

BLOOD ESKY USE IN EMERGENCY DEPARTMENT - CHW

PROCEDURE [®]

DOCUMENT SUMMARY/KEY POINTS

- This document describes the use of the Blood Esky to enable the immediate provision of blood to children who require it in the emergency department, but ensuring there is minimal wastage of packed cells.
- The use of the Blood Esky is activated by the Trauma Attend page

CHANGE SUMMARY

- New document

READ ACKNOWLEDGEMENT

Outline who needs to read or know about the document (roles only – do not use names).

Outline using ONE of the following requirements:

- Training/Assessment Required – ED, trauma and blood bank staff

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st April 2018	Review Period: 3 years
Team Leader:	Consultant	Area/Dept: Emergency Department

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Procedure

Purpose

International consensus has changed for the management of children with traumatic blood loss. For severe uncontrolled haemorrhage blood, where available, the initial resuscitation fluid should be available as the part of a **Massive Transfusion Protocol** [insert link]

Most children who attend the ED at The Children's Hospital at Westmead (CHW) with major trauma do not require urgent blood transfusion, but for those that do urgent blood transfusions need to be able **to be provided immediately**.

The Blood Esky will enable CHW to provide O-Negative blood at the time of arrival of the patient with major trauma (Trauma Attend), but minimise blood wastage by keeping the units in a refrigerated Esky that will be returned unopened to Blood Bank if the products are not used.

Activation

The Blood Esky will be activated by the 'Trauma Attend' page between **8am and 11pm**

ED Responsibilities

- On activation of 'Trauma Attend' ED NUM to designate team member to pick up blood esky from Blood Bank. This may be the appropriately trained AIN.
- If not staff member has arrived in Blood Bank within 5 minutes of the 'Trauma Attend' notification to collect the blood esky, the Blood Bank staff will ring the NUM on Ext **52437**.
- On activation of 'Trauma Attend' ED NUM and ED Consultant/fellow to decide whether to prime the fluid warmer with the esky blood. Priming line with blood and putting into the machine should take no more than 1.5min.
- The blood esky is **only to be opened when products are needed** (Fig 1). The Blood Component Issue Sheet should be completed as usual. Close the lid immediately so the second unit stays cold (Fig 2)
- If a unit is taken out of the Esky it **must not be put back**. Phone Blood Bank for advice
- As part of the ongoing management of the patient the Trauma Team Leader should decide whether to activate the Massive Transfusion Protocol or Code Crimson
- Once the trauma is over the ED NUM should ensure the blood esky is returned to Blood Bank with all the documentation. The blood esky is only validated for storage for 8 hours.
- In the event of a Code Crimson the Blood Esky should go to theatre with the patient. The Nurse Floor Manager in OT will be responsible for ensuring it returns to Blood Bank

- If the external sensor alarms (indicating temperature has exceeded limits):
 - Check the probe wire is connected. Reconnect if it has been disconnected (Fig 4)
 - If it still alarms contact Blood Bank for advice on Ext 52284 or Page 6832

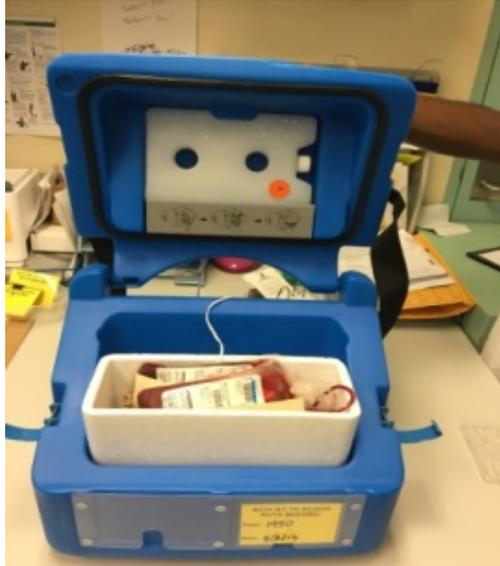


Figure 1



Figure 2

Temperature Control

The ED/Resus Blood Esky has been validated by Blood Bank to maintain an interior temperature of approximately 4°C for up to 8 hours. The Esky will hold up to 4 packed red cell units, with the temperature monitored by an internal data logger (Tempod Data Log) and an external temperature display (Min-Max Alarm Thermometer). (Fig 3 & 4)



Figure 3



Figure 4

For the ED/Resus Blood Esky only: The temperature inside the esky must stay within the range of 2-6°C in accordance with Red Cross and the ANZSBT Guidelines for Transfusion and Immunohaematology Laboratory Practice (ref: 1st edition 2016, page 32) pertaining to Storage and Transport of Red Cells:

- 5.2.2 Products issued by the laboratory to another location e.g. ward, theatres, those sent with patients transferred from locations or facilities outside the jurisdiction of the receiving laboratory or products accompanying emergency retrieval teams (e.g. in a helicopter or ambulance) are considered to be in storage. If these products are not placed into a monitored temperature-controlled device they must be kept in a validated shipping container able to maintain the appropriate storage temperature (see Table 5.1, page 32).

Table 5.1: Blood product storage temperatures

Product	Storage temperature	Maximum storage duration
Red cells	2 °C to 6 °C	42 days
Red cells (paediatric)		35 days
Red cells (washed)		28 days (If suspended in additive solution)
Red cells (irradiated)		14 days post irradiation (24 hours for IUT or exchange transfusion)
Red cell (frozen)		24 hours post thawing

Note: The Min-Max Alarm Thermometer will be set to 2.5°C (Min) and 5.5°C (Max). This will give an audible alert to the ED/Resus staff to use or return the units before the temperature exceeds 6°C, or to take corrective action in the unlikely event that it drops to 2°C.

Red blood cells may be transported between 1°C and 10°C within a 24 hour period. If temperature range exceeds 2°C to 6°C but is within 1°C and 10°C then the contents must be returned to storage (2°C to 6°C) within 24 hours or discarded.

ED/Resus Blood Esky Storage

When the ED/Resus Blood Esky is not in use:

- Ensure esky is clean and dry. Wipe away any moisture and clean off any blood, etc. with bleach.
- Ensure the Min-Max Alarm Thermometer probe is inside the polystyrene esky insert between two blue gel packs.
- Place polystyrene esky insert on designated shelf in the stock/issue fridge.
- Place outer esky under bench in Blood Bank lab.

Preparation of Red Cells for ED/Resus Blood Esky

The Blood Bank will keep at all times 1 set of 2 x O Neg RBCs in readiness to stock the ED/Resus Blood Esky.

The following is required per Esky :

- 2 O Neg rr K-Neg red cell units
- 2 compatibility labels
- 2 test tubes
- 1 work card

To prepare each set:

- Select 2 x O Neg rr K-Neg red cell units. Whenever possible, select units <2 weeks old.
- Remove a segment from each unit and place it in a labelled test tube and attach the test tube to its respective red cell unit.

Note: Unit segments must be retained to perform any phenotyping or crossmatching necessary in case the patient has red cell antibodies. Notify the MO immediately of any incompatibility or phenotype positive units.

- Attach to each unit a blank compatibility label.
- Place the units with attached segments and work card in the polystyrene insert in the designated emergency issue section of the stock fridge.

Dispensing the ED/Resus Blood Esky

The following is required per Esky:

- Blue ED/Resus Blood Esky
- 1 x polystyrene Packed Red Cells holder for Esky
- 1 x small (0.3 L) ice brick (filled to 210mL)
- 2 x large (0.6L) ice bricks (filled to 300mL)
- 2 x thin blue gel packs
- 1 Tempod Data Log
- 1 x Min-Max Alarm Thermometer (attached to lid of esky) with attached temperature probe vial.

Note: Do not hold temperature probe vial or place on bench top as this may cause the thermometer to alarm.

- 2 x prepared O Neg rr K-Neg Packed Red Cells
- 1 yellow card with required return date/time (*Fig 5*)

The ED/Resus Blood Esky will only be issued after a "Trauma Attend" page is received between **8am and 11pm**.

- Remove one set of 2 O Neg Packed Red Cells and the polystyrene insert from the designated emergency issue section in the stock fridge.
- Emergency dispense the units as per protocol, stick the emergency labels on to the compatibility tags and place the transfusion sheet in the outside pocket on the back of the esky. (*Fig 7*)
- Retain the workcard and segments in Blood Bank.
- Remove 2 large and 1 small ice bricks from the designated freezer.

Note: Use **only** the designated ice bricks (marked with orange stickers) designed for the Esky. All bricks must be **completely** frozen in the designated freezer to maintain Esky temperature. Do **not** freeze in -80°C freezer.

- Place one large brick flat on the bottom of the Esky and place the polystyrene holder on top.
- Place one small brick on its side behind the polystyrene holder.
- Place one large brick in the lid on the Esky (see picture instructions in the lid of the Esky for correct placement).
- The stored polystyrene insert should already have blue gels packs in it. If not, retrieve from the Reagent Fridge.
- Place blue gel pack in bottom of polystyrene holder with **temperature probe vial on top.**
- Check that the display on the Tempod data logger reads **Stby** for “Standby” (if not, the profile must be reconfigured. See Appendix 1: Use of the Tempod Data Logger).
- Press and hold the Start/Stop button on the data logger for 5 seconds. The display will show a black diamond and the number 10, indicating that it will start recording in 10 minutes.
- Place data logger on the blue gel pack in the Esky, next to the temperature probe vial.
- **Place the second gel pack on top so the data logger and probe vial are covered.**
- Place up to 4 red cell units lengthwise in the polystyrene holder, on top of the blue gel pack. (*Fig 6*)
- Place a yellow “Return to Blood Bank Before” card with the return time and date completed in one of the pockets in the front of the Esky. (*Fig 5*)
- Close lid and secure latches on the sides of the Esky.

Note: If lid does not close properly, check placement of ice bricks (Example: brick in lid is locked in place, or brick behind the polystyrene holder is on its side and not upright).

- Check the Min-Max Alarm Thermometer. The Lo Alarm/Hi Alarm mode and alarm bell icon should be displayed. If the thermometer is flashing red and alarming, the temperature range has been exceeded and the high or low display will flash to indicate

what temperature has been breached (see Appendix 2 for detailed instructions on resetting the alarm).

- Send Esky to ED/Resus.
- Prepare a new set of units to be kept in readiness in the blood bank fridge (See above section, Preparation of Red Cells for ED/Resus Blood Esky).

Returned ED/Resus Blood Esky

ED/Resus will return the Esky within 8 hours from being issued.

- Remove the yellow card with the required return date and time and ensure that the units have been returned within 8 hours.
- Perform a visual check on any returned units for signs of damage (opened ports, leakage, discolouration, etc.). If unacceptable, discard as per normal procedure. If acceptable, place in a separate section of the blood bank refrigerator until temperature has been confirmed.
- Remove data logger and download the temperature recordings (See Appendix: Use of Tempod Data Log).

Note: Do NOT press Start/Stop button on data logger after removing from Esky as this may inadvertently overwrite data. Data logger will stop recording when connected with computer.

- Note the highest and lowest temperatures recorded on the data logger.
- If temperature was maintained at 2-6°C, the units are suitable for reissue.
- If temperature was less than 2°C or higher than 6°C for >30 minutes, discard unit as per normal procedure.
- Return the Esky ice bricks to the designated freezer (do NOT place in -80°C freezer) and blue gel packs to the refrigerator. Allow ice bricks to freeze completely before using again.



Figure 5



Figure 6

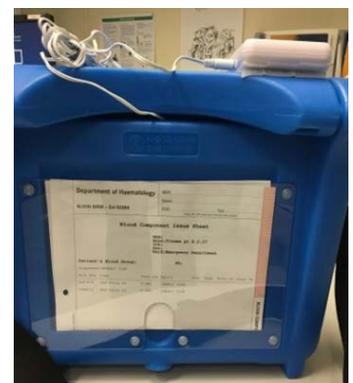


Figure 7

Appendix 1: Use of Tempod Data Log

When data logger is removed from the ED/Resus Blood Esky, download temperature data:

- **Do Not press Start/Stop button on data logger after removing from Esky** as this may inadvertently overwrite data. Data logger will stop recording when connected with computer.
- Connect data logger to computer via the USB port on the side of the monitor.
- Access the TempCentre Lite program. The program will open to the Device Manager screen. Remove cap on right end of data logger, exposing the USB connector. Click Connect on the left side to connect data logger. Once connected, the device information will display.

Note: If the Current Status of the device connected shows “Recording”, click the **Stop** button to end recording.

- Display will default to the Summary page. Under Logging Summary on this page, the highest and lowest temperatures will display. Note these on the Esky Inventory Log.
- Click on the Graph tab. Review temperature graph. Temperature readings within the blue range are acceptable.
- Click on the List tab to view individual temperature readings (only if out of range).
- Save a copy of the report:
 - Select File/Export/Export to PDF
 - Select location G: drive/Blood Bank Temperature Logger
 - Name file with today's date and time (in 24 hour form) in the format DDMMYYTTTT (example: a file saved on 5/3/17 at 1:36pm would be named 0503171336).
 - File type will default to PDF.
 - Click Save
- Once data report is saved, the data logger must be configured for the next recording.

Note: Once the data logger is configured, all data will be automatically deleted. Be sure to save the data report **before** reconfiguring.

- Click page tab for Configure Device.
- Click Load Profile.
- Select file Delay 10 min.cfg and click Open.
- Click Write Configuration.
- Once configuration is complete, click Disconnect on the Device Manager screen. It is now safe to remove the data logger from the USB port. Once removed, the display on the data logger should read **Stby** for “Standby”.

- Replace cap over USB connector. The data logger may now be reused. Press and hold Start/Stop button on data logger for 5 seconds to begin recording before placing in the ED/Resus Blood Esky.

Appendix 2: Use of Min-Max Time Stamp Alarm Thermometer

The thermometer has been pre-set with a Lo Alarm set at 2.5°C and a Hi Alarm set at 5.5°C.

If the thermometer is **alarming** and **Red Light** is **flashing**, it will mean that the temperature has gone beyond the pre-set 2.5°C or 5.5°C.

The Alarm button (bell icon):

If the alarm is sounding and the red light is flashing:

- Pressing the button once will silence the alarm but will display the temperature that has failed.
- Pressing the button again will DISABLE the alarm on (it no longer will alarm if the temperature goes out of range).
- Pressing the button again will ACTIVATE the alarm and display the alarm bell symbol.

Please ensure that the alarm bell is visible when issuing the ED/Resus Blood Esky.

The Mode button:

The display should show Lo Alarm/Hi Alarm settings when sending out the esky. If otherwise, press the Mode button until it appears.

For more detailed instructions, see the manufacturer's instructions below or in the ED/Resus Blood Esky folder.

MIN-MAX TIME STAMP ALARM THERMOMETER**FEATURES**

- High accuracy
- Unit internal or external sensor reading display
- Minimum and maximum reading memories with real time and date stamp
- Low / high alarm limit setting
- Alarm display with real time and date stamp
- Flashing light alarm indicator
- °C / °F exchange
- Time and date display
- Low battery indication
- Flip out desk stand
- Velcro magic tape fixing

**SPECIFICATION**

Measuring range	-50 ~ 70°C / -58 ~ 158°F
Display accuracy	±0.3°C / ±0.5°F
Display resolution	0.1°
Display reading update	10 seconds
Alarm limit setting resolution	0.1°
Time accuracy	±1 second per day
Time display format	12 / 24 hours format user option
Date display format	date/month/year or month/date/year user option
Effective calendar period	2013 ~ 2099
Battery	1.5 volt, type AAA or equivalent x2 pieces
Battery life	About 8000 hours in continuous operation
Working ambient temperature	0 ~ 50°C / 32 ~ 122°F
Display size	47(W) x 39(H) mm
Sensor cable length	3200 mm
Sensor bottle size	19.5(Φ) x 40(H) mm PE bottle
Product size	75(W) x 124(H) x 19(D) mm
Accessories	1) 1.5 volt, type AAA battery x2 pieces 2) Sensor in bottle x1 piece

INSTALLATION

1. Fully pull down the battery cover on the front.
2. Pull out the battery insulation strip.
3. Peel off display protective sheet.
4. For using external sensor measurement, plug in the external sensor and put the sensor inside the fridge or freezer.

SET TEMPERATURE UNIT

Slide [°C/°F] switch to the desired temperature unit.

DATE AND TIME SETTING

1. Press [MODE] until the display showing date and time.
2. Press [SET] to enable setting and the enabled digits will be flashing.
3. Press [↑] or [↓] to set the value.
4. Press [SET] to finish current setting and start the next setting.
5. Perform above steps 2-4 to set year, month, date, hour, minute and 12/24 hours format.

LOW / HIGH ALARM SETTING (LO ALM / HI ALM)

1. Press [MODE] until the display showing LO ALM / HI ALM.
2. Press [SET] and the LO ALM digits will be flashing.
3. Press [↑] or [↓] to set the value.
4. Press [SET] to finish LO ALM setting and start HI ALM setting.
5. Press [↑] or [↓] to set the value.
6. Press [SET] to finish setting.
7. The alarm will sound and the red light will be flashing when the reading is lower or higher than the alarm limit. Press any button will stop the alarm sound but the LO ALM or HI ALM icon and the red light will still be flashing which indicate that an alarm has been triggered.
8. To cancel the icon and red light flashing, press [🔔] in alarm display mode.

ALARM ON/OFF

Press [🔔] in alarm display mode to switch alarm limit off or on.

MINIMUM / MAXIMUM READING MEMORY

1. Press [MODE] until the display showing MIN and MAX readings.
2. Press [EVENT] will show when the minimum reading is measured at.
3. Press [EVENT] again will show when the maximum reading is measured at.
4. Press [EVENT] to return to normal MIN and MAX display.
5. To clear the memories press [CLEAR] once. All readings and time stamps will be reset to current values.
6. Always clear the memory once before taking new minimum / maximum reading.

ALARM DISPLAY

1. Press [MODE] until the display showing LO ALM and HI ALM setting values.
2. Press [EVENT] will show when the Low alarm is triggered at.
3. Press [EVENT] again will show when the high alarm is triggered at.
4. Press [EVENT] to return to normal LO ALM and HI ALM setting values display.

NOTE

1. Do not operate the thermometer in the environmental temperature lower than 0°C / 32°F or higher than 50°C / 122°F otherwise incorrect readings or damage to the thermometer may result.
2. If the thermometer is not in use for a long period of time then remove the batteries from battery compartment to avoid battery leakage.

ERROR SYMBOLS

Symbol	Description	Action required
☒	Low battery voltage	Replace the batteries
LLL	1) Sensor open circuit 2) The reading is out of low range (-50°C)	1) Return the thermometer for repair 2) Keep the measurement above low Range
HHH	1) Sensor short circuit 2) The reading is out of high range (70°C)	1) Return the thermometer for repair 2) Keep the measurement below high range

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