NHS
Blood and Transplant

Blood and bombs:

Blood Service support following the 2017 Manchester Concert Bombing

H Doughty, T Cowdrey, D Dawson, P Rogan, G Gogarty, E Massey, & K Pendry. NHSBT.

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Introduction

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- At 22.30 on 22nd May 2017 an IED exploded in the Manchester Arena as concert goers were leaving the Manchester Arena.
- 22 members of the public were killed and 116 people were admitted to hospital.
- In addition, 240 emergency calls were made and 60 ambulances and 400 police officers attended.

http://www.nicobande.com/wp-content/uploads/2017/05/At-least-22-dead-50-injured-in-suicide-bomb-attack-at-Manchester-Arena-1.jpg

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Mass casualty events

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Paris – a mixture of both IED and GSW

- London 2005
- Oslo/Utoya 2011
- Boston 2013
- Paris 2015
- Brussels 2016
- Westminster 2017
- Manchester 2017

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Aims and methods

NHS Blood and Transplant

Aims

- To describe the initial provision of blood components
- To compare the findings with previous events
- To identify lessons and recommendations

Methodology

- Incident reports,
- Laboratory Information Management System (PULSE)
- Hospital questionnaire

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Blood service response

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NHS Blood and Transplant notification

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NHSBT aware at 23.30

- DHSM –Duty Hospital Services Manager
- CIM – Critical Response Manager
- NCIM – National Critical Response Manager

Other on specialist call staff (clinicians, transport managers and others

Blood orders

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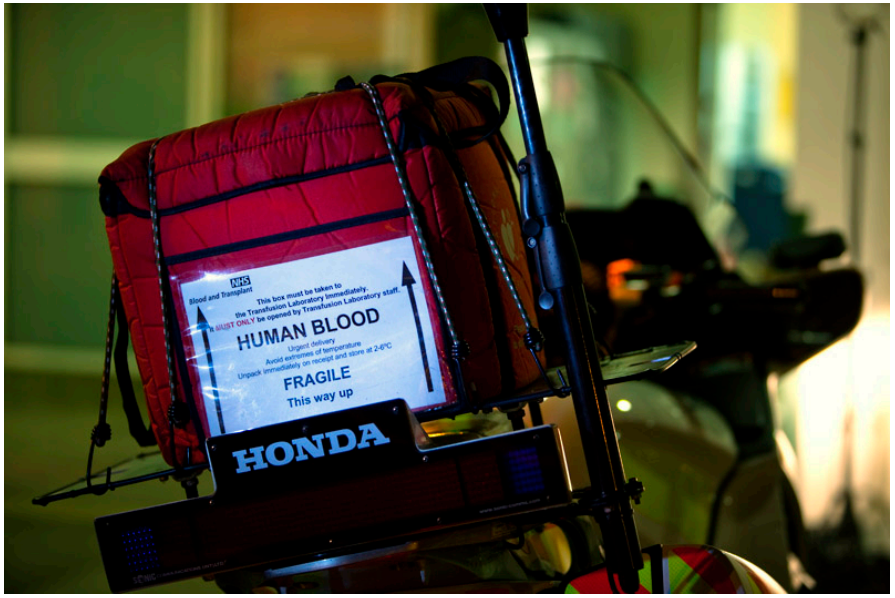
6 hospitals in Manchester ordered stock over night (00.45hr – 06.10hr).

The total order in these 6.5 hours was:

- 334 Red cells (SAGM)
- 18 packs of platelets
- 58 FFP
- 12 pools of MB cryoprecipitate.

All orders were met.



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Blood group mix

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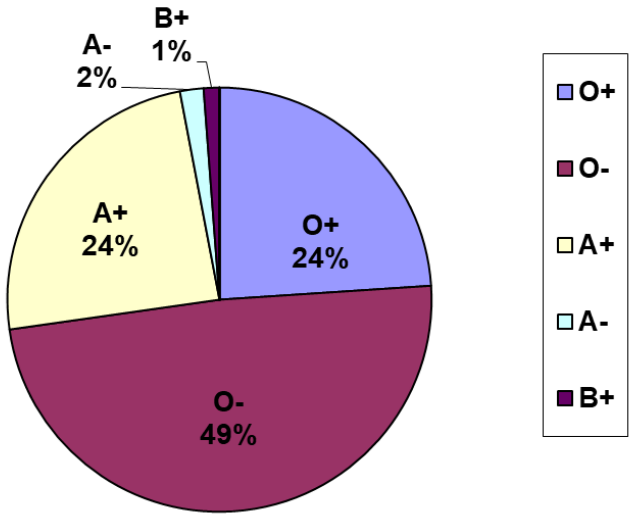
The blood group mix ordered reflected the requirement for universal blood components.

- Red cells, O neg 163 (48.8%)
- FFP AB 24 (41%), A, 24 (41%)
- Platelets Group A 12 (66.6 %).



Red cell issues by blood group

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Red cell issues

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Manchester Issues		O+	A+	B+	AB+	O-	A-	B-	AB-	Total
Sat	20-May-17	36	24	1	4	8	3	1	0	77
Sun	21-May-17	23	13	6	6	16	5	2	0	71
Mon	22-May-17	89	113	8	3	40	22	3	0	278
Tue	23-May-17	199	179	24	10	180	30	8	0	630
Wed	24-May-17	127	114	33	7	41	32	4	2	360
Thu	25-May-17	112	116	25	3	28	11	5	2	302
Fri	26-May-17	103	74	22	2	22	23	6	0	252
Sat	27-May-17	36	28	8	0	7	31	2	0	112

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Logistics

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- There were a total of 17 deliveries including inter-centre movement. 15 of which were blue light
- NHSBT drivers were tasked with blue light and urgent inter-centre transfers.
- Couriers were used for more routine deliveries.
- Delays for some routine deliveries were anticipated due to traffic disruption.
- Some deliveries deliberately packed into ‘long journey’ boxes

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Patient details and blood use

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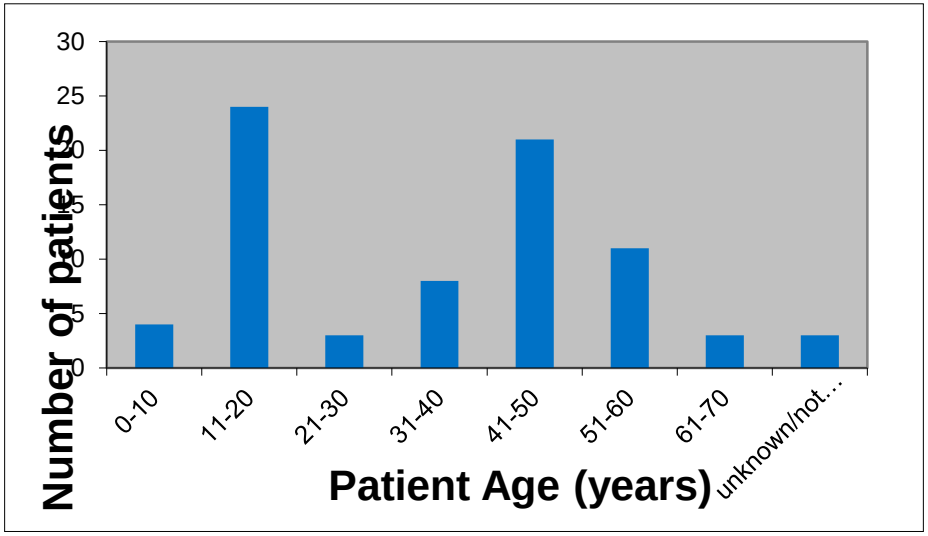
Patient demographics



- Females 52 (69.3%)
- Males 23
- Unknown 2
- 28 (36.4%) patients ≤ 20yrs

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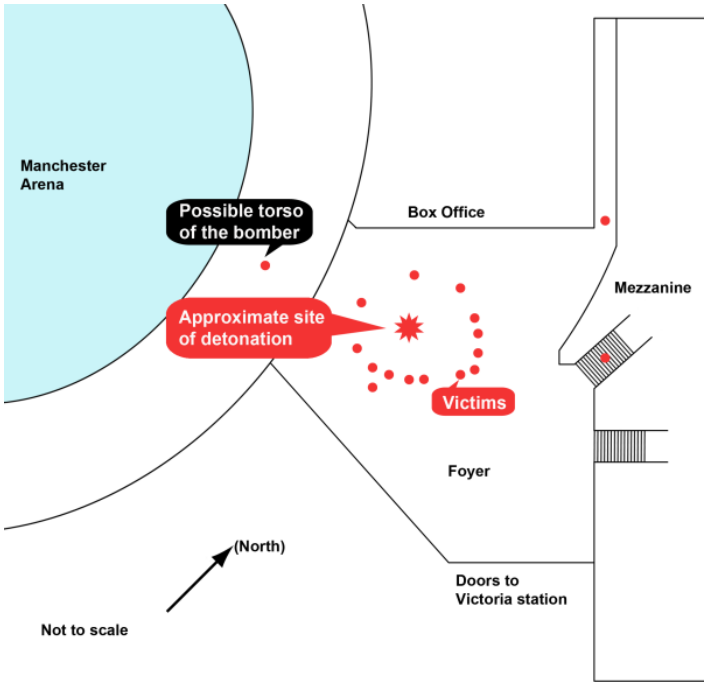
Blood component use

Survey describes 75 patients treated for injuries

- 23 patients received RCC
- 4 received plasma
- 2 patients received plts;
- 2 received cryo;



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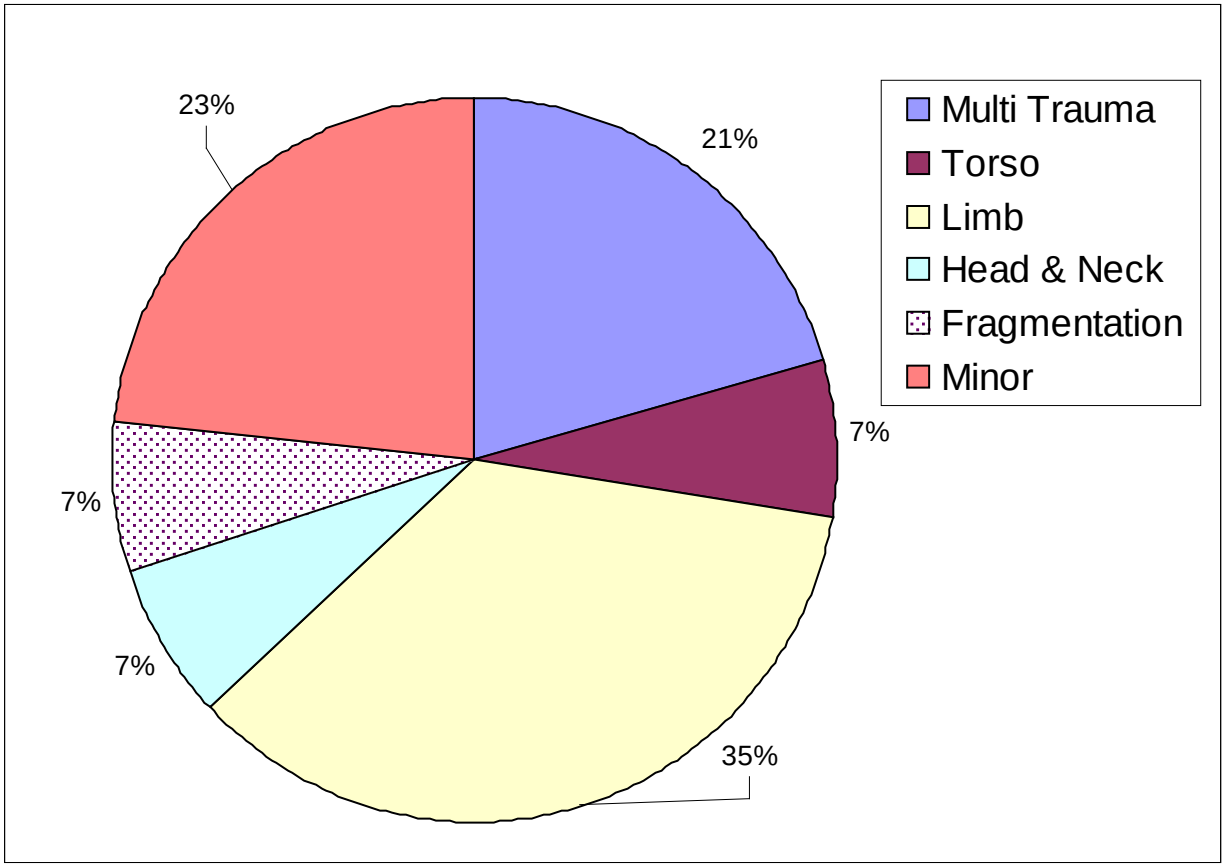
Injury type



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Red cell use

23 patients (30.7% of 75) were transfused

A total of 89 units of RCC were used

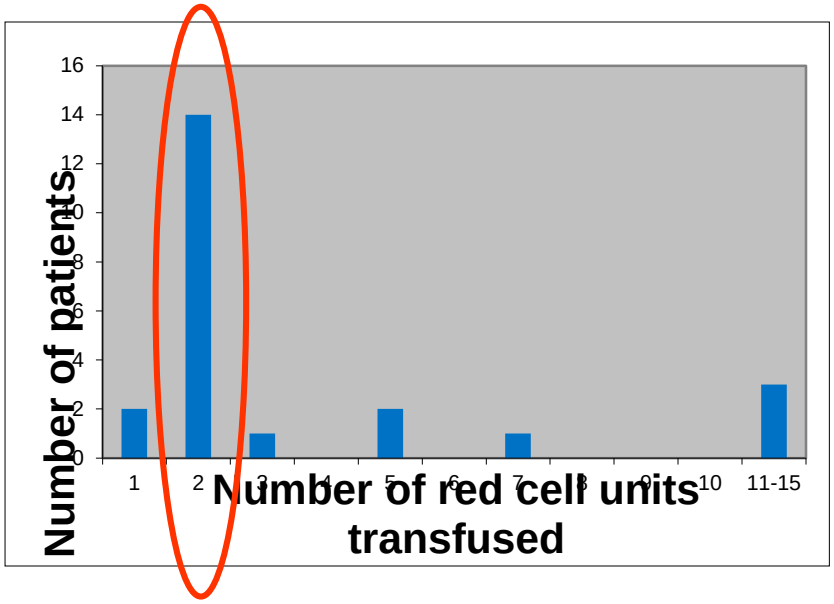
Mean RCC use = 3.9 units per patient

- Min = 1
- Max = 15
- Mode = 2

3 patients received ≥ 10 units (*4 = 5.3%)

5 patients received ≥ 5 units (*6 = 8 %)

*Corrective factor for children (aged >19) using 50th centile on UK weight charts



Multi-trauma accounted for the majority of red cells used

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Use of group O neg

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- 31 O Neg rbc were used. 28/31 (90.3%) O D Neg rbcs were transfused as emergency O D Neg
- At least 1 unit of emergency O Neg was transfused to 14/23 (60.9%) patients
- Two of the 23 patient who received RBC were O Neg. One which received additional to the initial emergency O Neg.
- The total O Neg use was 28 emergency units plus 3 additional group specific = 31 units.

Blood group	No of patients	Emergency O neg	Group specific	Total
O +	7	5	21	21
O -	2	4	3	31
A +	8	11	33	33
B +	1	1	1	1
AB -	1	0	3	3
Unknown	4	7	0	0
Total	23	28	61	89

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Lessons identified

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International experience

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- In Terrorist attacks - Relationship between mechanism/ injury severity and blood use.
- Overall 2-3 RCC per casualty. 6 units RCC per critically injured. May be less RCC if other components or WB used
- Modern planning assumes blood components (*or whole blood*) for the most severely injured
- Red cells, 2/3 (62-74%) used within first 4hr, 27% Group O, un-crossmatched

Glasgow et al 2013. A comprehensive review of blood product use in civilian mass casualty events. J Trauma Acute Care Surg 75, 3.

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NHSBT incident demand planning

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Bottom-up planning for incidents

- Number of casualties x
- Amount of blood required x
- Red cell demand: use ratio x 3

Assumptions

- Early use of blood components
- Increased use of ‘universal components’
- Few casualties should require massive transfusion
- Consider nature of incident and need for continuing support

H. Doughty & S. Allard (2006) Responding to Major Incidents – Lessons Learnt from July 2005 London Bombings. *Blood Matters (NHS Blood and Transplant)*, **20**, 14 - 15.

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A little over 10 hours after the event huge queues formed outside Blood and Transplant buildings to give blood

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Blood component demand and use ratio

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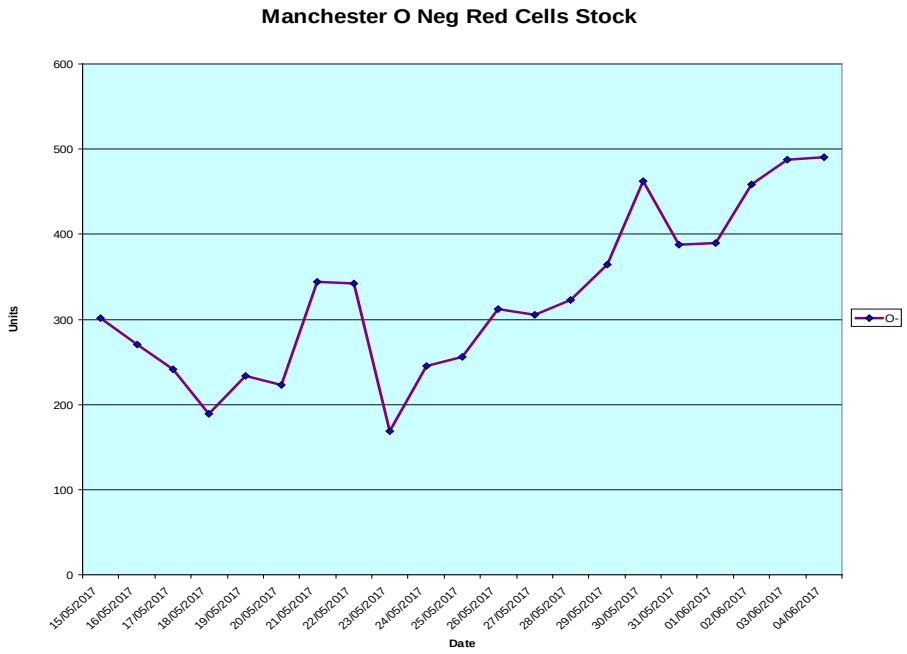
- Ratio of RCC ordered: transfused = 3.75
- Demand: use ratio for RCC of 3 previously seen in both UK and Israeli literature
- Ratio O D Neg ordered (163): O D Neg transfused (31) = **5.25**



Rebuild of Manchester O neg stocks

Glasgow SM, Allard S, Doughty H, Spreadborough P, Watkins E. (2012) Blood and bombs: the demand and use of blood following the London Bombings of 7 July 2005--a retrospective review. Transfusion Medicine. 22(4):244-50

Lessons

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1. Improve telephone access to Hospital Services
2. Earlier notification of NHSBT
3. Low demand for blood but high demand for group O
4. Joint management of O neg red cells. Consider options to take back stock
5. Increase IT and phone capacity to respond to donors.

Conclusions

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- The incident was characterised by a large proportion of females and young people.
- NHSBT was able to meet all immediate demands for this incident and BAU from local stock supported by the national network.
- The component demand was similar to that seen in previous MIs. Demand was low however, there was a greater demand for O neg red cells.
- The donor response was similar to previous events. Donations were controlled however the demand stressed IT capacity.

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Acknowledgements

- Donors
- NHSBT staff
- Hospitals
- Emergency services

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