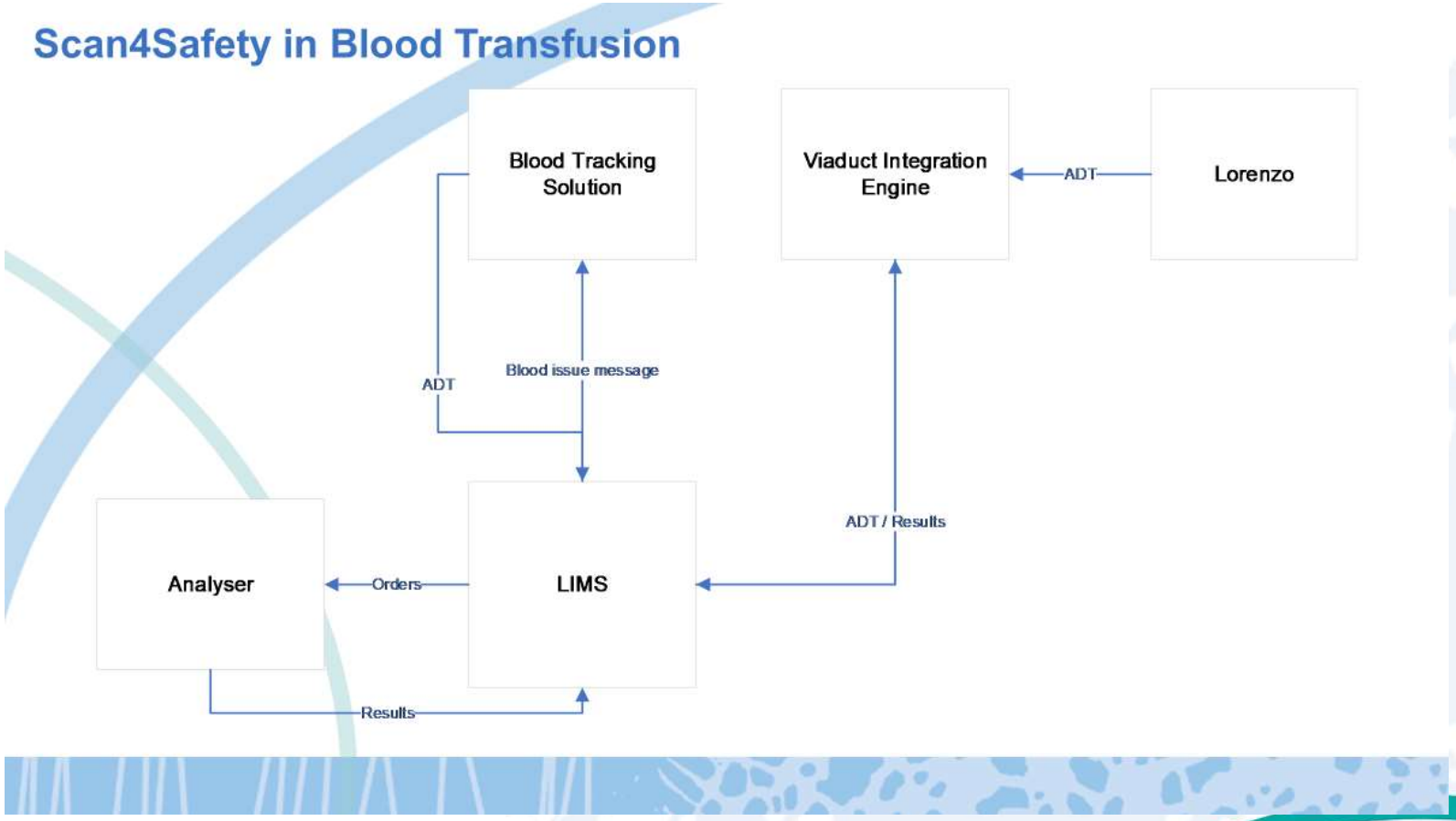
Opportunity to re-launch

Right patient – right blood – right time

Utilising interoperability

- Reduced blood handling
- Reduced laboratory demand on staffing
- Reduced red cell wastage
- Improved accessibility to blood
- Improved Traceability



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HaemoBank® and BloodTrack® Solutions

High visibility monitoring through scanning technology

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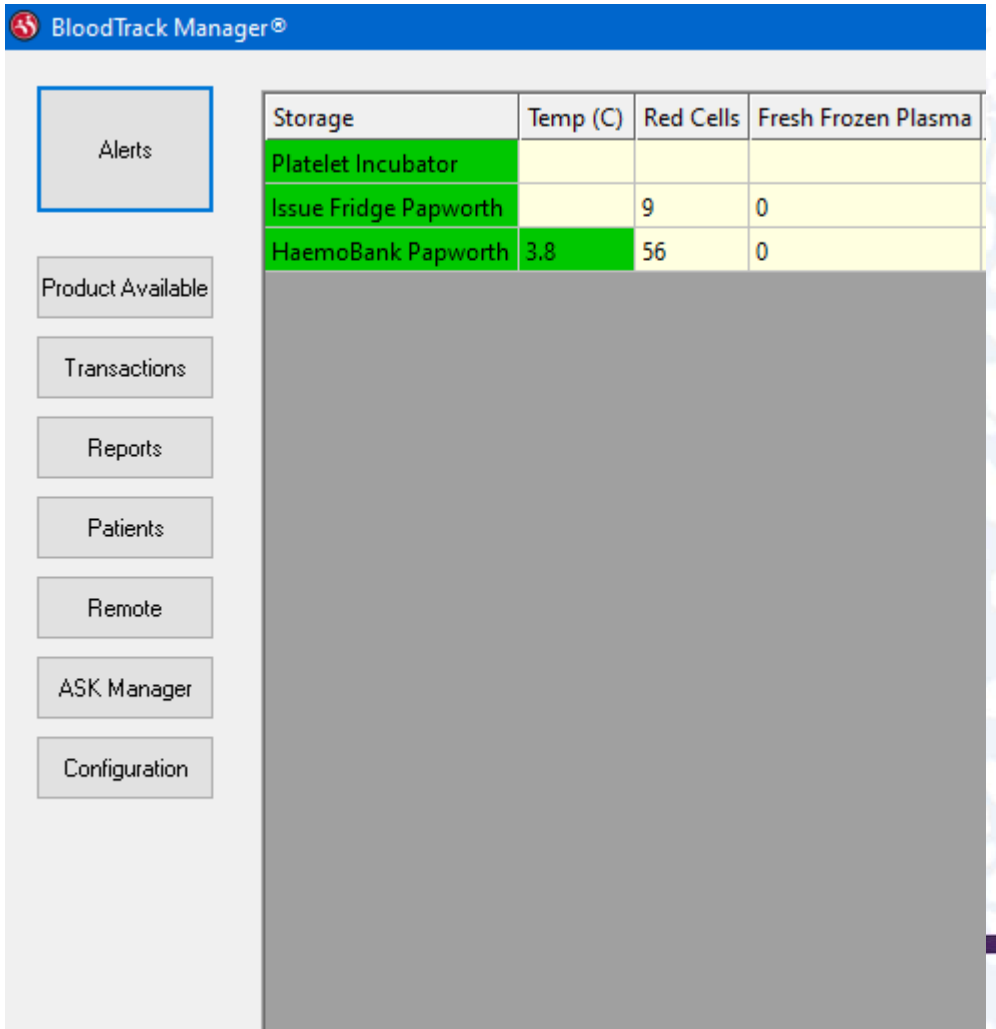

Year	WAPI
2018	5.5
2019	4.0
2020	1.4
2021	1.1

2024 WAPI: 0.5%

Barcode sequence

Linear/ 2D

Linear: numerical or text

2D: HL7 message sequence

Messaging standards

Health Level 7 (HL7) is a set of international standards use to share data between various health care providers.

Demands of mapping:

Linking the message segments to host system codes.

```
MSH|^~\&|EPIC|EPICADT|iFW|SMSADT|199912271408|CHARRIS|ADT^A04|1817457|D|2.5|
PID||0493575^^^2^ID 1|454721||DOE^JOHN^^^^|DOE^JOHN^^^^|19480203|M||B|254 MYSTREET AVE^^MYTOWN^OH^4
4123^USA||(216)123-4567|||M|NON|400003403~1129086|
NK1||ROE^MARIE^^^^|SPO||(216)123-4567||EC|||||||||||||||||||||||||
PV1||O|168 ~219~C~PMA^^^^^^^^^^|||277^ALLEN MYLASTNAME^BONNIE^^^^|||||||||| ||2688684|||||||||||||
||||||||||199912271408||||||002376853
```

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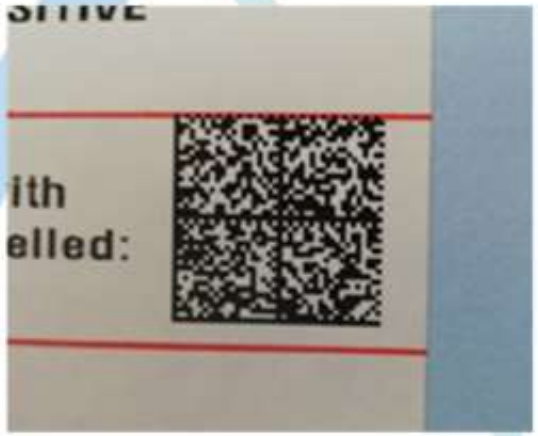
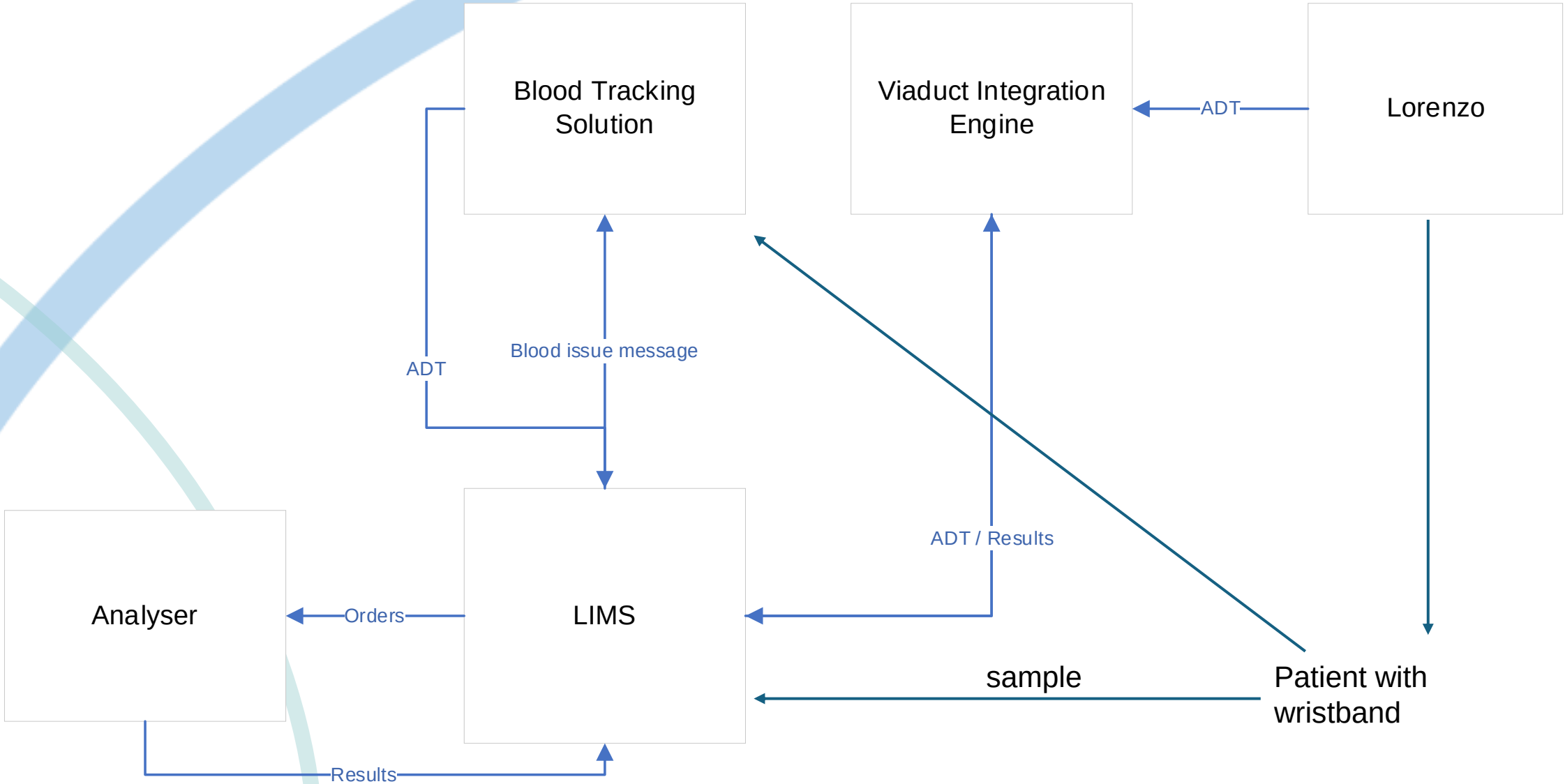
Barcode Technology



- Patient wristband
- Sample and request labelling
- Reagents
- Components
- Compatibility Labels
- Pick-up slips
- Staff user cards
- Administration tracking devices

- Mixture of Linear and 2D
- Allows linking of all processes in the chain – all read by automation and every transaction captured electronically on the LIMS.

Scan4Safety in Blood Transfusion



Patient wristband – GS1 compliant

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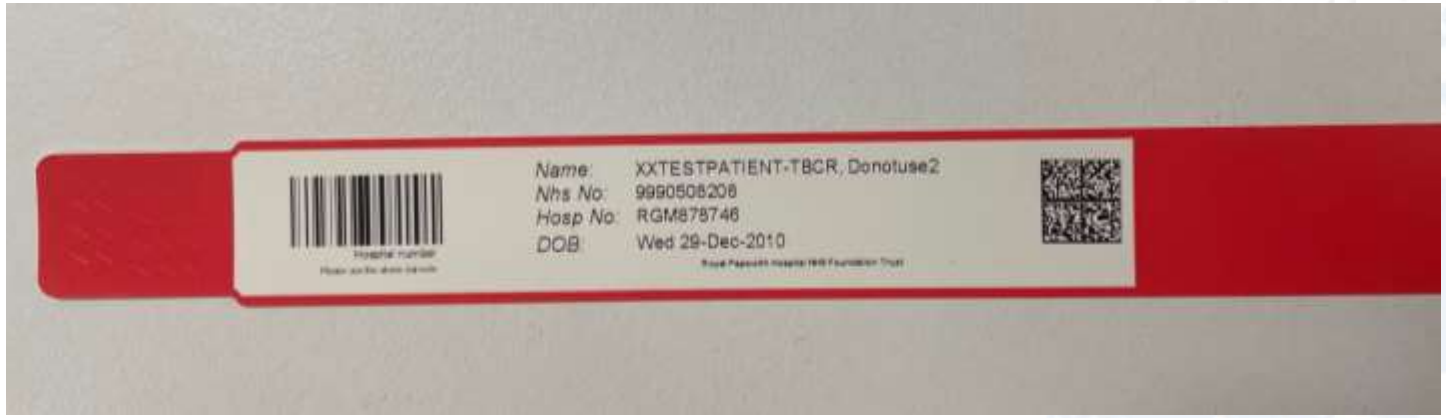
Meets DCB1077 standard – AIDC for patient identification

Positive Patient Identification - *correctly identifying a patient to ensure that the right person receives their intended care*



2D matrix

File Edit Format View Help

```
80185050898999050820859 1RGM,RGM878746,,50552306,93XXTESTPATIENT-TBCR,Donotuse2,29-Dec-2010,
```

GSRN - NHS number –Company prefix– Hospital MRN- Trust identifier prefix – Patient surname – Forename – Date of birth

Linear: RGM878746

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Possibility of Order comms

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Risks – human behaviour

National Comparative Audits of Blood Transfusion in 2012 and 2022 demonstrated that although sample rejection decreased with the implementation of only bedside electronic labelling, wrong blood in tube events actually increased.

This was due, in some cases to the misuse of the system by printing an additional wristband and using it away from the patient to label a sample.

The audit comments that an IT system must not replace Positive Patient Identification altogether.

Some Trusts use a combination of handwritten collections plus electronic bedside labelling collections. We at RPH are remaining with manual labelling and requesting.

References: Booth and Davies: *Transfusion sample mislabelling and wrong blood in tube in the UK: Insights from the national comparative audits of blood transfusion in 2012 and 2022*.
Transfusion Medicine 2025;35:41-47

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The laboratory process

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Pre - Analytical	Analytical	Post analytical
Sample collected at bedside – labelled by hand	Analyser reads barcode Picks up request	Result sent to EPR
Delivery to lab	BMS views and validates result	Blood Track assesses sample validity and eligibility rules
Sample Acceptance and barcoding	Result sent electronically to LIMS	Red cells available in HaemoBank® if eligible
Entry into LIMS		Lab releases non-remote issue components
2nd verification step		Sample and request filed
Sample centrifuged		Request form scanned into EMR
Reagents – pre acceptance testing		
Analyser QC		

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Blood Components – commitment to safety

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BSQR - MHRA – SABRE – SHOT – BSH Guidelines

Blood Safety and Quality Regulations 2005 – set the legal requirement for blood establishments and hospital blood banks

Medicines and Healthcare products Regulatory Agency – are the authorised body for regulating the law above. Blood Compliance report submitted annually.

Serious Adverse Blood Reactions and Events – reporting platform for collecting data on adverse events, assessing trends and monitoring corrective and preventive measures.

Serious Hazards of Transfusion – also collect but also analyses data and makes recommendations for improved practice. Releases an annual SHOT report.

British Society of Haematology Guidelines - working parties of subject matter experts who use research evidence and experience of the above to develop and publish **evidence based** best practice guidelines.

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Product arrival

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EDN note – confirmatory scans

Scan Components

Quantity 2 | Actual 0

Scan | Clear

Unit No | Product Code | ABO/D | Expiration Date & Time

Component

Visual Inspection * ☐ ACCEPT

Components

Worksite * Royal Papwort… | Sublocation

Scanned	Unit No	Product Code	Component	ABO/Rh	Expiration Date & Time
	G072 424 059 810 O	54477	PLT POOLED IN PLASMA	A-	05/01/2025 - 23:59
	G072 425 207 035 6	54294	PLT APH IRR PK 2	A+	06/01/2025 - 23:59

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Laboratory Information Management System

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SafeTrace Tx® software

Scan-scan-scan at every stage

Sample receipt – specimen verification
Component receipt
Component selection
Component release – printing of labels
Verification of labelling

Unit number and product code are required for each component step.

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Sample validity – sample rules

Electronic data transfer importance.	Minimises the risk of human error – no manual data entry is allowed in order to qualify for remote electronic issue.
Data Checks for positive antibody history and recent transfusions	Ensures any antigen/patient specific requirements are captured and met.
Quality checks – reagents, IQC	Ensures analytical process is optimal and controlled
User awareness of sample status	Notifies clinical user of current sample status thus avoiding unnecessary repeat venepunctures. Plus notifies user of available sample for remote electronic issue.

Assigning of component to patient

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The compatibility label

Information contained:

Product details:

unique number and product type

Patient PID details

Patient result detail (Group)

Location

C4|RGM878750|9990101507|XXTESTPATIENTKAAT|NIC-DONOTUSE|26-Oct-1994|F|O,+|K237A3496:00050|FIBRYGA|31-Aug-2024 23:59|No ABO/Rh|01-Mar-2023 09:00|0|0|1|0|0|0|0

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Access to unit for clinical staff

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Haemobank – scan- scan – scan

User – pickup slip – assigned product - verification

BloodTrack Manager® - Product Available

Red Cells Available

Last: HAEMOBANK
First: OLIVER
Number: RGMXXXX35
Birth Date: 01-Jan-1940
Gender: M

Blood Group: O Pos
Eligible For: Red Cells until 07-Apr-2025 13:57
Requirements:

Location	Prod...	Crossmatched	Unallocated
HaemoBank Papworth	Red Cells	0	17

Pickup Slip

Deliver To: Blood Sciences

Product	Red Cells
Quantity	1
Pickup From	HaemoBank Papworth

Access barcode controlled – staff ID

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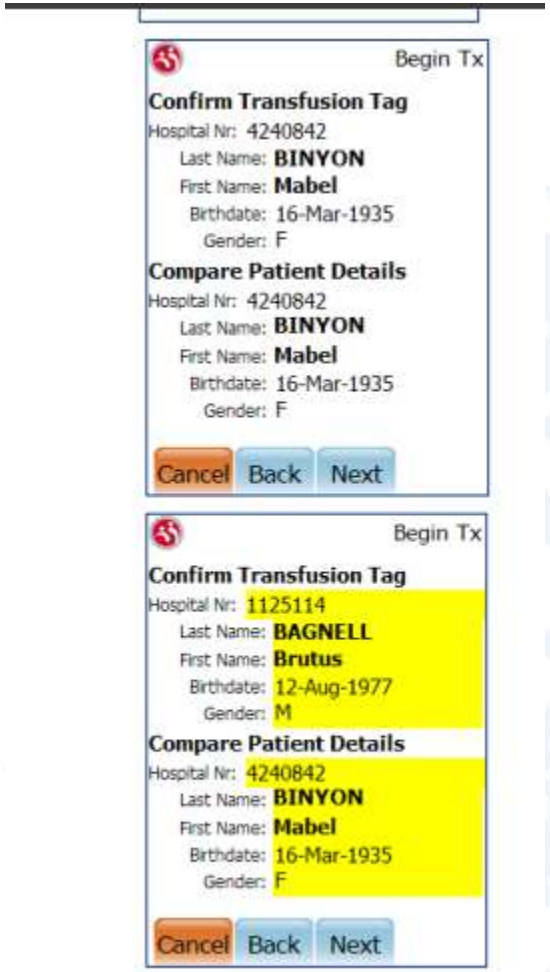
Error detection

Software highlights discrepancies with visual highlight and audible siren.

Alert will be generated in Blood Track for Lab staff action.



Administration of unit – Fate message

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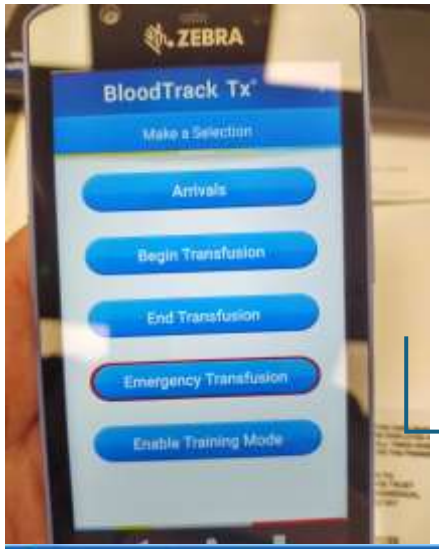
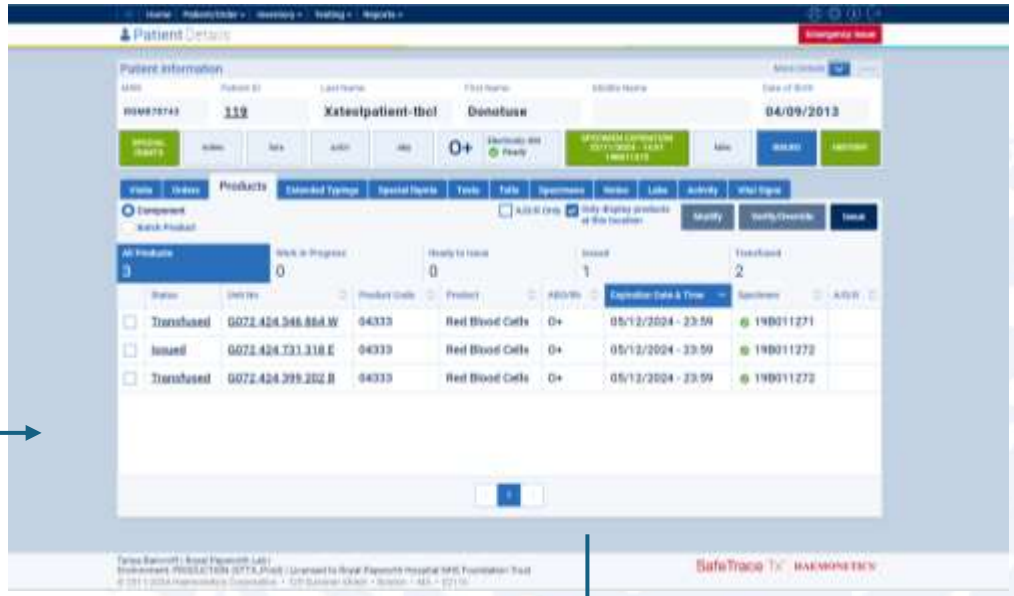
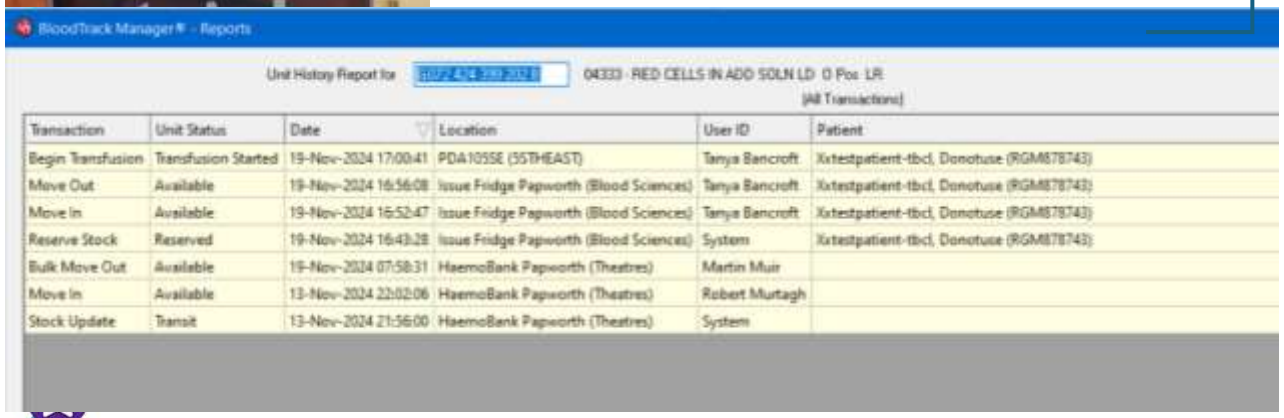
Right patient – right unit – right time







Transaction	Unit Status	Date	Location	User ID	Patient
Begin Transfusion	Transfusion Started	19-Nov-2024 17:00:41	PDA105SE (35THEAST)	Tanya Bancroft	Xxtestpatient-tbcl, Donotuse (RGM878743)
Move Out	Available	19-Nov-2024 16:56:08	Issue Fridge Papworth (Blood Sciences)	Tanya Bancroft	Xxtestpatient-tbcl, Donotuse (RGM878743)
Move In	Available	19-Nov-2024 16:52:47	Issue Fridge Papworth (Blood Sciences)	Tanya Bancroft	Xxtestpatient-tbcl, Donotuse (RGM878743)
Reserve Stock	Reserved	19-Nov-2024 16:43:28	Issue Fridge Papworth (Blood Sciences)	System	Xxtestpatient-tbcl, Donotuse (RGM878743)
Bulk Move Out	Available	19-Nov-2024 07:58:31	HaemoBank Papworth (Theatres)	Martin Muir	
Move In	Available	13-Nov-2024 22:02:06	HaemoBank Papworth (Theatres)	Robert Murtagh	
Stock Update	Transit	13-Nov-2024 21:56:00	HaemoBank Papworth (Theatres)	System	

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Efficiencies

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Stock held and handling

Reduced average daily stock holding from 105 red cell units to 75 units. Therefore, more units available from NHSBT

Reduced number of handling steps by remote issue. Blood remains in HaemoBank® until used. This means reduced temperature excursions for unit.

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Efficiencies

Minimising wastage (BSMS evidence)

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Year	Red Cell Wastage as percent of Issues (WAPI)
2018	5.5
2019	4.0
2020	1.4
2021	1.1
2022	0.6
2023	0.5
2024	0.5

From 135 RBC units per year in 2018 to 35 units per year in 2024.
£18,225 down to £5,355 per year.

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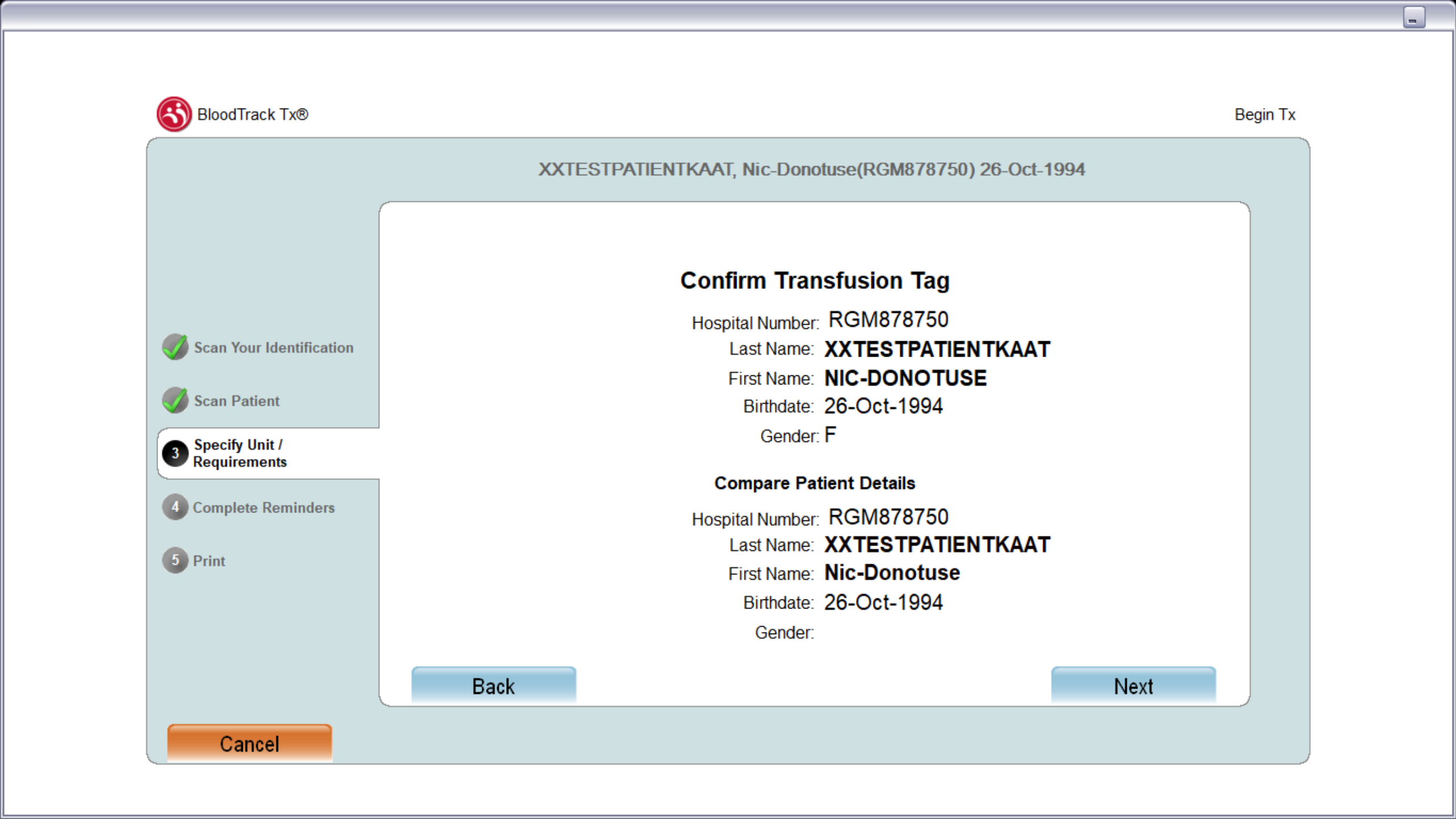
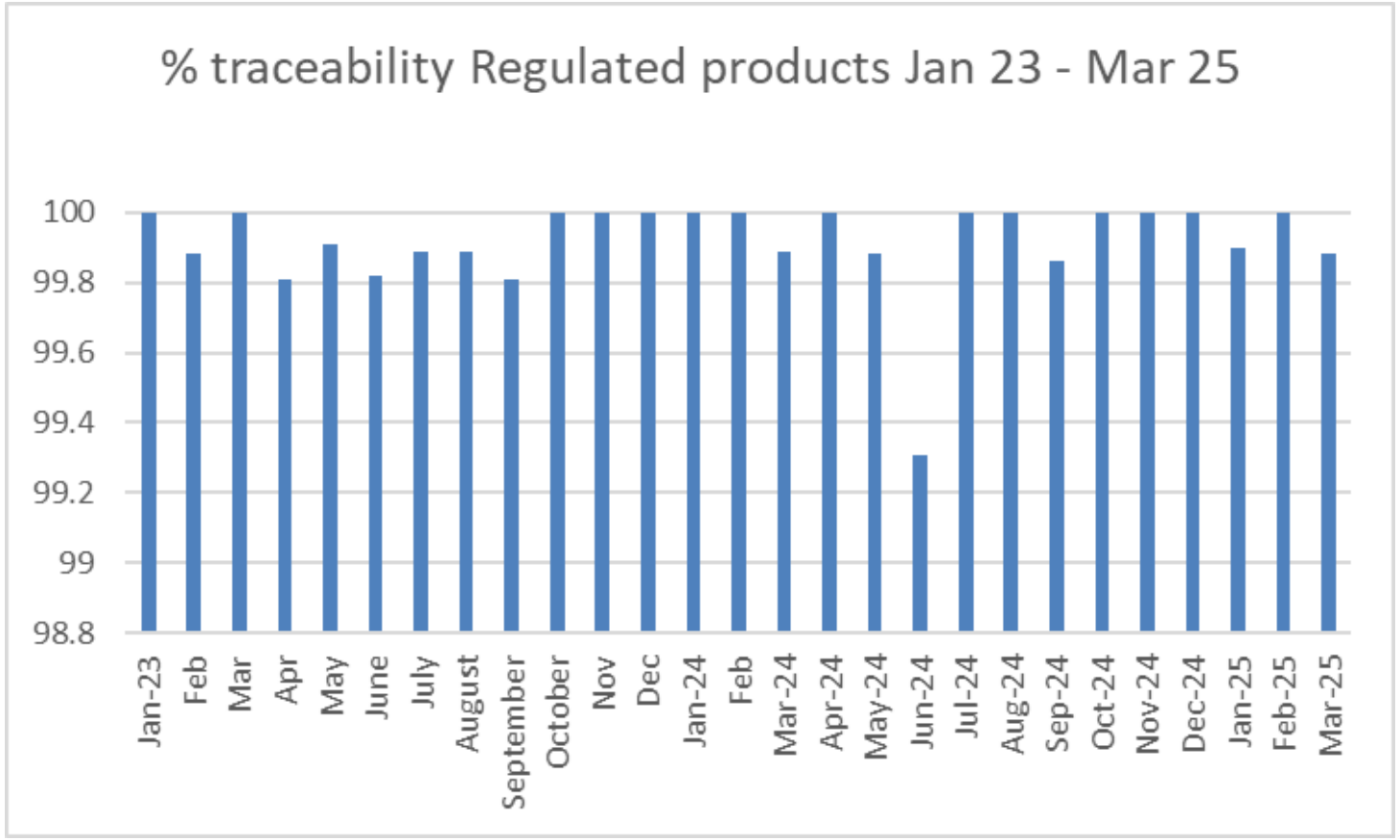
Efficiencies

- **Avoiding second nurse check.**
- The electronic PDA is the second nurse check as it checks the wristband against the record and procedures conducted in the lab. If any of the core PID or unit details do not match it raises an audible siren and visual colour change alerts.
- **Release for clinical time:**
- In the first month of going live on Critical Care, the use of BloodTrack® released 37 hours of nurse time.


BloodTrack Tx®
Begin Tx
XXTESTPATIENTKAAT, Nic-Donotuse(RGM878750) 26-Oct-1994
Scan Your Identification
Scan Patient
3 Specify Unit / Requirements
4 Complete Reminders
5 Print
Confirm Transfusion Tag
Hospital Number: RGM878750
Last Name: XXTESTPATIENTKAAT
First Name: NIC-DONOTUSE
Birthdate: 26-Oct-1994
Gender: F
Compare Patient Details
Hospital Number: RGM878750
Last Name: XXTESTPATIENTKAAT
First Name: Nic-Donotuse
Birthdate: 26-Oct-1994
Gender:
Back
Next
Cancel

Security of closing the sequence

- **Vein to vein Traceability** –
- Receipt of product
- Storage of product
- Issue to patient
- Administration to patient
- Message into patient record
- Archive for all records from legacy system.
- Data migration into new system



Additional efficiencies

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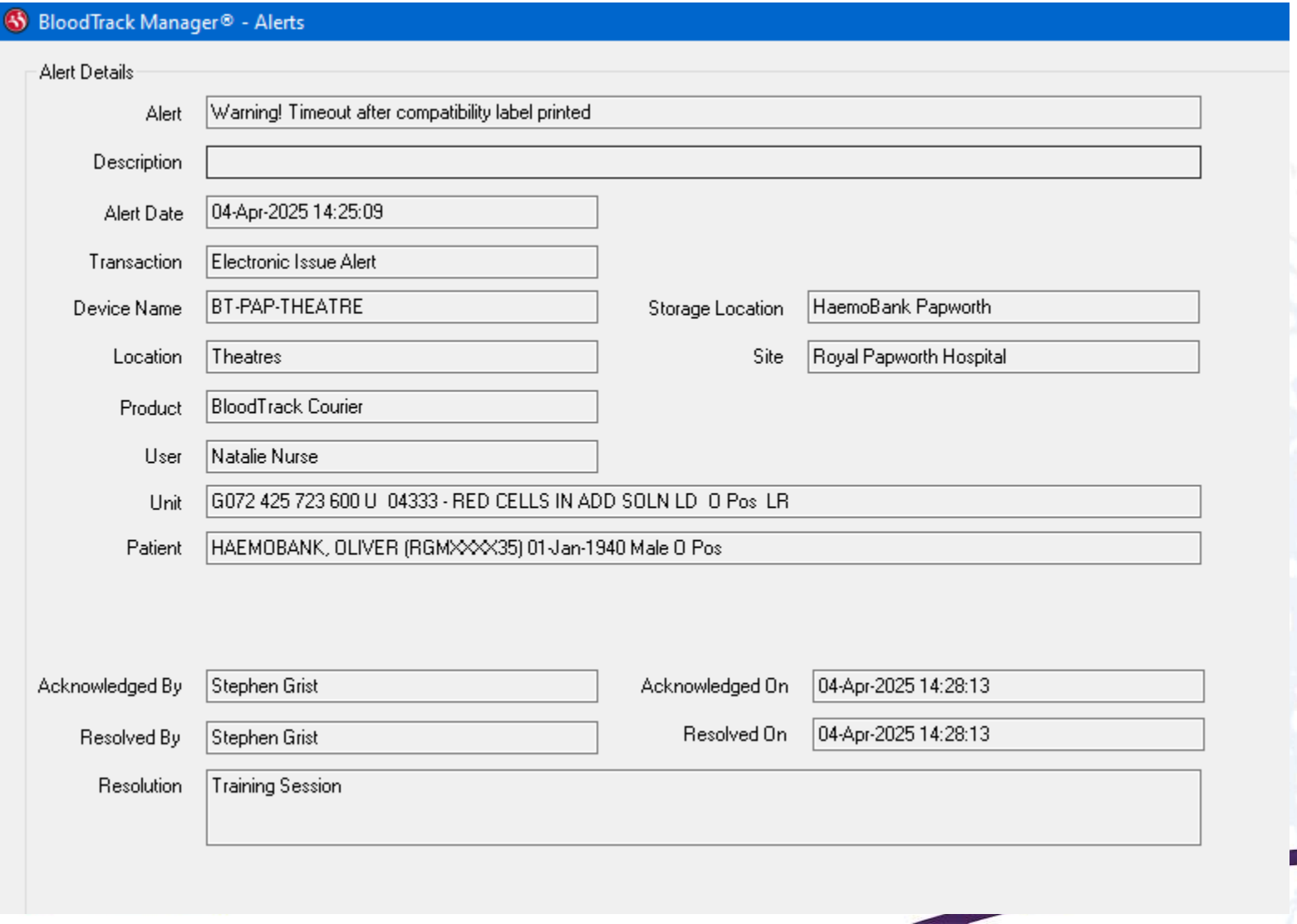
Audit trail and incident investigation.



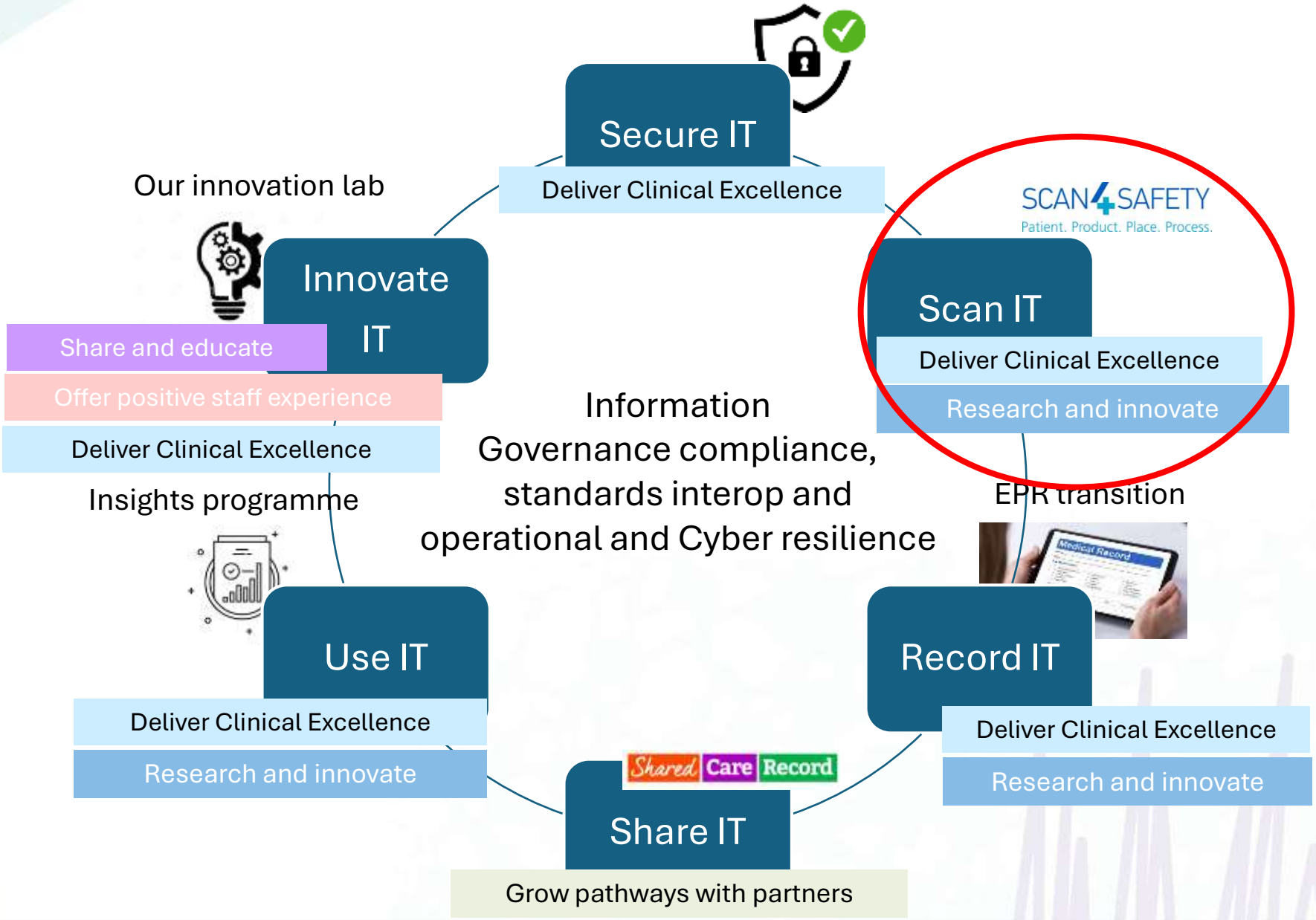
Scanning captures the Who, the What and the When of the event.

Investigators can then concentrate on the Why and the CAPAs.

Shortens the processing time of investigation.

Deliver IT!

Our 6 point digital and data delivery plan



SCAN4SAFETY
Patient. Product. Place. Process.

Standards use cases
In hospital (lifecycle)

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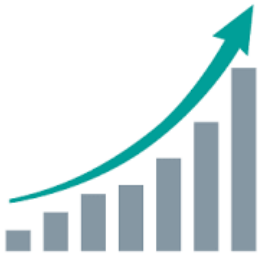
1

Buying best
Inventory, lifetime and standards



EDC Gold Stock/Inventory Management (P2P/PEPPOL)

2

In hospital efficiency and safety
Traceability;
Person, product, process, place

Traceability and Location numbering (GLN)

Patient identification (GSRN)

Patient identification (GSRN)

Realtime lab reporting

Catalogue management (GTIN)

Asset/equipment (GIAI)

3

End of product life/Disposal
Replenishment, Sustainability, bigdata
e.g

- Patient level costing and service line reporting
- Real time lab resulting through interoperability
- Safety - Reduced drug errors
- Reduce/avoid never events
- Efficiency - Ward Audits
- Implantable devices Remote care
- Tracking equipment

Summary

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Scan – scan – scan

Right Patient - right Blood - right Time

Win – win – win

Safety and Traceability and Efficiency

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