Information Technology(IT) Errors

Case studies

2022 – 2024

Antigen-positive red cells transfused to a patient with red cell antibodies

- *A patient with historic red cell antibodies required a transfusion*
- *Recent antibody screens were negative*
- *The current laboratory information management system (LIMS) contained a 'critical note' that the legacy LIMS should be interrogated for details of the antibody*
- *This note was missed by the biomedical scientist (BMS) and the sample for crossmatch was the first to be tested in the new LIMS*
- *Antigen-positive red cell units were selected, crossmatched and transfused to the patient*

Ineffective alarm escalation leads to transfusion of red cell units subjected to temperature excursion

- *Laboratory support staff doing daily blood refrigerator checks found that there was water on the floor and the refrigerator door was slightly open*
- *There was a unit of red cells in the refrigerator that was due to be returned to stock*
- *The staff member removed the red cell unit and took it back to the laboratory without checking the cold chain*
- *The support staff informed the biomedical scientist (BMS) about the situation, but lack of clear communication meant that the BMS determined the red cell unit was acceptable and returned it to stock*
- *This blood component was subsequently reissued to another patient and transfused*
- *The temperature-monitoring alarm system had previously alerted the hospital switchboard, and two attempts were made to notify the laboratory staff with no response*
- *The temperature-monitoring system then sent an email informing laboratory staff of the situation, but this had not been actioned*
- *Hence the BMS returning the unit to stock was unaware of a temperature excursion*

Incorrect use of electronic blood ‘prescribing’ system leading to procedure delay

- *There was a delay to the availability of blood components for a procedure in a patient with known red cell antibodies*
- *A midwife who was not trained in blood authorisation accessed the electronic patient record (EPR) prescribing system with an intention to request blood components*
- *Completing the EPR prescription did not order the blood components from the laboratory and therefore they were not available*
- *This resulted in a delay to planned surgery whilst suitable red cells were sourced*
- *The procedure went ahead when all blood components were available*
- *The training on the new EPR had not made it clear how to order blood components and who was eligible to prescribe/authorise blood components*

Ineffective checks during information technology (IT) downtime

- *Two units of fresh frozen plasma (FFP) were issued for a patient*
- *One unit was collected and delivered to the clinical area where it was noted that the unit number on the compatibility label did not match the unit number on the component*
- *The FFP unit was returned to the laboratory where transposition of labels between these two units was noted*
- *A label verification step was available within the electronic blood management system (EBMS), but this had been disabled, because of a cyber-attack on the laboratory information management system (LIMS), to allow other functions to work*
- *During this period, label verification became manual but high workload and interruptions increased the risk of human factors leading to error*

Implementation of a new electronic patient record (EPR) system introduced unsafe workarounds

- *A group and screen sample grouped as B D-positive, but the patient was known to be O D-positive*
- *The sample was labelled away from the patient*
- *The organisation implemented an EPR system using workstations on wheels that were too large to be moved to near the patient*
- *There was no other mobile equipment that could be used for sample labelling*
- *Prior to the introduction of the new EPR system, transfusion sample labels were generated using a different system (mobile handset and mobile printer) which allowed easy use at the patient's side*
- *The introduction of the new EPR resulted in an increase in 'workarounds' by staff such as using identification bands not attached to the patient*

Alert on electronic blood management system (EBMS) overridden twice

- *The wrong platelet pack from a two-unit donation was issued electronically and the discrepancy between codes was highlighted by the EBMS at the point of collection*
- *The laboratory re-issued the same unit, but the discrepancy remained, so the alert was overridden without identifying or resolving the source of the error*
- *The same discrepancy was highlighted at the pre-administration check and again was overridden, and the unit transfused*
- *This error came to light when the second pack from this donation could not be issued because it had already been fated as 'transfused'*
- *This highlights the importance of understanding the exact nature of the error message and effective troubleshooting before proceeding with transfusion*

Staff inexperienced in use of a newly implemented electronic blood management system (EBMS)

- *Nurses undertaking an electronic pre-administration check received a warning message that a unit of red cells was 'not recognised'*
- *There was a back-up protocol in place to revert to the two-person independent check using paper documentation, but this was not followed*
- *The laboratory was consulted and advised that the unit was returned, and a replacement was issued*
- *This was successfully scanned, and safely administered without any further warning messages*
- *Investigation demonstrated that clinical staff were unfamiliar with which barcode on the unit to scan and the initial error message had not clearly indicated this*

Crossmatched blood could not be collected while the remote electronic issue (REI) system was updating

- *A member of clinical staff, who was fully trained and competent at using the electronic blood-management system, clicked 'blood products out' on the blood kiosk and entered the patient's details*
- *An error message appeared indicating a problem retrieving the units assigned to this patient stating, 'Please try again, or contact support for assistance'*
- *The alert was acknowledged, but to avoid delay, emergency blood was collected instead of the assigned units*
- *Investigation identified that, at the time of the attempted collection, the laboratory had just issued two further units of red cells which were being transferred into the REI system, so the patient's record was updating*
- *Therefore, the kiosk would not allow the already issued blood to be collected*
- *The error message advice was specific and, had an attempt been made to collect the blood again the system would have allowed the blood that was issued and labelled for the patient to be removed*

Error message misunderstood, and expired blood transfused

- *The ward staff administering blood to an unwell patient who needed an urgent transfusion got the error message 'dereservation' from the electronic blood-management system (EBMS) and reverted to a manual independent two-person check, which is was the contingency for system downtime*
- *Neither noticed the 'use by' time on the blood bag tag and it was transfused beyond its expiry*
- *There had already been a delay in collecting the blood and there was no written or verbal communication from the laboratory indicating the unit was close to expiry*
- *There had been repeated error messages from the EBMS, so the clinical staff concluded that the system was not working as expected and went straight to the downtime procedure*
- *There was already a degree of 'alert fatigue' and the error message was not understood at the bedside to mean that the unit had expired*

Two different medical record numbers in use across hospital sites

- *A sample and request for red cells was sent to the transfusion laboratory from another hospital site*
- *Two units were crossmatched using the hospital number from the main hospital site and transported to the theatre refrigerator*
- *When the member of staff came to collect the first unit the electronic blood-management system said there was no blood available for the patient but, using the 'emergency access' facility, blood was located and found to have correct identifiers except for the hospital number*
- *There was a shared laboratory information management system (LIMS) across these two hospital sites which used a site-specific hospital number as the unique identifier*
- *The NHS number was included in the patient's record for information only*
- *The LIMS is due for replacement which may present an opportunity to resolve this lack of interoperability*

Information technology (IT) server failure causes multiple operational issues

- *There was a failure of the power supply to multiple servers because the uninterruptable power supply had been set up in a way which was not in accordance with the design and undermined the resilience built into the system*
- *This caused multiple systems to fail including the electronic blood-management system and remote electronic issue refrigerator resulting in potential delay to transfusion of a bleeding patient and avoidable use of emergency blood*
- *There were additional IT-related communication issues because the bleep system was down, and it was difficult to get specific help and advice on transfusion issues without access to a telephone directory*
- *Had they been in contact with the laboratory, theatre staff would have known that fully crossmatched units were available for the patient*

Communication of the back-up procedures during planned downtime

- *During a planned IT downtime which affected the electronic blood-management system, a patient in theatres was given emergency blood taken from a CREDO™ box instead of the crossmatched blood that was available in the laboratory*
- *Despite organisation-wide communications supplemented by individual emails to anaesthetists working on the day there was still lack of clarity about the arrangements*
- *There was a review of the downtime arrangements including consideration of a standard blood refrigerator with keycode access and a manual register as back up in future*

Loss of data from a temperature probe

- *A temperature-monitoring system required upgrading*
- *There was a failure to force a data back-up before the system was taken offline for maintenance, so data appeared to have been lost since the last back-up which was scheduled every 24 hours*
- *The external provider of this monitoring system did not consider the implications of the timing of the maintenance/upgrade although the need for an uninterrupted cold-chain record had been highlighted by the hospital laboratory and quality managers*
- *The missing data was eventually fully retrieved and there had been no temperature excursions therefore no risk to the blood supply*
- *Both parties undertook to take this into consideration when planning for future works*

Remote electronic issue on samples with an edited group

- *During correspondence with the laboratory information management system (LIMS) provider, it was mentioned that another site had found a problem with the LIMS/blood-tracking interface which meant samples where the group had been manually edited were still available for remote electronic issue*
- *The information technology search identified three samples which had a 'result manually edited' flag but remote electronic issue was still enabled, and blood had been collected for transfusion*

Multiple errors and misuse of the electronic blood management system

- *Emergency group O red cells assigned to a specific patient were collected from the laboratory by emergency department staff without a pick-up slip as it was an emergency*
- *The laboratory received an alert to say that there was an incompatibility between the patient identity (ID) band and the blood component*
- *The transfusion was stopped immediately, and the component was returned part-transfused*
- *The staff member who administered the transfusion came to the laboratory with two patients' ID bands in their hand stating they had scanned the wrong one and that it was not attached to the patient at the time*
- *Furthermore, the person who started the transfusion was not the same person whose ID badge was used in that process*
- *The ID band printers were not working in the emergency department, so staff had to go elsewhere to get ID bands printed and multiple wristbands were held in nurse's pockets*

Equipment and communication failure leading to delay in collection

- *A patient required a blood transfusion for intraoperative bleeding*
- *The electronic blood management system handheld device in theatre was not responding or working after several attempts*
- *Maternity's handheld device was missing*
- *The intensive care unit's handheld device would not print a barcode for use on the collection slip*
- *The clinical team tried to bleep the laboratory several times, but there was no answer*
- *The bleep number was confirmed with the switch board but again no answer*
- *Two colleagues went to pathology and banged on the door until someone answered to gain access to the blood refrigerator for this patient's blood which was needed urgently*

Someone else's access card used to get emergency blood

- *The transfusion laboratory rejected two pre-transfusion samples, so theatre needed to use emergency blood from the remote blood refrigerator*
- *The theatre nurse did not have access to Haemobank because their personal barcode was not working*
- *The hospital transfusion laboratory advised them to seek another staff member with access*
- *This was misinterpreted as being told to use someone else's barcode*
- *O D-negative red cells were removed, and the component transfused in theatre*

New laboratory information management system (LIMS)

- *The department went live with a new LIMS which included a new label printer*
- *As the labels printed, they came out successively, with the first printed label on the bottom when they are removed from the printer*
- *The biomedical scientist was unfamiliar with the new design of the labels and, although they checked the patient details, they omitted the bag number check and transposed the bag labels, which were both for the same patient*
- *Immediate action was taken to ask all staff to only print one label at a time and complete that labelling before printing labels for further units*
- *Additionally, quotes were sourced for software which could mandate a 'bag and tag' scan prior to release to prevent such an incident re-occurring*

Wrong platelets transfused despite multiple alerts

- *Platelet components were issued to two patients on the same ward with exactly the same surname, and very similar hospital numbers*
- *The nurse collecting received an audible alert on the blood-tracking system stating, 'stop contact blood bank for advice' and the screen stated that the unit was assigned to a different patient and to return the component to storage*
- *The nurse sought advice from the laboratory and was told to continue with collection*
- *The patient developed a fever and returning the platelets to the agitator resulted in another alert that the platelets were 'already in storage'*
- *The system therefore 'quarantined' the unit*
- *Later, on scanning the platelet component out a second time the blood-tracking system gave an audible alert 'stop contact blood bank for advice and the screen stated that the unit was 'unsuitable for use'*
- *The biomedical scientist again advised to continue with collection*
- *The two-person independent pre-administration check did not prevent transfusion to the wrong patient*

Failure to use a legacy system to look for red cell antibodies

- *Two units of red cells were provided by electronic issue, but legacy system checks were omitted*
- *The patient met all electronic issue criteria according to testing on current laboratory information management system which had been in place since August 2021*
- *The historical anti-K and anti-C were recorded on the legacy system but were not discovered until 'end of testing' form check was performed*
- *These checks should be performed daily because data migration from the legacy system may have been planned but had not yet taken place*
- *There were ongoing staffing capacity issues that could have contributed to the incident*

Unit expiry not noticed because the electronic blood management system (EBMS) was down

- *A nurse checked on EBMS as to whether the unit of red cells was ready for collection several times in the afternoon and evening - but they could not see that the blood component was available*
- *When it was finally noted to be available, they assumed it had only just been issued*
- *The unit was not issued using the electronic system as EBMS was offline, so it was signed out manually and the time of expiry was not noticed*
- *The unit had expired 5 hours before the transfusion started*

Electronic blood management system (EBMS) not used in an emergency transfusion

- *The major haemorrhage protocol (MHP) was activated and a unit of B D-positive red cells allocated to a patient on a different ward was collected from the issue blood refrigerator*
- *It was taken to the ward where the MHP was in progress and transfused to an O D-negative patient*
- *EBMS, which should have been used, was not used and would have prevented this error*
- *The medical staff made the assumption that this was emergency O D-negative blood and did not require a bedside check*
- *The patient died and death was possibly related to the transfusion (imputability 1)*

Failure to update or replace equipment

- *Transfusion was completed for a red cell component 6 hours and 31 minutes after leaving temperature-controlled storage*
- *The organisation had an electronic blood management system in place but due to information technology issues the handheld devices were no longer reliable so were not being used*
- *No begin time was recorded on the paperwork*
- *Patient was transferred to a different clinical area 6 hours after the unit was started and the unit was immediately taken down by the receiving area*
- *The end time was documented on the paperwork 30 minutes after the patient arrived in the clinical area*

Access denied

- *A patient post-solid organ transplant required group O red cells to ensure compatibility with both patient and organ donor to reduce the risk of passenger lymphocyte syndrome*
- *This was flagged on the clinical notepad within the laboratory information management system*
- *The biomedical scientist (BMS) was using a workstation logged in by support staff who had different access rights to view patient's transfusion requirements*
- *As a result, the patient's own group (group A) was provided*
- *The support worker had not logged off the computer so when the BMS answered the phone at the workstation to look up the patient they did not appreciate they were on someone else's login*
- *According to information provided, support workers should have had access to view the clinical notepad*

Forgotten access information

- *Clinical staff unable to access blood refrigerators for emergency O D-negative red cell units*
- *Staff who were trained to collect blood components could not remember their personal pin numbers to access the blood refrigerator resulting in a delay in transfusion*

Sample validity changed by laboratory information management system (LIMS) upgrade

- *Following a LIMS upgrade, staff reported that the sample validity was incorrect*
- *A patient sample that should have had a 72-hour sample validity was still at 5 days*
- *A lookback at all patients transfused since migration was undertaken and three patients had been transfused on expired samples*
- *This was an issue noted with a previous upgrade and therefore was included in the validation script and it passed*
- *But investigation showed that the 'hot fixes' were not on the checklist of application fixes required for the terminal servers, they were loaded one application package at a time and one of the servers had been missed*
- *There is now a second check on the server installations where hot fixes are required to ensure all are deployed as expected*
- *Process have been modified where all servers have all 'hot fixes' deployed as standard*

Unable to delete flags from laboratory information management system (LIMS)

- *A fetus was predicted D-negative and so mother and did not require anti-D immunoglobulin (Ig), however anti-D Ig was ordered and administered*
- *The cell-free fetal deoxyribonucleic acid (cffDNA) referral report was entered onto LIMS and clinical flag added to patient file, as per protocol*
- *The cffDNA results were not clearly documented on the maternity electronic record, although were available on the main electronic patient record*
- *The mother attended antenatal assessment unit with a bleed and received anti-D Ig*
- *The doctor did not see the cffDNA results and prescribed anti-D Ig which was then given to the mother*
- *This request should not have been made, as the cffDNA result was on the system and would have been visible to the midwife if the process had been completed correctly*