

## **SHOT Safety Notice 01: Emergency preparedness in the transfusion laboratory in case of total power outage**

Dear colleagues,

The SHOT team would like to take this opportunity to share learning and highlight the importance of emergency preparedness. This notice has been issued to share learning following an incident reported to SHOT in 2020 exposing the fragility of our services, which increasingly depend on electrical and electronic equipment. The staff members who faced this situation coped well in challenging circumstances, with no adverse patient outcomes. We would like to commend their actions; help identify potential risks and highlight areas where insights and enhancements can be gained.

As we are all aware, hospitals are not immune to power loss either because of natural or man-made causes. Even a brief disruption in power can affect many critical systems within the hospital including transfusion.

All transfusion staff should be familiar with local Emergency Preparedness, Resilience and Response plans. Staff should undertake training exercises as part of wider Trust/Health board preparation, with documented roles and responsibilities.

### Regulatory and accreditation requirements:

In addition to good practice and risk reduction, transfusion laboratories must also have contingency plans available to maintain compliance with the Blood Safety Quality Regulations (2005). Furthermore, ISO 15189 (Clause 4.1.1.4n) specifically states:

*'The laboratory director or delegate shall design and implement a contingency plan to ensure that essential services are available during emergency situations or other conditions when laboratory services are limited or unavailable. Contingency plans should be periodically tested. UKAS inspection will require assurance that such measures have been taken.'*

### Synopsis of the incident reported to SHOT:

There was a complete power outage at a hospital site and the emergency power which was expected to provide electricity to the laboratory also failed, which resulted in total loss of power to all critical equipment including storage equipment, blood group analysers, plasma thawers, LIMS computer terminals, Clinical laboratory and stores temperature monitoring system (TREND) outstation & PC, NHS telephone lines including those in the transfusion laboratory. This lasted for ~2 hours and staff had to improvise and innovate to communicate with colleagues to request additional help, and issue emergency blood components to patients as needed with no adverse impact or unnecessary delays. Here are some learning points from this event. These will serve as a helpful reminder to make sure you have covered all your bases in order to keep your supply lines flowing so that the focus can remain where it counts: safely transfusing patients in need.

The following summarises the steps to be taken to ensure preparedness in the event of a power outage:

## Policies and procedures

- Business contingency plans for transfusion are commonly part of an overarching Clinical Laboratory Services. However, Transfusion Services are encouraged to have their own SOPs in place
- These should cover LIMS, power, and equipment failure and should contain practical information for the laboratory staff. Power failure is not uncommon but may involve only one hospital site. Resilience measures include the ability to use other sites and potentially the wider pathology network
- Procedures should be established for contact for immediate advice out of hours, including methods of communication other than landline (including transfusion management, reference laboratories and medical staff)
- In the absence of any power, all backup procedures must fully endeavour to maintain the quality of components/products including frozen components. Contingency plans should cover how to issue frozen products in the absence of a thawer and a process for approval must be in place for component issue outside of SOP
- The information regarding validated emergency procedures should be clear, always accessible, and should be drilled/regularly read by all staff members
- Non-standard equipment must be cleaned to minimise the risk of bacterial contamination, and a record of cleaning should be created and maintained

## Resources

- In the case of power failure, avoid opening fridges or freezers where possible
- Laboratories are encouraged to ensure that critical equipment is identified and powered through the back-up generator circuit. In addition, the use of Uninterruptable Power Supply (UPS) systems will provide a bridging supply during the transition between mains to generator power. In the rare event of secondary power supply failure, UPS also provide a period to safely close-down equipment and issue components
- UPS should be available for all critical equipment which requires controlled power-down, for example blood grouping analysers. Other critical equipment (e.g. blood fridges, selected LIMS terminals and plasma thawers) should be supplied by back-up generator power supply
- Consider additional back-up solutions for critical equipment where feasible, e.g. battery controlled temperature graphs and loggers for blood storage fridges to enable temperature monitoring and log in a power outage. Temperature indicators may provide a useful emergency back-up
- Ensure an emergency supply of pre-printed/prepared and accessible manual compatibility labels and other documentation
- Ensure essential resources such as torches are available in case lighting is compromised

## People

- Staff should be aware of escalation procedures in the event of any emergency and should be familiar with all the business continuity plans applicable to their work
- Staff should be adequately trained and competency assessed for all business continuity procedures and should be confident to follow these when needed. Practice sessions must be incorporated to maintain awareness and address any emerging concerns
- Staff should be aware of information regarding how long blood their fridges and transport boxes can maintain an acceptable temperature
- Staff should be actively involved in all debriefs to capture learning from experiences



- Non-standard procedures should only be undertaken for clinically urgent cases and should be discussed with Transfusion/Haematology medical staff. Decisions and discussion regarding concessionary release should be documented
- Documented information regarding the groups of all components to be released in emergency situations should be available (e.g. O red cells and A/AB platelets and plasma components)
- A structured log of communication with the clinical team, including laboratory advice given should be maintained



- Preparation of frozen plasma for clinical use requires controlled thawing usually provided by means of a dedicated thawer. In the event of power supply failure this may be compromised. Resilience measures include the use of pre-thawed plasma and preparation elsewhere
- However, if emergency manual measures are to be used then SOPs and training should be in place to control the process
- When frozen components have to be thawed in a improvised waterbath or other equipment designed for the purpose, they should remain within a vacuum-sealed overwrap bag according to a validated procedure. The optimal temperature at which the component should be thawed is 37°C; temperatures between 33°C and 37°C are acceptable
- A record should be kept regarding cleaning, and the appropriate products used on the container and components post exposure to tap water
- Plasma components should not be left unattended for long periods of time when using non-standard procedures

**Summary:**

The SHOT team encourages all transfusion staff to be familiar with and ensure contingency plans are in place to deal with such emergencies so that safe patient care is not compromised. Not only does it require input and action on many different levels, but it also must be continually updated as needs and risks change. The transfusion process needs to be reviewed end to end and staff need to make sure that all relevant concerns have been addressed – this will greatly aid the team’s preparedness when crisis strikes. The information regarding validated emergency procedures should be clear, always accessible, and should be drilled/regularly read by all staff members. A number of these factors may also apply to other emergency situations, such as flooding, reagent/resource unavailability and staff shortage. We strongly encourage all transfusion laboratories to review their procedures and policies to ensure that there is appropriate guidance available to ensure that safe working procedures are maintained in these situations.

**Key points to note:**

- **Be prepared in case of power failure. Preparedness saves lives**
- **Have a robust, clear communication plan in place**
- **Practice, practice, practice**

Questions to consider:

Are all transfusion staff in your team aware of the business continuity plans?

What type of backup communication systems do you have?

Have you identified staff members who could act as runners in the case of total communication failure?

Are all important points of contact (i.e. staff, hospital operations management, blood services) available offline?

Does your blood bank track your typical daily use of blood components? Do you have a regional blood centre that you can contact on a 24-hour basis?

When did you last test your generator? Do you have a strong supply of manual and battery-powered equipment (including spare batteries) in the event of total power failure?

Useful references:

The National Blood Transfusion Committee Emergency Planning subgroup has produced several key documents related to emergency preparedness and resilience and can be accessed here: <https://www.transfusionguidelines.org/uk-transfusion-committees/national-blood-transfusion-committee/working-groups> [accessed 23 Nov 2020]

BSQR (2005) The Blood Safety and Quality Regulations ISBN 0110990412; <https://www.legislation.gov.uk/ukxi/2005/50/contents/made> [accessed 23 Nov 2020]

British Standards Institution (2014) Medical laboratories. Requirements for quality and competence – (ISO15189:2012) <https://www.ukas.com/services/accreditation-services/medical-laboratory-accreditation-iso-15189/> [accessed 23 Nov 2020]

The Good Practice Guide (Chapter 9) (2020) [https://www.edqm.eu/sites/default/files/medias/fichiers/Blood/good\\_practices\\_guidelines\\_for\\_blood\\_establishments-blood\\_guide\\_20th\\_may\\_2020.pdf](https://www.edqm.eu/sites/default/files/medias/fichiers/Blood/good_practices_guidelines_for_blood_establishments-blood_guide_20th_may_2020.pdf) [accessed 17 Dec 2020]

