



The Safe Carriage of Red Blood Cells in Aeromedical Retrievals

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MedSTAR Emergency Medical Retrieval



MedSTAR

- > Single statewide retrieval service
- > Centralised:
 - Communications and coordination
 - Neonates and paediatric
 - Adult and pre-hospital
- > All platforms:
 - Road
 - Rotary wing
 - Fixed wing
(*RFDS and Lear Jet*)
- > SA Ambulance Service



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What is at stake?

- > 1 in 3 Australian will need blood or products during their lifetime
- > 1 in 3 Australians gives blood per year
- > 1 blood donation can save up to 3 lives
- > Australia needs more than 27,000 donations every week
- > Demand for blood and blood products will grow by 100% over the next 10 years
- > Each unit costs \$365.34

(‘Blood Service Statistics’. January 2012, Australian Red Cross Blood Service)

Blood is only part of the puzzle

> Post Partum Haemorrhage

- Placenta delivery
- Rub Up Uterus
- Syntocinon
- PG F2a
- Bakri balloon

> Trauma

- Gentle handling
- Splinting of fractures
- Haemostatic suture's
- Tourniquet's
- Pelvic binder's





Blood

- > Cold
- > Clotting factors
- > K+
- > Age?

- > Team, procedures, transport

- > 6, 4, 2

What have we done before?



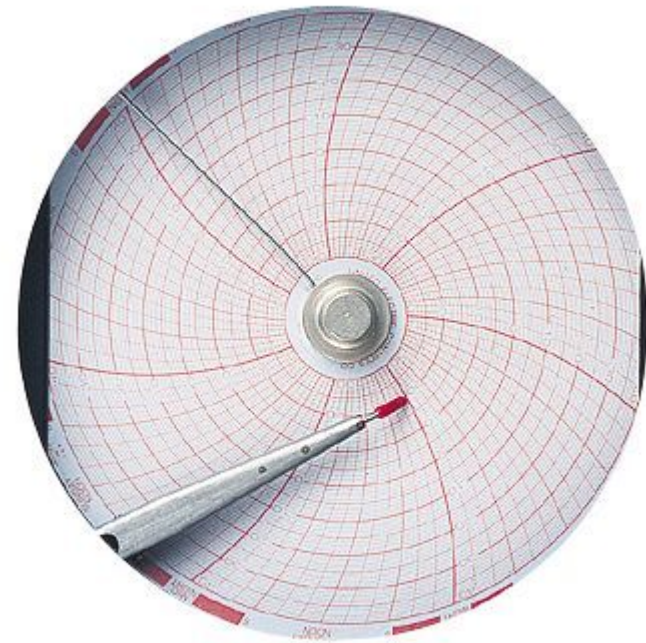
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What have we done before?



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Retrieval blood use in SA

> **Blood Transportation for Medical Retrieval Services**

Air Med Journal 2003 Nov-Dec;22(6):24-7

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What have we done before?



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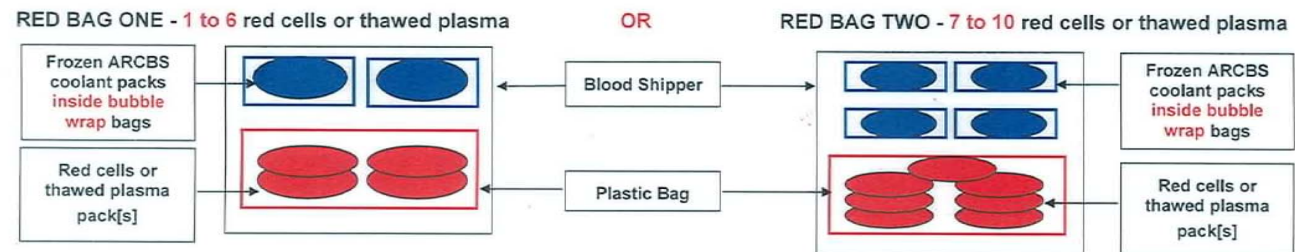


SAPATHOLOGY

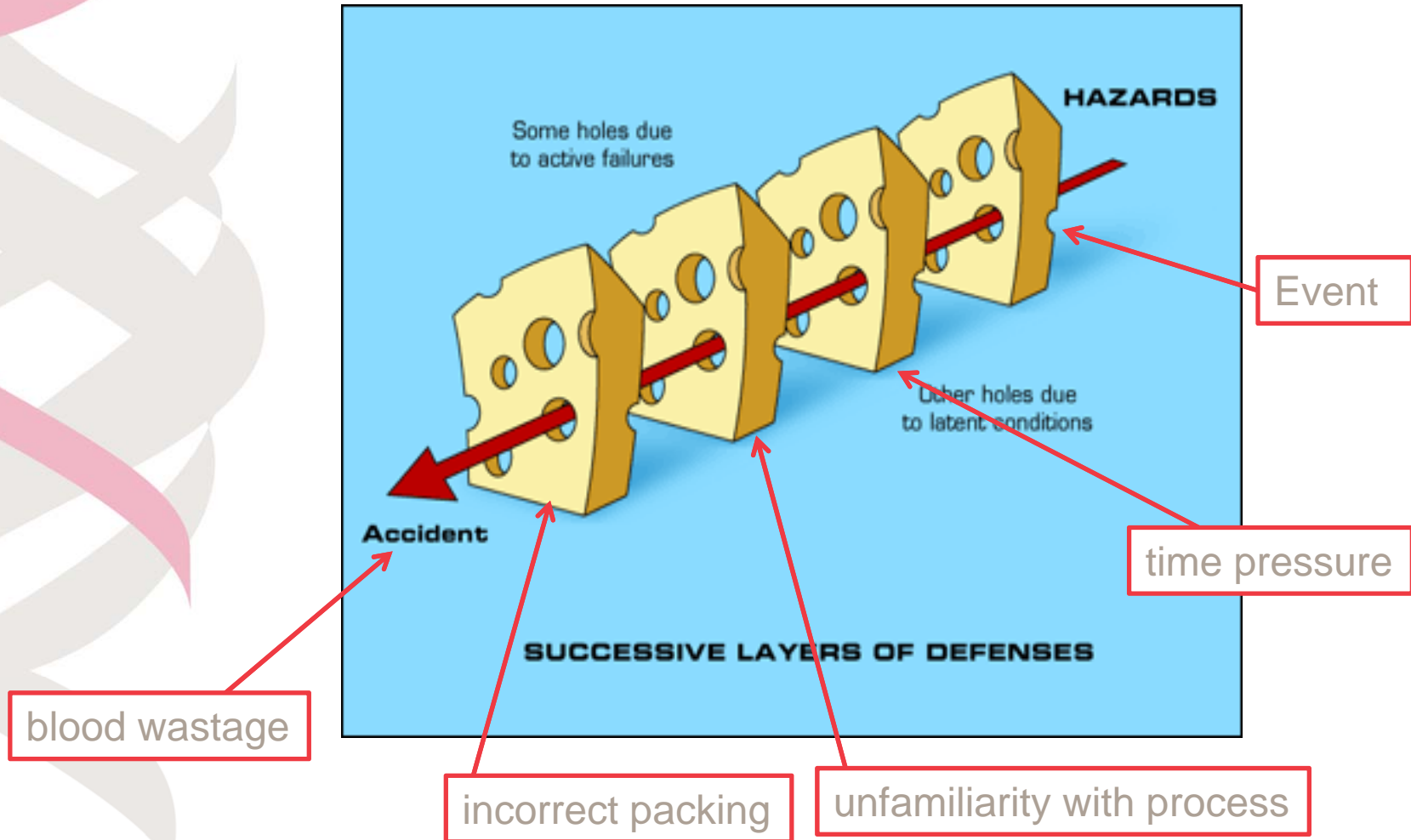
Red Bag Packing Configuration

- **Do not remove** blood until ready to be used
- Ensure coolant packs are **always on top** of blood in the shipper
- Leave the coolant packs in the shipper **at all times**
- Return blood to Transfusion **within 4 hours** of dispatch

RED BAG Packing Configuration



The Swiss Cheese model





Wastage

> Some of the loss:

- x 8 red cells 13/3/09 (\$2922.72)
- x 4 red cells 1/4/09 (\$1461.36)
- x 4 red cells 20/5/09 (\$1461.36)
- x 1 red cell 23/5/09 (\$365.34)



Objectives of the project?

- > Reduce blood wastage
- > Remove time pressured human error
- > Remove weekly blood fridge alarm challenge
- > Blood maintained between 1 – 10deg Celcius:
 - Long haul missions
 - Extreme weather conditions
 - Across all platforms



simplicity

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What are we doing now?

- > Project implemented in October 2011
- > Patient specific shippers:
 - x2 Adult shippers – each with 2 units
 - x1 Paediatric shipper – single unit of <7 day old blood



What are we doing now?

- > Daily courier exchange
 - 24hr turn around
- > Packed by Transfusion Medicine Staff
 - controlled environment
 - No time pressure
- > Daily temperature audit
 - Local spreadsheet

Shipper specifications

> 'LifeBox' small

- 3.9kg's un-packed
- 6.3kg's packed

> Exterior:

- copolymer polypropylene, high performance resin

> Interior walls:

- Reticulated polystyrene and carbon aerogel vacuum panels

> Dimensions:

- 42.9cm x 27.7cm x 33cm's

> Exterior digital temperature display

> Each unit costs: \$650.00 *(at time of purchase)*





Shipper validation

> Objective:

- Assess effectiveness in maintaining temperature of 2 red cell units at 1 – 10 deg Celcius
- Over a period of 24hours

> Testing carried out at:

- Room temperature
- 4 deg C
- 38 – 44 deg C



Validation results

- > Room temperature:
 - Temp maintained between 1.5 to 7.8 deg C
 - Greater than 30hrs
- > 4 deg C
 - Temp maintained between 1.5 to 6.8 deg C
 - 8hrs and 55min's
- > 38 to 44 deg C:
 - Temp maintained between 2.0 to 9.3 deg C
 - 22hrs and 55min's

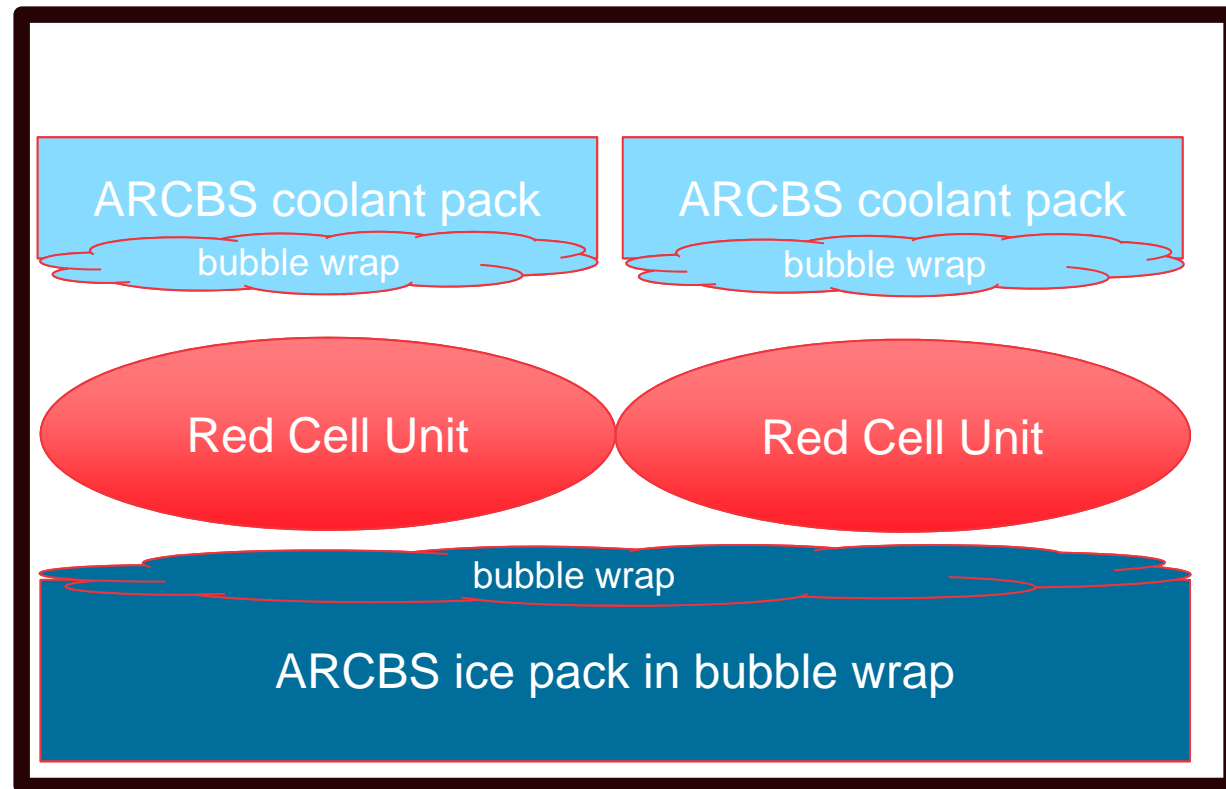
What are we doing now?



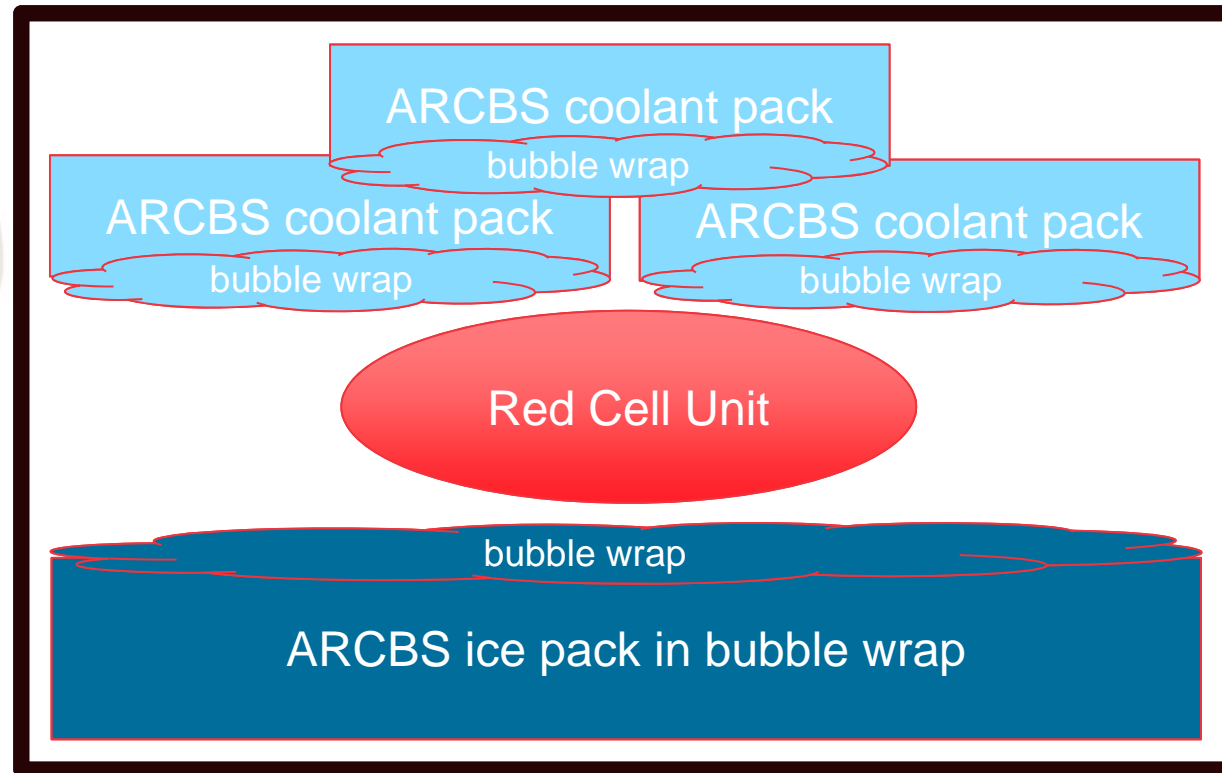
external temp reader

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Packing configuration - adult



Packing configuration - paediatric





The Perfect Storm

- > Single episode of blood wastage since project started
 - New registrar rotation
 - New team roster configuration
 - High demand – both day teams did 3 ‘back-to-back’ missions
 - Teams did not return to base



Thanks and Acknowledgements

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Royal Adelaide Hospital

> Ken Davis

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Royal Adelaide Hospital

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> Natalie Hincksman

- Clinical Practice Consultant – Nurse Coordinator



What happens next?

- > “Critical Bleeding” Pack
 - 2 Red Blood Cell packs
 - 2 Fresh Frozen Plasma packs
 - Tranexamic Acid (TXA)
- > MedSTAR and TXA
 - Standard operating procedure
 - In operational use
 - Re-audit blood use in retrieval medicine



Declaration

- > No conflict of interest
- > No financial interest in either shipper manufacturer or distributor
- > No animals injured whilst filming this project



**Government
of South Australia**

SA Health



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