Supplementary File

Appendix 1
Selected Delphi panel

	Name and title	Stakeholder Groups	
		Profession and area of expertise	Current Role and Emeritus roles relevant to the Delphi study
1	Lt Col Lynn Adam	Emergency Medicine Nurse British Army	Director Army Nursing Services, Marlborough Line, Andover, UK
2	Dr John Black	Emergency Medicine and Prehospital Care Doctor Military reservist	Consultant in Emergency Medicine at the John Radcliffe Hospital, Oxford, UK Medical Director, South Central Ambulance Service NHS Trust
3	Lt Col Doug Bowley	General Surgeon British Army	Consultant Surgeon, Heart of England NHS Foundation Trust, Birmingham, UK
4	Prof Karim Brohi	Trauma and Vascular Surgeon	Consultant Trauma and Vascular Surgeon Professor of Trauma Sciences, Barts and the London School of Medicine, UK
5	Lt Col Adam Brooks	General and Trauma Surgeon British Army, retired	Consultant Surgeon, Pathway Lead for Major Trauma and Clinical Lead for Emergency Surgery at Nottingham University Hospitals, UK
6	Prof David Cone	Emergency Medicine Doctor	Professor of Emergency Medicine Yale University School of Medicine, CT, USA Dispatch medical director for the New Haven Sponsor Hospital Program
7	Lt Col Peter Davis	Emergency Medicine and Prehospital Care Doctor British Army	Consultant in Emergency Medicine and Retrieval Medicine, Queen Elizabeth University Hospital Glasgow, UK
8	Dr Peter Driscol	Emergency Medicine Doctor	Academic Lead of the physician Associate programme at University of Central Lancashire Emeritus chair of the European Trauma Course educational subcommittee Emeritus Consultant in Emergency Medicine, Salford Royal Foundation Trust, UK
9	Surg Capt Geraint Evans	Emergency Medicine Doctor British Navy, retired	Emeritus Consultant Advisor Emergency Medicine Navy and Military Clinical Director Royal Centre for Defence Medicine
10	Dr Peter Goode	Emergency Medicine Doctor	Consultant in Emergency Medicine at Newcastle Upon Tyne NHS Foundation Trust, UK
11	Dr Carl Gwinnutt	Critical care and Anaesthesia Doctor	Emeritus Anaesthetic Consultant, Salford Royal NHS Foundation Trust President of the Resuscitation Council UK
12	Dr Timothy Hardcastle	Emergency Medicine Doctor	Deputy Director of the Trauma Service, Inkosi Albert Luthuli Central Hospital, Durban South Africa, nominal

			head of the Trauma Surgery Sub-speciality training program at University of KwaZulu-Nata, South Africa
13	Col Jeremy Henning	Critical Care and Anaesthesia Doctor	Consultant in Critical Care and Anaesthesia, James Cook University Hospital, Middlesbrough, UK Defence Senior Lecturer in Critical Care, Academic Department of Military Anaesthesia and Critical Care, Birmingham
14	Prof John Hess	Haematology Doctor	Professor of Laboratory Medicine and Hematology University of Washington, Seattle, WA, USA
15	Brigadier Timothy Hodgetts	Emergency Medicine Doctor British Army	Medical Director, Defence Medical Services, UK Professor of Emergency Medicine University of Birmingham UK
16	Ms Celia Kendrick	Emergency Medicine Nurse	Lead Nurse in A & E & Emergency Planning, Peterborough & Stamford Hospitals NHS Foundation Trust
17	Mr Yoram Kluger	General Surgeon	Director, Department of General Surgery, Rambam Medical Center, Haifa, Israel Clinical associate professor at the Faculty of Medicine of the Technion
18	Lt Col Simon Le Clerc	Emergency Medicine and Prehospital Care Doctor British Army	Medical Director, The Great North Air Ambulance Service EM Consultant 16 Med Regt and at James Cook University Hospital Middlesbrough, UK
19	Prof David Lockey	Critical care and Anaesthesia Doctor	Consultant in Intensive Care Medicine and Anaesthesia in Bristol, UK Honorary Professor of Clinical Sciences University of Bristol Clinical Director of Severn Major Trauma Network Consultant at London's Air Ambulance and lead for research and development
20	Prof Hans – Morton Lossius	Prehospital Care Doctor	Professor Director of Research, The Norwegian Air Ambulance Foundation and Department of Surgical Science, University of Bergen, Norway Co Editor in Chief, Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine
21	Col Peter Mahoney	Critical Care and Anaesthesia Doctor British Army	Emeritus Defence Professor of Anaesthesia and Critical Care, Defence Medical Services
22	Prof Michael Millin	Emergency Medicine Doctor	Johns Hopkins Hospital Faculty, Maryland, USA Associate Professor of Emergency Medicine National chair of the standards and clinical practice committee and the wilderness EMS committee with the National Association of EMS Physicians Medical director for the BWI airport fire and rescue department Medical director for Johns Hopkins critical care transport program
23	Dr Michael Murphy	Prehospital Care Doctor	Medical Director for Prehospital Care South Shore Hospital Chair, Metropolitan Boston EMS Trauma Committee

24	Dr Cathal O'Donnell	Emergency Medicine Doctor	Consultant in Emergency Medicine, Mid-Western Regional Hospital Limerick, Ireland Medical Director of the National Ambulance Service in Ireland
25	Dr Mike Parr	Critical care	Director of Intensive Care, Liverpool Hospital University of New South Wales, Australia Editor Resuscitation
26	Sir Keith Porter	Trauma Surgeon	Professor of Clinical Traumatology, University Hospitals Birmingham NHS Foundation Trust, the University of Birmingham and the Royal Centre for Defence Medicine, UK
27	Col Sam Rawlinson	Haematology British Army, retired	Emeritus Defence Consultant Advisor Haematology, Defence Medical Services, British Army.
28	Col Robert Russell	Emergency Medicine Doctor British Army	Consultant in Emergency Medicine, Queen Elizabeth Hospital, Birmingham UK Defence Consultant Advisor Emergency Medicine, Defence Medical Services, British Army
29	Gp Capt Martin Ruth	Critical care Royal Air Force	Consultant Critical Care, Defence Medical Group North, Linton-on-Ouse, UK
30	Surg Captain Jason Smith	Emergency Medicine Doctor British Navy	Consultant in Emergency Medicine, Derriford Hospital, Plymouth, UK Professor of Emergency Medicine, Academic Department of Military Emergency Medicine Professor or the Royal College of Emergency Medicine
31	Dr Simon Stanworth	Haematology	Consultant Haematologist, NHS Blood and Transplant and Oxford Radcliffe Hospitals NHS Trust, UK
32	Col Nigel Tai	Trauma and Vascular Surgeon British Army	Consultant In Trauma and Vascular Surgeon, The Royal London Hospital Honorary Senior Lecturer, Academic Department of Military Surgery and Trauma, Royal Centre for Defence Medicine
33	Dr Karl – Christian Thies	Critical care and Anaesthesia	Consultant in Anaesthesia and Prehospital Emergency Medicine, Birmingham children's hospital, UK Chair of the European Trauma Course
34	Prof Lee Wallis	Emergency Medicine Doctor	Professor and Head of division of Emergency Medicine, University of Cape Town, South Africa Head of Emergency Medicine for the Provincial Government Western Cape President of the African Federation for Emergency Medicine Editor of the African Journal of Emergency Medicine
35	Dr Andreas Ziegler	PHC Doctor	EMS Physician, Emergency Medical Service, City of Vienna CBRN Advisor Teaching Physician of Vienna EMS Academy

Appendix 2

Full results of all statements
Statements shaded blue reached positive consensus, statements shaded green reached negative consensus. The median and interquartile ranges are shown for the round 3 statement, unless consensus was reached in the second round. In this case they represent the second round results.

Statement number	Statement	% disagree round 2	% agree round 2	% disagree round 3	% agree round 3	Median	lower q	upper q
1	High energy transfer verses the patient is highly predictive of the need for massive transfusion.	35	58	15	**85**	5	5	6
2	Any period of entrapment is highly predictive for massive transfusion.	67	19	77	12	3	2.5	3.5
3	Prolonged entrapment > 45 minutes is highly predictive of the need for massive transfusion.	50	27	42	12	4	3	4
4	Motor vehicle collision (MVC) involving a pedestrian or cyclist versus a car (or bigger vehicle) is highly predictive of the need for massive transfusion.	46	46	23	35	4	4	5
5	Motorbike MVC not involving another vehicle is highly predictive of the need for massive transfusion.	50	42	31	31	4	3	5
6	High speed MCV (>70 miles per hour) is highly predictive of the need for massive transfusion	42	50	15	69	5	4	6
7	MVC in which the vehicle rolls over is highly predictive of the need for massive transfusion.	42	38	35	8	4	3	4
8	Death to another vehicle occupant in the same MVC is highly predictive of the need for massive transfusion.	31	54	27	65	5	3.5	5
9	Not wearing a seat belt during an MVC is highly predictive of the need for a massive transfusion.	38	50	27	62	5	3.5	5
10	Significant deformity to the vehicle I a MVC is highly predictive of the need for massive transfusion.	50	42	35	23	4	3	4.5
11	A fall of >3m in height is highly predictive of the need for massive transfusion.	38	50	23	54	5	4	5
12	A fall from above the first storey of a building is highly predictive of the need for massive transfusion.	23	65	23	73	5	4.5	5

13	A pressure plate improvised explosive device (IED) or other blast exposure is highly predictive of the need for massive transfusion.	14	77	9	**91**	6	5	6
14	An IED on a foot patrol is highly predictive of the need for massive transfusion.	19	71	9	**86**	6	5.5	6
15	An IED on vehicles with unrestrained occupants blown clear is highly predictive of the need for massive transfusion.	29	62	9	**82**	6	5.5	6
16	A high velocity (machine gun) gunshot wound (GSW) to the trunk is highly predictive of the need for massive transfusion	17	71	8	75	6	6	7
17	A low velocity (pistol) gunshot wound (GSW) to the trunk is highly predictive of the need for massive transfusion	38	38	23	27	4	4	5
18	A GSW to a proximal limb is highly predictive on the need for massive blood transfusion.	46	23	35	17	4	3	4
19	Significant injury from blast is much more predictive than blunt or penetrating trauma in predicting the need for massive transfusion.	28	56	8	71	5	4	6
20	Extent of coverage of body armour affects the likelihood of requiring a massive transfusion in blast injury. Those with less coverage are more likely to need a massive transfusion.	14	52	5	73	5	4.5	6
21	Mechanism without evidence of injury or altered physiology on arrival in the Emergency Department (ED) is a poor indicator of severe injury or need for massive transfusion.	16	76	0	**88**	6	5	6.5
22	Severe injury to more than one body region is highly predictive of the need for massive transfusion.	12	**81**			5	5	6
23	Injury to more than one body cavity is highly predictive of the need for massive transfusion.	11	**85**			5	5	6
24	Presence of active non-compressible haemorrhage **without** signs of shock is highly predictive of the need for massive transfusion.	12	77	0	**88**	5	5	6
25	Presence of active non-compressible haemorrhage **with** signs of shock is highly predictive of the need for massive transfusion.	4	**85**			6	6	7
26	Bilateral chest injury is highly predictive of the need for massive transfusion.	30	63	23	73	5	4.5	6
27	Single Gun Shot Wound (GSW) to trunk/torso is highly predictive of the need for massive transfusion.	27	54	21	67	5	4	5
28	Cross-torso GSW is highly predictive of the need for massive transfusion.	20	64	13	75	6	6	6
29	Multiple gunshots to Trunk/torso are highly predictive of the need for massive	4	**88**			6	5	6.5

	transfusion.							
30	GSW into neck/groin/axilla is highly predictive of the need for massive transfusion.	12	76	4	**88**	6	6	6
31	Single stab wounds are highly predictive of the need for massive transfusion.	56	30	73	8	3	2	4
32	Multiple stab wounds are highly predictive of the need for massive transfusion.	33	48	27	35	4	3.5	5
33	Major crush injury to the torso is highly predictive of the need for massive transfusion.	19	74	12	**85**	5	5	6
34	Major crush injury to the proximal limbs is highly predictive of the need for massive transfusion.	31	50	20	64	5	4	5
35	Major blunt trauma chest/abdo/pelvis and proximal long bone is highly predictive of the need for massive transfusion.	19	78	8	**85**	6	5	6.5
36	Major blunt trauma to the upper abdomen (liver/spleen region) is highly predictive of the need for massive transfusion.	15	73	8	**85**	5	5	5.5
37	Massive abdominal contusion from blunt trauma is highly predictive of the need for massive transfusion.	19	65	8	**81**	5	5	5
38	A distending abdomen is highly predictive of the need for massive transfusion.	12	62	12	69	5	4	6
39	Abdominal tenderness is highly predictive of the need for massive transfusion.	59	22	**81**	4	3	2	3
40	Abdominal guarding is highly predictive of the need for massive transfusion.	63	11	**81**	4	3	2	3
41	Single below Knee/Elbow limb amputation is highly predictive of the need for massive transfusion.	65	19	76	8	3	2	4
42	Single amputation of an extremity proximal to the elbow or knee is highly predictive of the need for massive transfusion.	54	23	60	20	3	3	4
43	Bilateral below knee amputation is highly predictive of the need for massive transfusion.	24	52	12	72	5	4	5
44	Bilateral above knee amputation is highly predictive of the need for massive transfusion.	11	**81**			6	5	7
45	Multiple amputation (3 or 4 limbs) is highly predictive of the need for massive transfusion.	7	**89**			6	5	7
46	Bilateral femur fracture is highly predictive of the need for massive transfusion.	22	59	15	77	5	5	5
47	Pelvic involvement with lower limb amputations is highly predictive of the need for massive transfusion.	7	**89**			7	5	7

48	Multiple limb deformities are highly predictive of the need for massive transfusion.	26	70	19	73	5	4.5	5
49	Multiple open fractures in blast injuries are highly predictive of the need for massive transfusion.	11	78	0	**92**	6	6	6
50	Clinical pelvic instability is highly predictive of the need for massive transfusion.	19	74	8	**88**	6	5	6
51	Obvious open pelvic injury is highly predictive of the need for massive transfusion.	15	**81**			6	5	7
52	Severe perineal injury is highly predictive of the need for massive transfusion.	12	76	8	**92**	6	5	6
53	Open maxillofacial injury is highly predictive of the need for massive transfusion.	41	37	32	24	4	3	5
54	Obvious major vascular injury is highly predictive of the need for massive transfusion.	11	78	4	**84**	6	5	6
55	A pulse **greater than 120/min** is predictive of the need for massive transfusion.	52	33	65	19	3	3	4
56	A pulse **greater than 130/min** is predictive of the need for massive transfusion.	48	41	31	19	4	3	4
57	Bradycardia is highly predictive of the need for massive transfusion.	44	41	28	36	4	3	5
58	A weak or thready **radial pulse** is highly predictive of the need for massive transfusion.	44	44	27	31	4	3.5	5
59	A weak or thready **femoral pulse** is highly predictive of the need for massive transfusion.	30	59	19	65	5	4	6
60	A weak or thready **central pulse** is highly predictive of the need for massive transfusion.	19	74	15	73	5.5	4.5	6
61	Prolonged capillary refill time is highly predictive of the need for massive transfusion	59	30	65	15	3	3	4
62	Absence of radial pulse is highly predictive of the need for massive transfusion.	33	56	31	62	5	3	5
63	Absence of radial and femoral pulses is highly predictive of the need for massive transfusion.	22	70	15	**85**	5	5	6
64	Poor peripheral venous filling is highly predictive of the need for massive transfusion	26	48	28	24	4	3	5
65	Increasing respiratory distress is highly predictive of the need for massive transfusion.	44	44	42	27	4	3	5
66	Respiratory rate (RR) **greater than 30/min** is highly predictive of the need for massive transfusion.	52	37	65	15	3	3	4
67	RR **greater than 40/min** is highly predictive of the need for massive	41	48	31	19	4	3	4

	transfusion.							
68	SBP **less than 100 mmHg** is highly predictive of the need for massive transfusion.	41	37	33	30	4	3	5
69	SBP **less than 90 mmHg** is highly predictive of the need for massive transfusion.	26	63	30	56	5	3	5
70	SBP **less than 80 mmHg** is highly predictive of the need for massive transfusion.	22	74	19	78	5	5	6
71	A normal BP in a young adult with identified haemorrhage risk doesn't exclude massive blood loss.	15	**85**			5.5	5	7
72	Trends in Pulse Rate, BP, RR, and GCS are more predictive than a single measurement in predicting the need for massive transfusion.	7	**89**			7	6	7
73	Tachycardia and hypotension on presentation to EMS is highly predictive of the need for massive transfusion.	11	78	8	**88**	6	5	6
74	Hypotension not responsive to small-volume fluid resuscitation is highly predictive of the need for massive transfusion.	15	**81**			5	5	6
75	Hypotension after exclusion of tension pneumothorax or tamponade is highly predictive of the need for massive transfusion.	7	**85**			5	4	5
76	Normal BP in a known hypertensive patient is highly predictive of the need for massive transfusion.	22	56	27	54	5	3.5	5
77	A clinically hypoperfused casualty with an appropriate mechanism of injury is highly predictive of the need for massive transfusion.	15	78	4	**88**	5	5	5.5
78	Hypotension and signs of trauma consistent with massive blood loss (e.g. massive haemathorax) is highly predictive of the need for massive transfusion.	7	**93**			6	6	7
79	A high BP and slow pulse is highly predictive of the need for massive transfusion.	**81**	11			3	2	3
80	A cool torso is highly predictive of the need for massive transfusion.	67	26	65	12	3	3	4
81	A Core temp less than 35'C is highly predictive of the need for massive transfusion.	46	35	36	16	4	3	4
82	Confusion is highly predictive of the need for massive transfusion.	59	22	**81**	7	3	3	3
83	A GCS of **13 or 14** without obvious head injury is highly predictive of the need for massive transfusion.	63	30	74	11	3	3	4
84	A GCS of **less than 13** without obvious head injury is highly predictive of the need for massive transfusion.	41	33	44	19	4	3	4

85	Immediate loss of consciousness is highly predictive of the need for massive transfusion	67	19	**85**	4	2	2	3
86	If the initial physiology reported by EMS is abnormal, this is highly predictive of the need for massive transfusion	59	19	69	15	3	2	4
87	Suspected haemothorax is highly predictive of the need for massive transfusion	70	26	70	7	3	3	4
88	Revised Trauma Score (GCS+syst BP+RR) can be used as a predictor of the need for massive transfusion.	42	46	42	17	4	3	4
89	ATLS **grade 3** shock is highly predictive of the need for massive transfusion.	35	50	19	62	5	4	5
90	ATLS **grade 4** shock is highly predictive of the need for massive transfusion.	15	77	12	**85**	6	5	6
91	Appearing pale is highly predictive of the need for massive transfusion.	62	27	**89**	7	3	3	3
92	Appearing mottled is highly predictive of the need for massive transfusion.	59	30	70	15	3	3	4
93	Sweating is highly predictive of the need for massive transfusion.	63	30	78	11	3	2	3
94	Having very white feet, or feet pale for the natural skin tone of the patient in people without white skin, is highly predictive of the need for massive transfusion.	59	22	78	11	3	3	3
95	Being extremely thirsty is highly predictive of the need for massive transfusion.	59	26	78	22	3	3	3
96	Appearing peripherally cyanosed is highly predictive of the need for massive transfusion.	56	19	78	7	3	3	3
97	Being moribund/peri-arrest on arrival is highly predictive of the need for massive transfusion	30	59	7	**85**	6	5	6
98	PEA (post trauma) on arrival or in ED is highly predictive of the need for massive transfusion	33	59	8	**88**	6	6	6
99	Cardiac arrest with ROSC is highly predictive of the need for massive transfusion	30	67	12	**85**	5	5	6
100	A patient who looks well perfused is unlikely to need a massive blood transfusion.	19	74	7	**85**	5	5	6
101	An estimate of the duration of uncontrolled bleeding is useful in predicting the need for massive transfusion.	38	50	19	69	5	4	5
102	An estimate of external blood loss at scene or in transit is useful in predicting the need for massive transfusion	41	44	37	33	4	3	5
103	Hypotension on scene with extensive visible blood loss is highly predictive of the need for massive transfusion	11	78	4	**81**	5	5	6
104	Giving Pre-hospital fluids is highly predictive of the need for massive transfusion	63	22	**81**	7	3	3	3

105	If multiple limb tourniquets have been needed in the prehospital enviroment, massive transfusion is much more likely.	30	63	12	**81**	5	5	6
106	If topical haemostatics have been needed prehospital, massive transfusion is highly predictive of the need for massive transfusion	42	54	17	67	5	4	5
107	If a Pelvic splint has been applied prehospital, this is highly predictive of the need for massive transfusion	59	26	69	12	3	3	4
108	If a Limb splint has been applied prehospital, this is highly predictive of the need for massive transfusion	67	11	**89**	0	3	2	3
109	Prolonged time from wounding to medical intervention is highly predictive of the need for massive transfusion	50	38	38	15	4	3	4
110	Prolonged time at scene is highly predictive of the need for massive transfusion	63	19	73	12	3	3	4
111	Clinical deterioration during transfer to hospital is highly predictive of the need for massive transfusion	22	70	15	73	5	4.5	5
112	If a patient is still stable on arrival following a long pre hospital time, they are unlikely to require massive transfusion.	11	74	0	**92**	5	5	6
113	History of CPR at any time is highly predictive of the need for massive transfusion	30	56	15	73	5	4.5	6
114	The presence of on-going visible blood loss (e.g. frank loss or via invasive tubes) is highly predictive of the need for massive transfusion	7	**89**			6	5	7
115	If the patient required intubation at scene/in-transit, this is highly predictive of the need for massive transfusion	63	30	77	12	3	3	3.5
116	If the patient requires immediate intubation upon arrival at hospital, this is highly predictive of the need for massive transfusion	67	22	**85**	12	3	3	3
117	Transient response to IV fluids in the shocked patient is highly predictive of the need for massive transfusion	26	67	15	73	5	4.5	6
118	If there is no response to fluid boluses in the shocked patient then massive transfusion is much more likely.	11	**89**			6	5	7
119	Lack of response to IV fluids (e.g. still very hypotensive after two litres of crystalloid) are appropriate criteria to start massive transfusion	22	78	4	**88**	6	5.5	6
120	No response to initial volume therapy despite appropriate haemorrhage control makes massive transfusion much more likely	11	**85**			6	5	7
121	Failure to raise SBP to greater than 100 mmHg with initial 2 units of blood makes massive transfusion much more likely	11	78	0	**92**	5	5	6

122	Continuing problems with maintaining BP throughout damage control surgery and resuscitation make massive transfusion much more likely	4	**96**			6.5	5.5	7
123	If spinal injury is clinically excluded (i.e. moves all limbs) and the patient is unstable cardiovascularly then massive transfusion is much more likely	8	**88**			6	5	6
124	In isolation no tests are predictive of massive blood transfusion.	18	79	4	**93**	6	6	7
125	Thrombocytopaenia on first FBC this is highly predictive of the need for massive transfusion	20	64	4	**80**	5	5	5
126	Acute anaemia on arrival with minimal fluid resuscitation is highly predictive of the need for massive transfusion	19	70	4	**88**	5	5	5.5
127	Low haemocrit on arrival is highly predictive of the need for massive transfusion	29	68	11	**85**	5	5	5
128	Low platelets on arrival is highly predictive of the need for massive transfusion	31	54	8	73	5	4.5	5
129	Haemoglobin less than 11g/dl on arrival is highly predictive of the need for massive transfusion	46	39	31	15	4	3	4
130	Acidosis on ABG less than 7.2 is highly predictive of the need for massive transfusion	26	63	8	73	5	4.5	5
131	Metabolic acidosis of with a **Base Excess (BE) of -4 or worse** is highly predictive of the need for massive transfusion	27	65	8	77	5	5	5
132	Metabolic acidosis of with a **BE -5.0 or worse** is highly predictive of the need for massive transfusion	27	73	8	**85**	5	5	5
133	Metabolic acidosis of with a **BE -6.0 or worse** is this is highly predictive of the need for massive transfusion	23	77	8	**88**	6	5	6
134	Metabolic acidosis of with a **BE -8 or worse** is highly predictive of the need for massive transfusion	19	**81**			6	5	7
135	Lactate greater than **4mmol/l** is highly predictive of the need for massive transfusion	23	62	8	77	5	5	5
136	Lactate greater than **5mmol/l** is highly predictive of the need for massive transfusion	19	62	8	**81**	5	5	5.5
137	Significant and increasing lactic acidosis is highly predictive of the need for massive transfusion.	12	**81**			6	5	7
138	If the patient has a coagulopathy on any tests this is highly predictive of the need for massive transfusion.	4	**86**			6	5	6
139	Prothrombin Time (PT) greater than 15 seconds is highly predictive of the need for massive transfusion.	15	54	8	65	5	4	5
140	Internationalised Normalised Ratio (INR) greater than 1.5 is highly predictive of the need for massive transfusion.	19	58	8	69	5	4	5

141	Abnormal clotting on ROTEM/ TEG is highly predictive of the need for massive transfusion.	13	78	4	**91**	6	6	6
142	The presence of an under filled pressure curve on the arterial line tracing is highly predictive of the need for massive transfusion.	10	71	10	**81**	5	5	6
143	Low CVP is highly predictive of the need for massive transfusion.	35	46	24	24	4	4	5
144	Haemothorax on CXR is highly predictive of the need for massive transfusion.	37	44	27	23	4	3.5	4.5
145	Massive haemothorax on CXR is highly predictive of the need for massive transfusion	11	78	4	**81**	6	5	6
146	A positive FAST scan with normal vital signs is highly predictive of the need for massive transfusion.	44	26	27	19	4	3.5	4
147	A positive FAST and abnormal vital signs is highly predictive of the need for massive transfusion	11	78	8	**81**	5	5	5.5
148	Two or more injuries with the potential to bleed significantly found on initial imaging (e.g. large haemothorax and positive FAST) is highly predictive of the need for massive transfusion	0	**81**			6	5	6
149	The presence of a pelvic fracture confirmed on X-ray is highly predictive of the need for massive transfusion	30	33	23	19	4	4	4
150	The presence of a vertical shear fracture on pelvic X-ray is highly predictive of the need for massive transfusion	16	76	8	**83**	5	5	6
151	The presence of an unstable pelvic ring fracture (Tile type B or C) is highly predictive of the need for massive transfusion	12	**84**			6	5	6
152	CT findings of contrast blush suggesting ongoing arterial haemorrhage, or significant intra-thoracic or intra-abdominal haemorrhage is highly predictive of the need for massive transfusion	8	**85**			6	5	6.5
153	CT findings of retroperitoneal haemorrhage is highly predictive of the need for massive transfusion	19	74	12	**81**	5	5	5.5
154	CT confirming major pelvic injury is highly predictive of the need for massive transfusion	11	**81**			6	5	6
155	Angiographic evidence of major vascular injury is highly predictive of the need for massive transfusion	0	**81**			6	5	6
156	The presence of large amounts of blood on initial placement of a tube thoracostomy (typically greater than 500mL) or large amount of continuous output from tube thoracostomy is highly predictive of the need for massive transfusion	11	78	4	**96**	6	5.5	6

157	These patients are often so unwell that there is little in the way of investigations can be done as they need resuscitative surgery immediately.	35	58	19	65	5	4	6
158	Patients on anticoagulant therapy are much more likely to need massive transfusion.	4	**85**			6	5	6
159	Patients with cirrhosis are much more likely to need massive transfusion.	7	**85**			5	5	6
160	Patients with any pre-existing coagulopathy – e.g. haemophilia, liver disease are much more likely to need massive transfusion.	7	**93**			6	5	6
161	Patients with anaemia are much more likely to need massive transfusion.	30	44	19	23	4	4	4.5
162	Patients with thrombocytopaenia are much more likely to need massive transfusion	23	62	8	79	5	5	5
163	Patients on antiplatelet agents (eg clopidogrel, aspirin) are much more likely to need massive transfusion.	22	59	11	70	5	4	5
164	Patients over 55 are much more likely to need massive transfusion.	41	26	26	11	4	4	4
165	Patients over 75 are much more likely to need massive transfusion	35	42	26	22	4	4	4
166	Patients with prior cardiovascular disease are much more likely to need massive transfusion.	56	11	77	0	3	3	3.5
167	Patients with diabetes mellitus are much more likely to need massive transfusion.	62	12	**84**	4	3	2	3
168	Patients on medications that may mask hemodynamic response (eg Beta Blocker) are much more likely to need massive transfusion.	56	19	73	0	3	3	4
169	Chemotherapy patients and patients with haematological malignancies are much more likely to need massive transfusion.	45	23	26	17	4	4	4
170	If Massive Blood Transfusion is clinically indicated, commencement of a massive transfusion policy must not be delayed pending results of investigations.	7	**89**			7	6	7
171	There are no individual predictors of massive blood transfusion; a composite picture is required taking multiple factors into account	0	**96**			7	6	7
172	General trend and course of patient from time zero (injury) is the best predictor of the need for massive transfusion.	7	**93**			6	6	7
173	Massive blood loss can be contributed to by clinicians through inappropriate use of large volumes of crystalloid in massive blood loss, leading to increased blood loss due to coagulopathy.	0	**96**			6.5	6	7

174	Massive blood loss can be contributed to by clinicians through failure to prevent iatrogenic hypothermia	0	**96**			6	6	7
175	The ABC score is currently the best predictive tool in massive blood transfusion.	0	42	7	13	4	4	4
176	The experienced practitioner is able to easily judge clinically who needs a massive transfusion without the need of a guideline.	44	48	37	30	4	3	5
177	For junior practitioners, or for any grade practicing where major trauma cases requiring massive transfusion are seen infrequently, a decision rule would be helpful.	4	**93**			6	5	7
178	There is invariably a delay in initiating the massive transfusion protocol if the decision is being made by non consultant grades/inexperienced personnel.	22	78	12	73	6	4.5	6
179	Decision rules are helpful in that they force early confrontation of the form of resuscitation and the pattern of monitoring.	4	**93**			6	5	7
180	A decision rule would be useful as it would lead to earlier activation of a Massive Transfusion protocol and therefore improved product availability.	4	**89**			6	5	7
181	There is a danger, if a massive blood transfusion protocol is not instituted early, that inappropriately low volumes of FFP and platelets are given as it is not recognised that they are needed until large volumes of PRBC have been given.	4	**96**			6	5	7
182	A decision rule to rule out the likely need for massive transfusion would be useful as this may prevent over use of blood products.	7	**86**			6	5	6
183	Massive transfusion is a dynamic process relying on continuing operator recognition of the response of the patient to ongoing interventions (transfusion, surgical etc) so a rule is unhelpful	50	38	23	31	4	4	5
184	A decision rule would be a useful risk reduction tool.	4	**93**			6	5	6
185	Guidelines are preferable to rules in this situation– rules may be followed slavishly and cause delay when consulted if not known by heart. Guidance is less proscriptive.	14	71	7	**93**	5	5	6
186	Guidance would be helpful on when to start pre-hospital blood transfusion where available.	0	**96**			6	5	7
187	A decision rule which gives a course of action (i.e. start massive transfusion protocol) rather than a percentage risk of the need of massive transfusion would be more useful.	7	**85**			6	5	6

188	To be appropriately specific, the point at which massive transfusion is ruled in would need to have a **50%** chance of requiring a massive transfusion.	62	15	**81**	8	3	3	3
189	To be appropriately specific, the point at which massive transfusion is ruled in would need to have a **60%** chance of requiring a massive transfusion.	56	24	**85**	4	3	3	3
190	To be appropriately specific, the point at which massive transfusion is ruled in would need to have a **70%** chance of requiring a massive transfusion	44	40	42	15	4	3	4
191	To be appropriately specific, the point at which massive transfusion is ruled in would need to have an **80%** chance of requiring a massive transfusion	25	58	15	62	5	4	5
192	Activation of a massive transfusion protocol would almost certainly mean giving higher than standard ratios of blood products. Because of this, no more than **20%** of patients should receive this unnecessarily.	17	61	15	73	5	4.5	5
193	Activation of a massive transfusion protocol would almost certainly mean giving higher than standard ratios of blood products. Because of this, no more than **30%** of patients should receive this unnecessarily.	39	35	27	19	4	3.5	4
194	Activation of a massive transfusion protocol would almost certainly mean giving higher than standard ratios of blood products. Because of this, no more than 40% of patients should receive this unnecessarily.	52	30	77	4	3	3	3.5
195	Activation of a massive transfusion protocol would almost certainly mean giving higher than standard ratios of blood products. Because of this, no more than **50%** of patients should receive this unnecessarily.	52	26	77	4	3	3	3.5

Abbreviations: MBT, massive blood transfusion ; ATLS, Advanced Trauma Life Support; PEA, pulseless electrical activity; ROSC, return of spontaneous circulation; IV, intravenous; BP, blood pressure; FBC, Full Blood Count; BE, Base Excess; FAST, Focused Assessment with Sonography in Trauma; CT, computed tomography; ROTEM, rotational thromboelastometry; TEG, thromboelastography.