

# Strategies to reduce red cell wastage at a major trauma centre

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## Background

Southmead Hospital (North Bristol Trust) is a major trauma centre with an obstetric unit; however, the lab holds a relatively small blood stock due to it's close proximity to NHSBT Filton. At the start of this review the transfusion lab managed 9 blood fridges (7 onsite and 2 offsite) and all but 2 of the onsite fridges held emergency stock - a total of 26 units. Following some incidents where blood in bedside boxes had been returned poorly packed, the lab took a zero tolerance approach to restocking units if the box had been opened in the clinical area. Units would often return to the lab in a different box, without cool packs and even a mix of FFP and red cells.

Consequently blood stock wastage at NBT was high compared to other hospitals in the region and other trauma centres of similar size. Most wastage was due to units being out of temperature control (OTC) and time expiry (TE). Several strategies were introduced to reduce wastage from 5.8%

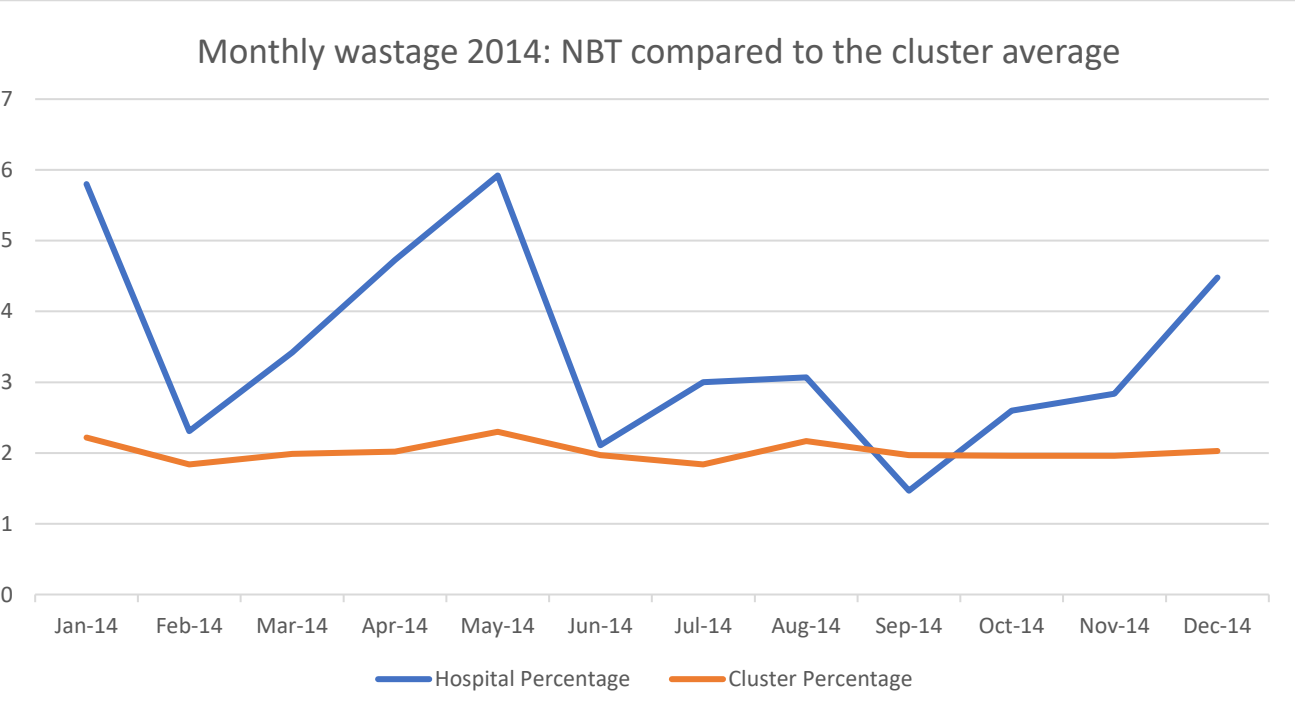


Figure 1: Monthly red cell wastage at NBT in 2014. This highlights the poor performance compared to other hospitals in the cluster and demonstrates the need for change.

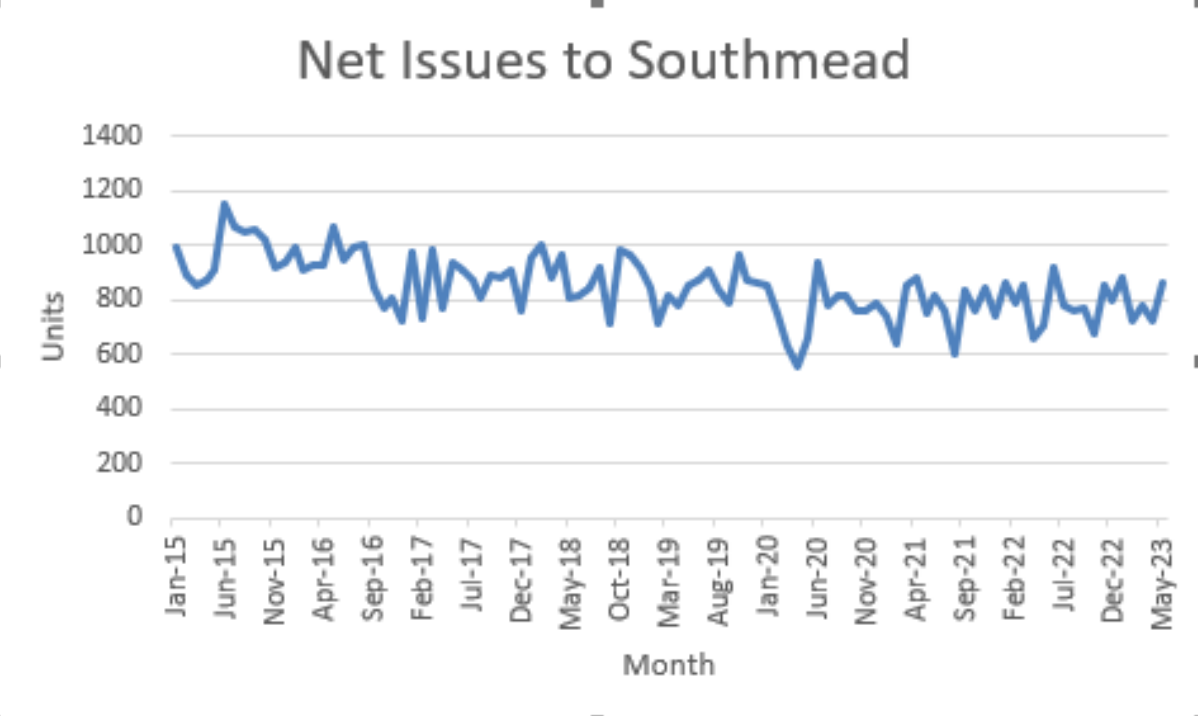


Figure 2: Blood issued to Southmead Hospital by NHSBT

## First moves

Most OTC units were those sent in boxes to the patient's bedside because clinical staff would lose track of how long the box had been present and/or opened. The time the box was valid for was reduced significantly if it had been opened, and staff would routinely open the boxes to confirm the number of units present. A form was introduced that would be completed by the lab upon sealing the box for transport stating the number of units, date and time packed, the time by which it must be returned and the validity once opened. Clinical staff needed to record the time the box was opened; however compliance was poor, leaving a gap in the cold chain.

Date box packed: \_\_\_\_\_ Time: \_\_\_\_\_

Time Seal Broken:

Box validity (return to lab by):

2 Hours from time packed IF tag intact.

30 Minutes from time tag broken.

**URGENT BLOOD PROVISION for bedside transfusion only**

**Good Practice Points**

- Do not open box until immediate transfusion is required
- Close the lid fully (zip) after each unit is withdrawn, never remove cold packs
- Once removed, units must not be returned to the box - they must be transfused or returned to the lab ASAP
- Pre-transfusion checks should be undertaken using a BloodTrack FTA
- RBC unit transfusion must be completed within 4 hours of removal from box
- Inform lab of stand down
- Return all boxes, QTA tracers and unused components to the lab ASAP
- DO NOT place any components from this box into your local blood fridge
- Additional emergency stock (O D Pos and O D Neg red cells) are available in your local theatres & ED blood fridges

Time box packed: \_\_\_\_\_

Return to laboratory by: \_\_\_\_\_

Contents (no.): ☐ RBC ☐ FFP ☐ PLT ☐ Cryo

Destination: \_\_\_\_\_

Please contact the lab (ext. 48350 / bleep 9433) if you require additional or replacement blood components

Blood Box No: \_\_\_\_\_

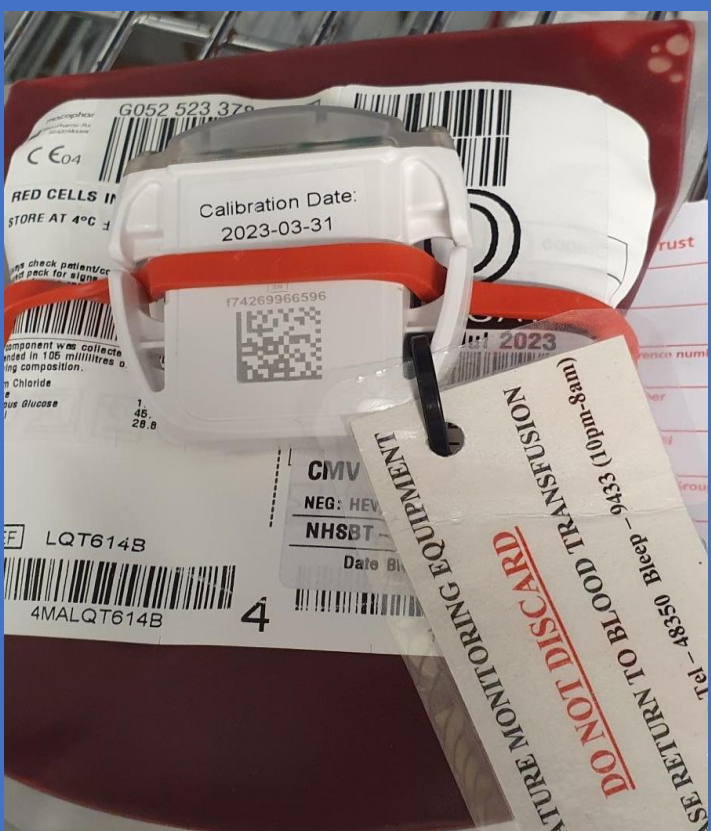
Date: \_\_\_\_\_

Figure 3: Documentation added to blood boxes to record cold chain. The first was attached using a luggage tag and cable tie, the second was added to a clear pouch on top of the box.

Unfortunately these boxes were occasionally left in the clinical area where they could remain for several days with staff assuming they were empty. This posed significant risk, so timers with an audible alarm were added to the boxes to prompt staff nearby to check the boxes and return them to the lab. This did help initially, but the timers weren't durable so often broke.

## Temperature tracers

The majority of cold chain failures were emergency units, so a direct approach was required to tackle this issue and protect this precious resource. Investment was made in temperature tracers that could be attached to individual units both physically and electronically. The details of the unit to which the tracer was attached was recorded in a web portal, meaning the report generated when reviewing the data formed part of the end-to-end cold chain. This demonstrated the temperatures the unit was exposed to and for how long; it showed that blood was often looked after well in the boxes despite lack of recorded evidence. This reduced wastage in these situations but as the tracers were only applied to haemorrhage packs, the improvement was only evident for group O red cells. The improvement was stark, with wastage dropping from 32% to 12% (Izzard, 2021)



However, use of the temperature tracers has a cost implication so they must be returned to the lab if the unit is used, which often requires phone calls to clinical areas to locate the devices. Additional BMS time is required to set them up in the portal for each unit, which isn't practical in an emergency situation. Both of these factors have limited the use of tracers to the pre-issued emergency units held in the lab blood fridge. It is not practical for the BMS to set up tracers for additional emergency or named allocated units in a haemorrhage situation.

Figure 4: QTA temperature tracer attached to an emergency O negative unit using a latex free elastic band.

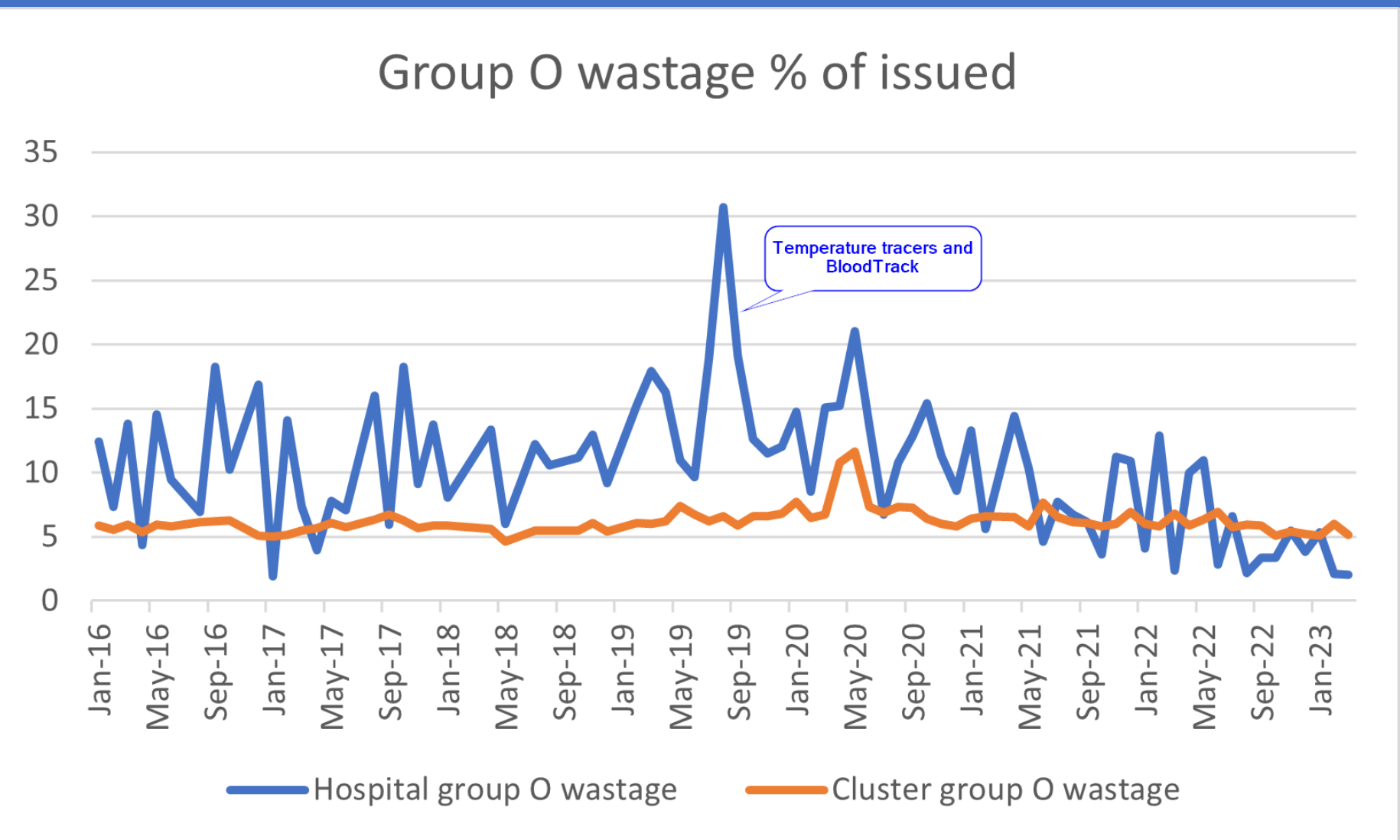


Figure 5: Graph showing the improvement in stock wastage following the introduction of temperature tracers

## Reducing the reservation time

Traditionally, issued units have been reserved for a specific patient for 48 hours before being returned to stock. Depending on the time of day and location of the fridge, those units sometimes aren't physically back in stock until day 3. The proposal to reduce the reservation time to 24 hours had previously been rejected by the transfusion committee, however with the blood tracking software it was possible to demonstrate that 96% of units were transfused within the first 24 hours of the requested date and time. With this evidence, the transfusion committee agreed to reduce the reservation time for all electronic issued units. Patients who require a manual crossmatch still have units reserved for 48 hours. This was introduced in May 2022 has had a marked impact on stock wastage, moving NBT's wastage below the cluster average for the first time. There has been no impact on patient care, and a separate process is in place for patients with specific risks (such as abnormal placentation) to ensure there is no break in blood cover for this group. This change enabled better stock management across all blood groups, and the improvement is especially pronounced in group O because the opportunities to issue these units was increased.

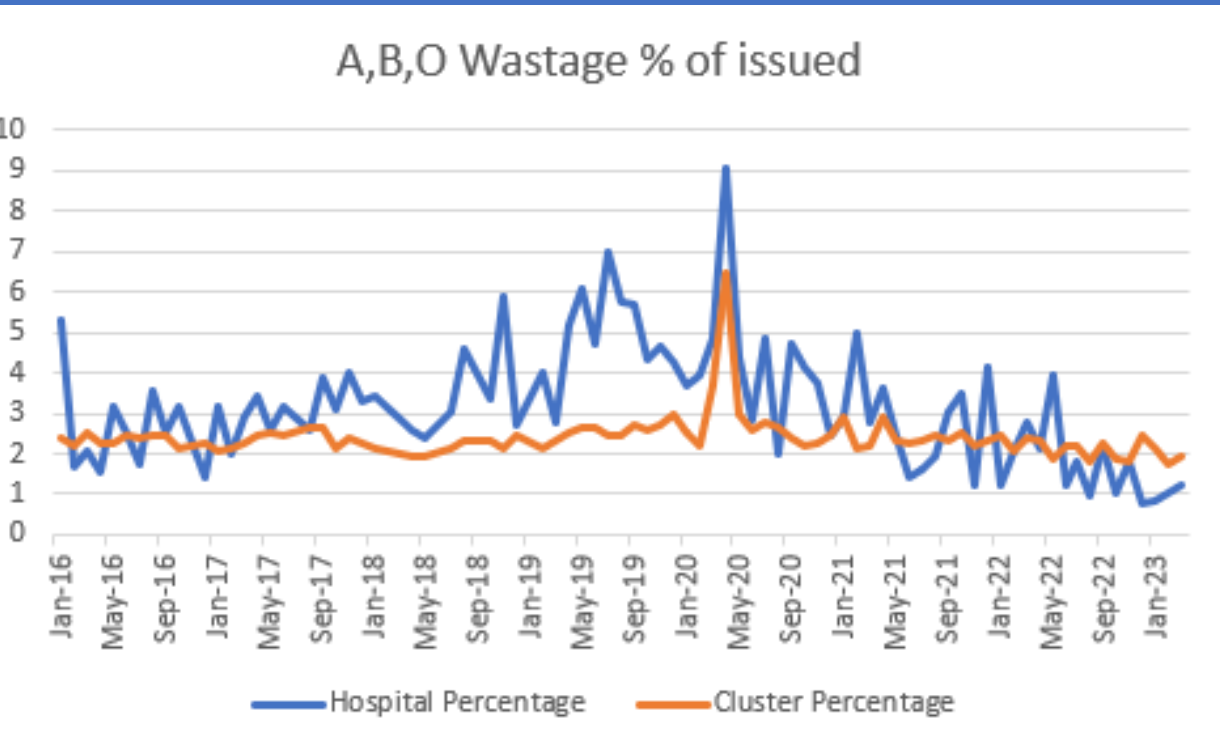


Figure 6: Graph showing improvements in wastage across all blood groups.

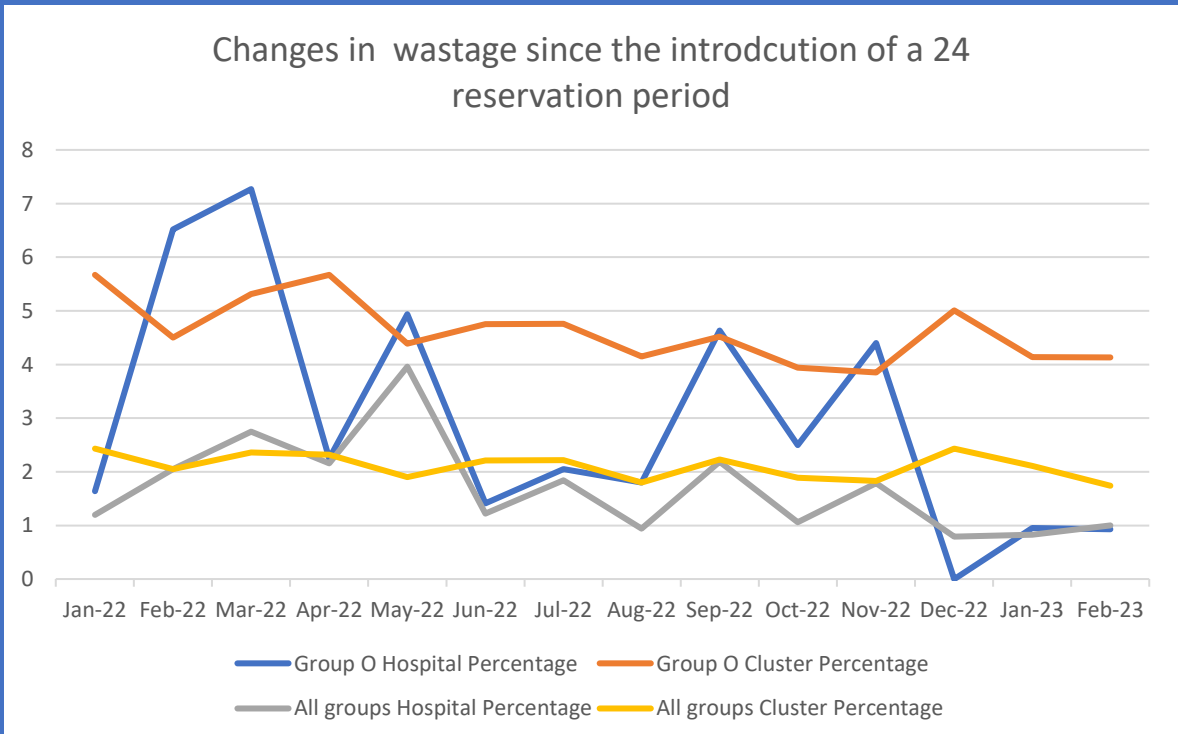


Figure 7: Graph showing stock wastage from 2022-2023 for NBT and cluster.

## Electronic Blood Tracking and Temperature Excursions

Haemonetics BloodTrack was installed at NBT in October 2019. This increased the accuracy of cold chain data and provided enough confidence to introduce temperature excursions as outlined in JPAC guidance. The BMS receiving the unit back is alerted to the cold chain breach by BloodTrack, and is able to view the full audit of that unit's movements in order to make an informed decision on its safety and therefore apply an excursion if appropriate. The overall stock impact is small, but nevertheless some units have been saved using this process.

BloodTrack also improved oversight of stock in fridges, allowing lab staff to adjust the blood order based on the units expected to be returned.

## Time expired units

Time expiry remained a significant cause of wastage. On investigation, these were mostly units that had been held in remote fridges as emergency stock then returned to the lab to be used in general stock. Historically there had been a problem with units being held as emergency stock until only a few days remained on their lifespan, but this had been addressed by updating the laboratory procedures for managing this resource. On investigation it was found that these units were being returned to stock in plenty of time to be issued to 1 or more patients without being used. An audit was undertaken to establish the appropriateness of these requests which raised no concerns. Stock levels were reviewed regularly but as a major trauma centre there was reluctance to reduce further. The lab manages 9 remote blood fridges and the majority hold emergency units (table 1).

Fridge location	Emergency stock pre review	Emergency stock post review
Lab	4 O Pos 4 O Neg	4 O Pos 4 O Neg
Obstetrics and Gynaecology	2 O Neg adult 1 O Neg paed	2 O Neg adult 2 O Neg paed
Emergency Department	2 O Pos 4 O Neg	2 O Pos 4 O Neg
Day Case	None	None
Urgent and Hybrid Theatres	2 O Pos 2 O Neg	2 O Pos 2 O Neg
Routine Theatres	2 O Pos 2 O Neg	None
Treatment Centre 1 (offsite)	4 O Pos 2 O Neg	2 O Neg
Treatment Centre 2 (offsite)	4 O Pos 2 O Neg	2 O Neg
Total	18 O Pos 18 O Neg	8 O Pos 16 O Neg

Emergency usage at each of the fridges is audited regularly and recommendations made to the hospital transfusion committee accordingly. Over several years, emergency stock has gradually reduced, however there has been some resistance at times. The committee would not allow stock to be removed from one of the onsite fridges despite data showing use was sparse, however this decision was reviewed during the Amber Alert when it was agreed that these units could be removed. Emergency stock has not been returned to that fridge.

The offsite treatment centres mostly treat patients who are unlikely to need blood, and units are provided on a named patient basis for those who are at risk of blood loss. Emergency stock use is extremely low at these locations (one centre has never transfused a unit) and their stock has been reduced to the minimum acceptable level.

Table 1: Emergency stock held at each of the fridges managed by NBT

## Overview and Future Developments

Over several years, numerous initiatives have been introduced in attempts to reduce blood wastage. Feedback from service users and lab staff has been considered at each step to make any changes as user friendly as possible and encourage staff to embrace the changes. There has been remarkable improvement and this is at least partly due to the multi-disciplinary engagement in the process. Wastage is now less than 2% per month.

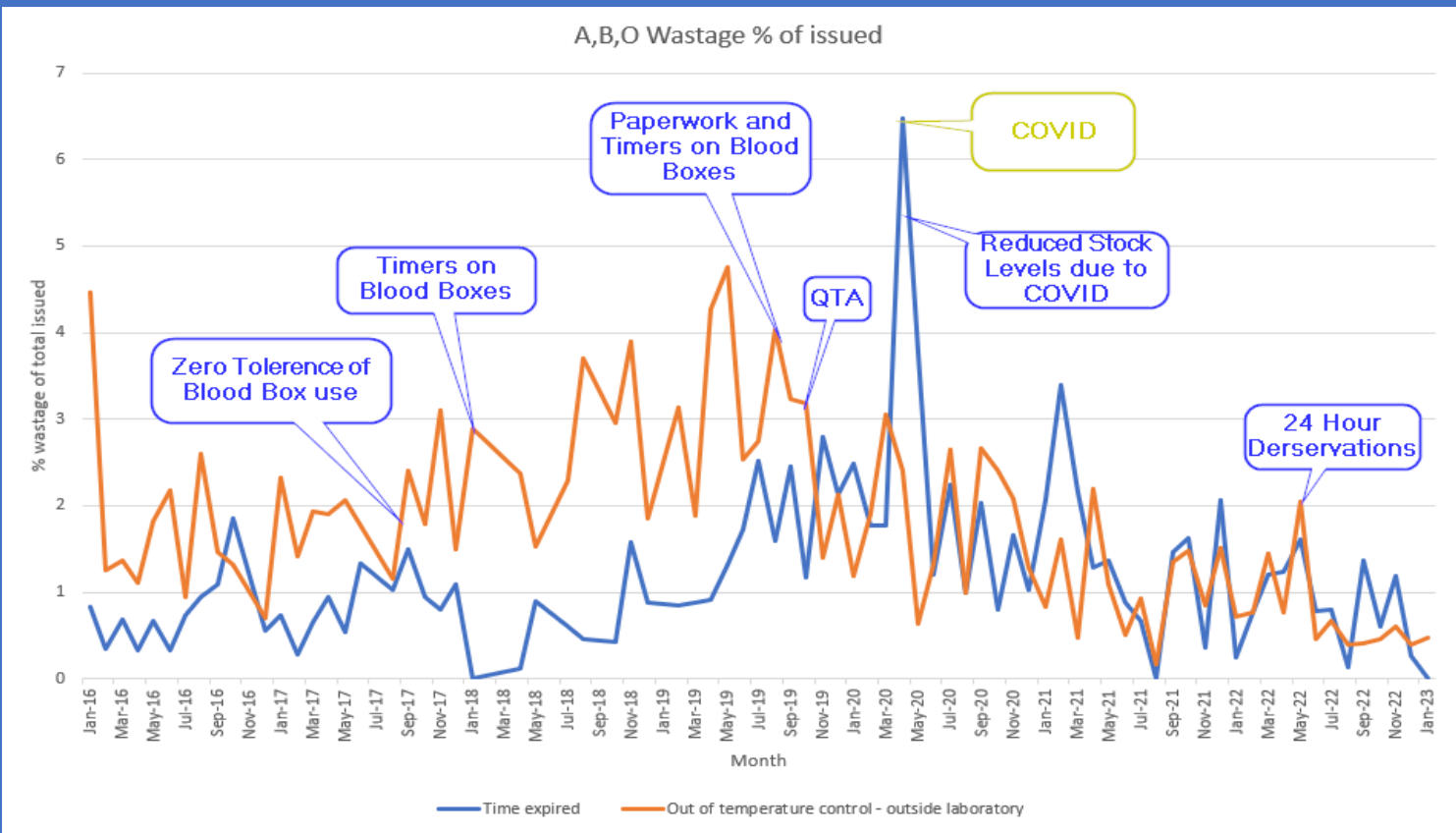


Figure 8: Graph showing wastage due to OTC and TE, annotated with the changes implemented

Although wastage has been reduced to below the cluster average, there is still room for improvement. The department plans to utilise the remote allocation and remote issue elements of BloodTrack in the future which will revolutionise management of blood in some areas.

