

Appendix

This appendix was part of the submitted manuscript and has been peer reviewed. It is posted as supplied by the authors.

Supplementary material

List of investigators

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Nambour Hospital	Richard Moore	Westmead Hospital	Christina Whitehead

Final attributes and levels

Attribute	Attribute level
Patient type	Sepsis category A ¹
	Sepsis category B ¹
	TBI category A ²
	TBI category B ²
Cost to hospital for fluid challenge	\$0
	\$10
	\$20
	\$30
	\$40
Fluid type	Normal saline
	Buffered salt solution
	Synthetic Colloid
	Blood derived product
Haemodynamic resolution time	20 minutes
	40 minutes
	60 minutes
	80 minutes
Type of evidence	Observational
	Randomised Controlled Trial
Safety concerns	No safety concerns
	Acute kidney injury
	Coagulopathy
	Metabolic Acid-base disorder
	Tissue oedema
Demonstrated mortality benefit	No
	Yes
Volume required	200mL
	500mL
	700mL
	1000mL

1. Category A had a lower severity of illness compared to category B that was haemodynamically less stable characterised by increasing inotrope/vasopressor requirements (see Table 1)
2. Category A had a lower severity of illness compared to category B that had increasing intracranial pressure (see Table 1)

Experimental design

	BLOCK 1		BLOCK 2		BLOCK 3		BLOCK 4	
	BLOCK 1 Question 1 (Scenario 5)		BLOCK 2 Question 1 (Scenario 1)		BLOCK 3 Question 1 (Scenario 4)		BLOCK 4 Question 1 (Scenario 6)	
	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
Type of patient	Post-op sepsis – category A		Post-op sepsis – category B		Post-op sepsis – category A		Trauma with TBI – category A	
Fluid type	Normal Saline	Synthetic Colloid	Normal Saline	Synthetic Colloid	Blood derived product	Normal Saline	Blood derived product	Normal Saline
Haemodynamic resolution time	40 minutes	40 minutes	20 minutes	80 minutes	20 minutes	80 minutes	40 minutes	20 minutes
Type of evidence	RCT	Observational	Observational	RCT	Observational	Observational	Observational	RCT
Safety concerns	Yes - Increased risk of coagulopathy	Yes - Increased risk of acute renal replacement therapy	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic acidosis/alkalosis)	No safety concerns	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic acidosis/alkalosis)	No safety concerns	No safety concerns	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)
Demonstrated Mortality benefit	No	No	Yes	No	No	No	No	Yes
Volume required	700mL	700mL	200mL	200mL	500mL	500mL	700mL	200mL
Cost to hospital for fluid challenge	\$40	\$10	\$40	\$0	\$0	\$40	\$10	\$0
For this patient, which fluid would you choose?	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
	BLOCK 1 Question 2 (Scenario 10)		BLOCK 2 Question 2 (Scenario 2)		BLOCK 3 Question 2 (Scenario 13)		BLOCK 4 Question 2 (Scenario 7)	
	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
Type of patient	Post-op sepsis – category A		Trauma with TBI – category A		Post-op sepsis – category B		Post-op sepsis – category B	
Fluid type	Buffered salt solution	Normal Saline	Synthetic Colloid	Buffered salt solution	Buffered salt solution	Synthetic Colloid	Blood derived product	Buffered salt solution
Haemodynamic resolution time	80 minutes	40 minutes	60 minutes	20 minutes	20 minutes	80 minutes	60 minutes	20 minutes
Type of evidence	Observational	Observational	RCT	RCT	Observational	RCT	RCT	Observational
Safety concerns	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic acidosis/alkalosis)	Yes - Increased risk of acute renal replacement therapy	Yes - Increased risk of acute renal replacement therapy	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)	Yes - Increased risk of acute renal replacement therapy	Yes - Increased risk of acute renal replacement therapy	Yes - Increased risk of coagulopathy
Demonstrated Mortality benefit	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Volume required	500mL	700mL	1000mL	200mL	500mL	1000mL	1000mL	500mL
Cost to hospital for fluid challenge	\$10	\$10	\$20	\$40	\$40	\$10	\$20	\$40
For this patient, which fluid would you choose?	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
	BLOCK 1 Question 3 (Scenario 11)		BLOCK 2 Question 3 (Scenario 3)		BLOCK 3 Question 3 (Scenario 15)		BLOCK 4 Question 3 (Scenario 8)	
	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
Type of patient	Trauma with TBI – category B		Post-op sepsis – category A		Post-op sepsis – category A		Trauma with TBI – category A	
Fluid type	Synthetic Colloid	Synthetic Colloid	Blood derived product	Buffered salt solution	Synthetic Colloid	Normal Saline	Buffered salt solution	Blood derived product

Haemodynamic resolution time	40 minutes	60 minutes	60 minutes	20 minutes	20 minutes	80 minutes	80 minutes	60 minutes
Type of evidence	Observational	RCT	Observational	RCT	Observational	Observational	Observational	RCT
Safety concerns	Yes - Increased risk of coagulopathy	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)	Yes - Increased risk of coagulopathy	No safety concerns	Yes - Increased risk of acute renal replacement therapy	Yes - Increased risk of coagulopathy	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic acidosis/alkalosis)
Demonstrated Mortality benefit	No	Yes	No	No	Yes	No	Yes	Yes
Volume required	200mL	1000mL	700mL	500mL	200mL	200mL	500mL	700mL
Cost to hospital for fluid challenge	\$0	\$20	\$10	\$0	\$40	\$0	\$0	\$20
For this patient, which fluid would you choose?	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
	BLOCK 1 Question 4 (Scenario 12)		BLOCK 2 Question 4 (Scenario 18)		BLOCK 3 Question 4 (Scenario 17)		BLOCK 4 Question 4 (Scenario 9)	
Type of patient	Fluid A Trauma with TBI – category B	Fluid B Blood derived product	Fluid A Trauma with TBI – category A	Fluid B Buffered salt solution	Fluid A Trauma with TBI – category B	Fluid B Buffered salt solution	Fluid A Synthetic Colloid	Fluid B Blood derived product
Fluid type	Normal Saline		Normal Saline			Normal Saline		
Haemodynamic resolution time	60 minutes	60 minutes	40 minutes	40 minutes	80 minutes	20 minutes	80 minutes	60 minutes
Type of evidence	RCT	RCT	RCT	Observational	RCT	Observational	RCT	RCT
Safety concerns	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)	Yes - Increased risk of coagulopathy	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic acidosis/alkalosis)	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic acidosis/alkalosis)	No safety concerns	Yes - Increased risk of acute renal replacement therapy	Yes- Increased risk of tissue oedema (e.g. pulmonary, cerebral, or skin)
Demonstrated Mortality benefit	Yes	Yes	No	No	No	No	Yes	Yes
Volume required	1000mL	1000mL	700mL	700mL	200mL	500mL	1000mL	1000mL
Cost to hospital for fluid challenge	\$20	\$40	\$10	\$10	\$40	\$0	\$20	\$20
For this patient, which fluid would you choose?	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B
	BLOCK 1 Question 5 (Scenario 16)		BLOCK 2 Question 5 (Scenario 19)		BLOCK 3 Question 5 (Scenario 20)		BLOCK 4 Question 5 (Scenario 14)	
Type of patient	Fluid A Trauma with TBI – category B	Fluid B Buffered salt solution	Fluid A Trauma with TBI – category A	Fluid B Blood derived product	Fluid A Post-op sepsis – category B	Fluid B Synthetic Colloid	Fluid A Normal Saline	Fluid B Blood derived product
Fluid type	Synthetic Colloid		Buffered salt solution		Blood derived product			
Haemodynamic resolution time	80 minutes	40 minutes	20 minutes	80 minutes	40 minutes	60 minutes	60 minutes	40 minutes
Type of evidence	RCT	Observational	Observational	Observational	RCT	RCT	RCT	Observational
Safety concerns	Yes - Increased risk of acute renal replacement therapy	No safety concerns	No safety concerns	Yes - Increased risk of coagulopathy	No safety concerns	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic	Yes - increased risk of metabolic acid-base disorder (e.g. Metabolic	Yes - Increased risk of coagulopathy

							acidosis/alkalosis)	
Demonstrated Mortality benefit	Yes	Yes	No	No	Yes	Yes	No	No
Volume required	1000mL	500mL	500mL	200mL	200mL	1000mL	700mL	700mL
Cost to hospital for fluid challenge	\$20	\$10	\$0	\$40	\$0	\$20	\$10	\$20
For this patient, which fluid would you choose?	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B	Fluid A	Fluid B

Final model

The final model was a mixed (random parameters) logit model as described below.

$$U(A / B) = \sigma + \beta_1 \text{fluid type} + \beta_2 \text{time to haemodynamic resolution} + \beta_3 \text{level of evidence} + \beta_4 \text{safety} + \beta_5 \text{mortality} + \beta_6 \text{cost} + \beta_7 \text{patient} + \varepsilon$$

$$U(\text{no treatment}) = 0.$$

Where β_{1-7} represents the parameter estimates of the respective attributes and denotes the relative contribution to treatment choice when statistically significant ($P < 0.05$). σ is the alternative specific constant and captures the preference of fluid over no fluid, and ε denotes the random error term associated with each choice set and accounts for the unobserved preference variation. A higher utility indicates preference for fluid. With the exception of cost, haemodynamic resolution time, and fluid volume, all attributes were effects coded and interpreted relative to the base category

Reference categories for variables in final model

Attribute	Attribute level
Patient	Sepsis, category A (reference)
	Sepsis, category B
	TBI, category A
	TBI, category B
Cost to hospital for fluid challenge	<i>Analysed as continuous variable</i>
Fluid type	Normal saline (reference)
	Buffered salt solution
	Synthetic Colloid
	Blood derived product
	Randomised Controlled Trial
Haemodynamic resolution time	<i>Analysed as continuous variable</i>
Level of evidence	Observational (reference)
	RCT
Safety concerns	No safety concerns (reference)
	Acute renal injury
	Coagulopathy
	Metabolic Acid-base disorder
	Tissue oedema
Demonstrated mortality benefit	No (reference)
	Yes
Volume required	<i>Analysed as continuous variable</i>
Hospital type	Tertiary (reference)
	Metro
	Regional/rural
Professional experience	0-5 years (reference)
	6-14 years
	15 years plus

Doctors unadjusted results
Table S1. Unadjusted results for doctors only model

Attribute	Attribute level	OR	OR 95%CI lower	OR 95%CI Upper	P
Alternative specific constant (reference, no fluid)		1.33	0.84	2.12	0.2220
Cost*	<i>per \$1 increase</i>	0.99	0.99	0.99	0.0002
Patient (sepsis, category A reference)					
	Sepsis, Cat. B	1.86	1.39	2.47	<0.0001
	TBI, Cat. A	1.09	1.76	0.81	0.5664
	TBI, Cat. B	0.56	0.42	0.75	0.0001
Fluid type (reference, Normal saline)					
	Buffered salt solution	2.32	1.87	2.87	<0.0001
	Synthetic Colloid	0.38	0.30	0.48	<0.0001
	Blood derived product	0.71	0.59	0.85	0.0002
Haemodynamic resolution time	<i>per minute increase</i>	0.99	0.98	0.99	0.0001
Level of evidence (observational, reference)					
	Randomised Controlled Trial	1.34	1.19	1.50	<0.0001
Safety concerns (No safety concerns, reference)					
	Acute renal injury	1.28	0.84	1.95	0.2466
	Coagulopathy	1.10	0.81	1.50	0.5330
	Metabolic Acid-base disorder	0.13	0.04	0.38	0.0002
	Tissue oedema	1.61	1.13	2.30	0.0087
Mortality benefit (no, reference)		1.23	1.07	1.41	0.0031
Volume	<i>per mL increase</i>	1.00	1.00	1.00	0.0537

Nurses unadjusted results
Table S2. Unadjusted results for nurses only model

Attribute	Attribute level	OR	OR 95%CI lower	OR 95%CI Upper	P
Alternative specific constant (reference, no fluid)		4.25	2.37	7.61	<0.0001
Cost	per \$1 increase	1.00	0.99	1.00	0.5289
Patient (sepsis, category A reference)					
	Sepsis, Cat.B	2.52	1.41	1.41	0.0017
	TBI, Cat. A	0.60	0.38	0.95	0.0290
	TBI, Cat. B	0.45	0.29	0.71	0.0005
Fluid type (reference, Normal saline)					
	Buffered salt solution	0.93	0.76	1.13	0.4779
	Synthetic Colloid	0.79	0.64	0.98	0.0347
	Blood derived product	0.70	0.58	0.83	0.0001
Haemodynamic resolution time	per minute increase	1.00	0.99	1.00	0.5737
Level of evidence (observational, reference)					
	Randomised Controlled Trial	1.06	0.95	1.18	0.3250
Safety concerns (No safety concerns, reference)					
	Acute renal injury	1.57	1.02	2.43	0.0409
	Coagulopathy	1.01	0.72	1.40	0.9688
	Metabolic Acid-base disorder	0.46	0.15	1.46	0.1878
	Tissue oedema	0.70	0.49	1.01	0.0588
Mortality benefit (no, reference)		0.97	0.84	1.12	0.6821
Volume	per mL increase	1.00	1.00	1.00	0.1186

Full cohort results
Table S3. Unadjusted results for the full cohort

Attribute	attribute level	OR	OR 95%CI lower	OR 95%CI Upper	P
Alternative specific constant (reference, no fluid)		1.94	1.42	2.66	<0.0001
Cost	per \$1 increase	0.99	0.99	1.00	0.0018
Patient (sepsis, category A reference)					
	Sepsis, Cat. B	1.66	1.33	2.07	<0.0001
	TBI, Cat. A	1.02	0.83	1.26	0.8312
	TBI, Cat. B	0.65	0.53	0.79	<0.0001
Fluid type (reference, Normal saline)					
	Buffered salt solution	1.44	1.25	1.65	<0.0001
	Synthetic Colloid	0.58	0.50	0.67	<0.0001
	Blood derived product	0.72	0.64	0.81	<0.0001
Haemodynamic resolution time	per minute increase	0.99	0.99	1.00	0.0004
Level of evidence (observational, reference)					
	Randomised Controlled Trial	1.17	1.09	1.27	<0.0001
Safety concerns (No safety concerns, reference)					
	Acute renal injury	1.50	1.13	2.00	0.0057
	Coagulopathy	1.13	0.91	1.41	0.2552
	Metabolic Acid-base disorder	0.22	0.11	0.48	0.0001
	Tissue oedema	1.11	0.87	1.42	0.4190
Mortality benefit (no, reference)		1.08	0.98	1.19	0.1140
Volume	per mL increase	1.00	1.00	1.00	0.8251

Table S4. Adjusted results for the full cohort

Attribute	Attribute level	OR	OR 95%CI lower	OR 95%CI Upper	P
Alternative specific constant (reference, no fluid)		2.18	1.56	3.03	<0.0001
Cost	per \$1 increase	0.99	0.99	1.00	0.0023
Patient (sepsis, category A reference)					
	Sepsis, Cat. B	1.69	1.35	2.11	<0.0001
	TBI, Cat. A	1.02	0.82	1.26	0.8604
	TBI, Cat. B	0.63	0.51	0.77	<0.0001
Fluid type (reference, Normal saline)					
	Buffered salt solution	1.43	1.25	1.65	<0.0001
	Synthetic Colloid	0.57	0.49	0.66	<0.0001
	Blood derived product	0.73	0.64	0.82	<0.0001
Haemodynamic resolution time	per minute increase	0.99	0.99	1.00	0.0008
Level of evidence (observational, reference)					
	Randomised Controlled Trial	1.17	1.09	1.27	0.0001
Safety concerns (No safety concerns, reference)					
	Acute renal injury	1.50	1.12	2.00	0.0066
	Coagulopathy	1.11	0.90	1.39	0.3287
	Metabolic Acid-base disorder	0.23	0.11	0.50	0.0002
	Tissue oedema	1.10	0.86	1.41	0.4618
Mortality benefit (no, reference)		1.08	0.98	1.19	0.1313
Volume	<i>per mL increase</i>	1.00	1.00	1.00	0.8820
Hospital type (Tertiary, reference)					
	Metro	0.92	0.75	1.14	0.4482
	Regional/rural	1.24	0.98	1.57	0.0791
Professional experience (0-5 years, reference)					
	6-14 years	1.02	0.87	1.20	0.8044
	15years plus	0.86	0.73	1.01	0.0722
Doctor (nurse, reference)		0.75	0.67	0.85	<0.0001