

Red Cell Immunohaematology

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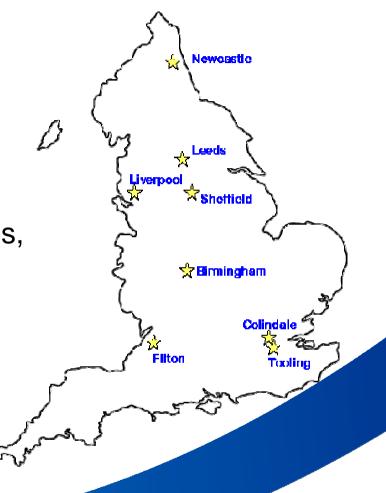


What is RCI?

 Support for transfusion laboratories in England

 Located at Liverpool, Newcastle, Leeds, Sheffield, Birmingham, Filton (Bristol), Tooting and Colindale (both London)

• ~ 500 hospitals





What do we do?

- Samples referred for
 - Reference antibody investigations (surgery, transfusion dependent)
 - –DAT positive patients
 - -Provision of cross-matched blood
 - -Haemolytic Transfusion Reaction investigation
 - Antenatal antibody investigation
 - -Titre or quantification
 - Provision of IUT units / units for delivery
 - ABO or RhD anomalies
 - FMH estimation



What else do we do?

- Red cell genotyping no obtainable phenotype
- MOD blood grouping
- T activation studies
- IgA deficiency
- Bone Marrow patient monitoring



When to refer

- Majority of transfusions managed by the hospital transfusion laboratory
- BUT
- "If there is any doubt concerning the identity of any antibodies present, or the ability to exclude clinically significant antibodies, a blood sample should be sent to a red cell reference laboratory."
- "(ABO) Anomalies should be resolved prior to provision of red cells or other cellular components unless this seriously compromises the clinical care of the patient" 1



When to refer

- "If the patient is known to have formed a red cell alloantibody, each new sample should be fully tested to identify or exclude the presence of further alloantibodies" 1
 - Complicated blood provision?
- "When one antibody specificity has been identified, it is essential that the presence or absence of additional clinically significant antibodies is established" 1

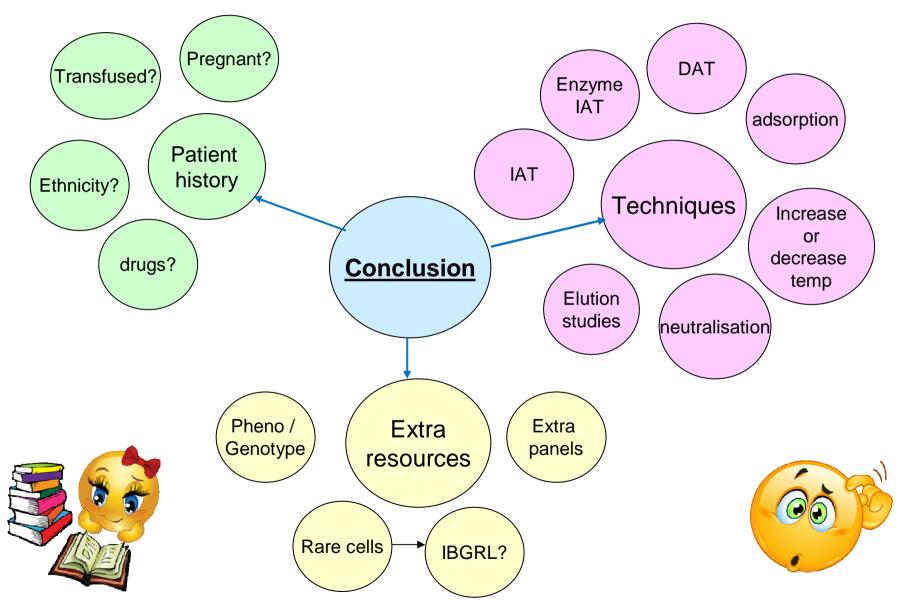


When to refer

- "Laboratories that are not registered for antibody identification in an accredited external quality assessment scheme should refer samples from all patients that have given positive results in the antibody screen to a laboratory that is registered for antibody identification." 1
 - NEQAS (National External Quality Assessment Scheme)
- Fully labelled sample needed!
 - Forename, Surname, DOB, hospital/NHS number, date bled & signature



How do we come to conclusions?





Extra Resources

- Additional panels provided by NHSBT or external reagent company
 - Includes panel of R1R1 and R2R2 RBCs
- Phenotyping reagents
- Genotyping
- Rare phenotyped donors
- National / International rare cell exchange (SCARF)
- International Blood Group Reference Laboratory (IBGRL)
 - WHO International Rare Donor Panel



Assigning specificity

"Antibody specificity should only be assigned when the plasma is reactive with at least two examples of reagent red cells expressing the antigen and nonreactive with at least two examples of reagent red cells lacking the antigen." ₁



Exclusions

Failure to recognise all of the antibody specificities within a sample can lead to a haemolytic transfusion reaction. Specificities should be excluded using red cells having homozygous expression of the relevant antigen. A single example only of each phenotype is sufficient for exclusion." 1

- D, Cw, C, E, c, e, K, k, M, S, s, Jka, Jkb, Fya, Fyb



Example

NHSBT	Reagent	s Pa	nel	1					1	Antiboo	ly Inve	stigati	on Wo	orkshee	t					
Sample	Name		234721			Roques	tor					Data	ibase R	ef No.				Tested by		
Date of	Birth					Hosp n	0					Sam	ple No.					Date Test	od	
Product	t .		- 1	Lot No.		Produc				Lot No.		Produ	ct			Lot N	0,	Product	Carrier Comments	Lot No.
Panel in	Alsevers			R144 33			CellSta			R143 3	CONTRACTOR		in Cell			R163		Panel in L		R146 3350
Panel P	apainised i	n Alseve	rs	R154 33	50	Panel P	apainise	d in Ce	tStab	R153 3	350	+	1	sed in Co		R173		EXPIRY D	ATE: 2016.05.26	
	Rh	M	N	S	8	P1	Lu*	K	k	Kp*	Le*	Let	Fy*	Fy*	Jk*	Jk ^b	Other	JACT	ENZ	
1	R ₁ wR ₁	0	+	0	+	2	0	0	+	0	+	0	+	0	+	0	HLA+	0	0	
2	R ₁ R ₁	+	0	+	0	1	+	+	+	0	0	+	0	+	0	+		3	5	
3	R ₂ R ₂	0	+	0	+	0	0	0	+	0	+	0	0	+	+	0		0	0	
4	r'r	+	0	0	+	1	0	0	+	0	+	0	0	+	+	0		0	0	
5	r"r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		Ó	D	
6	п	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0		4	5	
7	IT	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	Cob+	3	5	
8	FT	0	+	0	+	2	0	0	+	+	0	+	+	0	+	0		0	0	
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	+	0	HLA+	0	0	
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Example

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anel Pa	painised i	-		R154 335	1	1	apainise	-	_	R153 3	-	Section 2015	The Person Name of Street,	sed in Co	T	R173	Other	EXPIRY D	EN2	05.26	
77,17	Rh	м	N	8	s	P1	Lu	к	k	Kp*	Lez	Lei	Fy*	Fy ^b	Jk*	0	HLA+	IAT	0		_
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2	R ₁ R ₁	+	0	+	0	1	+	+	*	0	0	+	0	*	0	+		0	0		_
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4	r'r	+	0	0	14	1	0	0	N	0	/+	0	0	1	A	0		1		-	_
5	r"r	4	0	N	0	0	0	0	+	0	0	×	*	0	0	+		2	5	-	
6	rr	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0	Cab-	4	5	-	_
7	rr	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	Cob+	5	100		
8	rr	0	+	0	+	2	0	0	+	4	0	+	+	0	+	0	10.4	0	0		
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	+	0	HLA+	0	0	-	_
10	rr	+	0	0	+	0	4	0	+	0	0	+	0	+	0	+		0	0	-	
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Batch No's				1																	



Example

NHSBT	Reagents	Pa	nel	1					1	Antibod	ly Inve	stigati	on Wo	rkshee	et					
Sample	Name					Reques	tor					Data	base R	ef No.				Tested by		
Date of	Birth					Hosp n		-				Sam	ple No.					Date Teste	d	
Product				Lot No.		Produc	i i			Lot No.		Produ	ct	_		Lot		Product		Lot No.
	Alsevers	et annual contract		R144 33			CellSta			R143 3	-		in CellN		Name of the last		3350	Panel In LI		R146 3350
Panel Pa	apainised in	21	-	R154 33	50	1	apainise	_	-	R153 33		-		sed in Co	Property of	_	3350	-	ATE: 2016.05.26	
	Rh	M	N	8	3	P4	Lu	K	K	Kp*	Ler	Les	Ey	Fy	Jie	Jkb	Other	191	ENT	_
1	R ₁ "B ₁	0	+	0	+	2	0	0	+	0	+	0	+	0	+	0	HLA+	0	0	
2	R ₁ R ₁	+	0	+	0	1	+	+	+	0	0	+	0	+	0	+		3	5	
3	R ₂ R ₂	0	N	0	+	0	0	0	+	0	+	0	0	+	+	0		0	0	
4	r'r	+	0	0	4	1	0	0	4	0	K	0	0	A	1	0		0	0	
5	r"r	*	0	N	0	0	0	0	+	0	0	4	N	0	0	y		0	0	
6	rr	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0		4	5	
7	rr	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	Cob+	3	5	
8	rr	0	+	0	+	2	0	0	+	+	0	+	+	0	+	0		0	0	
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	4	0	HLA+	10	0	
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Your turn!

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Sample	Name	Pati	PAL	- 1		Reques	tor					Data	base R	ef No.				Tested by				_
Date of	Birth		Crear.			Hosp n	0					Sam	ple No.					Date Teste	od			_
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	Rh	M	N	S	S	P1	Lu	K	k	Kpª	Le	Leb	Fy⁴	Fya	Jk*	Jkb	Other	IAT	ENZ			
1	R ₁ ^w R ₁	0	+	0	+	2	0	0	+	0	+	0	+	0	+	0	HLA+	3	5			
2	R ₁ R ₁	+	0	+	0	1	+	+	+	0	0	+	0	+	0	+		3	5			1
3	R ₂ R ₂	0	+	0	+	0	0	0	+	0	+	0	0	+	+	0		3	5			
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5	r"r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		0	0			
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8	rr	0	+	0	+	2	0	0	+	+	0	+	+	0	+	0		0	0			T
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	+	0	HLA+	0	0			T
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Your turn!

NHSBT	Reagen	ts Pa	nel	1						Antibod	y Inve	stigati	on Wo	rkshee	et				1170			_
Sample	Name	Patie	at	2		Reques	tor					Data	base R	ef No.				Tested by				
Date of	Birth	Carre				Hosp no	,					Sam	ple No.	9				Date Teste	d			
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	Rh	М	N	S	s	P1	Lu*	K	k	Kpª	Lea	Leb	Fy*	Fyb	Jka	Jk _p	Other	IAT	ENZ	-	-	-
1	R ₁ ^w R ₁	0	+	0	+	2	0	0	+	0	+	0	+	0	+	0	HLA+	3	4	-	-	-
2	R ₁ R ₁	+	0	+	0	1	+	+	+	0	0	+	0	+	0	+		0	0	-		-
3	R ₂ R ₂	0	+	0	+	0	0	0	+	0	+	0	0	+	+	0		3	4	-		-
4	r'r	+	0	0	+	1	0	0	+	0	+	0	0	+	+	0		3	4			-
5	r"r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		0	0	-		-
6	rr	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0		3	4			_
7	rr	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	Cob+	0	0			1
8	rr	0	+	0	+	2	0	0	+	+	0	+	+	0	+	0		3	4			L
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	+	0	HLA+	3	4			L
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Your turn!

NHSBT	Reagen	ts P	anel	1						Antibod	ly Inve	stigati	on Wo	orkshe	et					
Sample	Name	Date	a. F	- 7		Reques	tor					Data	base R	ef No.				Tested by		
Date of	Birth	W. DIACO	(ALI HILL			Hosp no						Sam	ple No.	ě l				Date Test	od	
roduc	t			Lot No.		Product				Lot No.		Produ				Lot N		Product		Lot No.
	Alsevers		2	R144 33			CellSta		100	R143 3			in Cells	Media sed in Co	-1104	R163		Panel in L	ISP ATE: 2016.05.26	R146 3350
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	Rh	М	N	8	8	P1	Lu*	к	k	Kp*	Le*	Le*	Fy	Fyh	Jk*	-	Other HLA+	AT		
1	R ₁ wR ₁	0	+	0	+	2	0	0	+	0	+	0	+	0	+	0	HLAT	0	0	
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3	R ₂ R ₂	0	+	0	+	0	0	0	+	0	+	0	0	+	+	0		0	0	
4	r'r	+	0	0	+	1	0	0	+	0	+	0	0	+	+	0		0	0	
5	r"r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		- 3	0	
6	rr	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0		- 3	0	
7	rr	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	Cob+	3	0	
8	rr	0	+	0	1.	2	0	0	+	+	0	+	+	0	+	0		3	0	
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	+	0	HLA+	0	0	
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Answers

Detabase Ref No. Detabase Ref No. Sample No. Samp	ot		
Sample No. Sample No. Sample No.		Tested by	
Fight Figh		Date Tested	
Papainised in Alsevers	Lot No.	Product	Lot No.
Riv M	R163 3350 HIMedia R173 3350	Panel in LISP EXPIRY DATE: 2016.05.26	R146 3350
R ₁ *R ₁		T T T	
R ₁ R ₁ + 0 + 0 1 + + + + 0 0 + 0 + 0 + 0 + 0 +	2 2 00.0	1AT ENZ	
R ₂ R ₂ 0 + 0 + 0 0 0 0 + 0 + 0 0 + 0 0 + 0 +	+ 0 HLA+	2 2	
Pr	0 +	3 3	
	+ 0	3 3	\rightarrow
rr + + 0 + 3 0 + 0 0 0 + + 0 rr 0 + 0 + 0 rr 0 + 0 0 0 0	+ 0	00	
Tr	0 +	00	
Fr	+ 0	00	
Tr	0 + Cob+	00	
Fr	+ 0	0 0	
Batch No PS IgG IgA IgM C3c C3d Cti Entere	+ 0 HLA+	00	
Batch No PS IgG IgA IgM C3c C3d Cti Entere	0 +	00	
Batch No PS IgG IgA IgM C3c C3d Cti Entere		0	
Batch No PS IgG IgA IgM C3c C3d Cti Entere			
Batch No PS IgG IgA IgM C3c C3d Cti Entere			
Batch No PS IgG IgA IgM C3c C3d Cti Entere			
Batch No PS IgG IgA IgM C3c C3d Cti Entere			
Batch No PS IgG IgA IgM C3c C3d Cti Entere			
Batch No PS IgG IgA IgM C3c C3d Cti Entere	0	Pheno	
Batch No PS IgG IgA IgM C3c C3d Cti Entere	A RhD neg		= LK-
Batch No PS IgG IgA IgM C3c C3d Cti Entere		CE LT C	211
Batch No PS IgG IgA IgM C3c C3d Cti Entere	usion		
Batch No PS IgG IgA IgM C3c C3d Cti Entere	Anti-D by	IRT & ENZ	
Batch No PS IgG IgA IgM C3c C3d Cti Entere	100	1 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
PS IgG IgA IgM C3c C3d Cti Entere			
100 100 100 100 100 100 100 100 100 100			
		* # **	
	ase by:	Authorised by	
ent			
h			



Answers

NHSBT	Reagen	s Pa	nel	1					1	Antiboo	ly Inve	stigation	on Wo	rkshee	et.						
Sample	Name	Dal	-	E 2		Reques	tor					Data	base Re	of No.				Tested by			
Date of	Birth	Fert	cer	10 2		Hosp n	0					Sam	ple No.					Date Teste	d		
Produc				Lot No.		Produc				Lot No.		Produ	ct			Lot	No.	Product			ot No.
	Alsevers			R144 335			CellSta			R143 3			in CellM				3350	Panel in L	SP ATE: 2016.05.2		R146 3350
Panel P	apainised	1 21	_	R154 335		7	-	d in Cel	-	R153 3				sed in Ce		-	3350			1	
	Rh	M	N	3	15	PT	ALTO.	×	×	Kp*	, Ka	Let	Fy	Fy	Jk*	J. kb	Other	IAT	ENZ	+	
1	R ₁ "R ₁	0	+	0	+	2	0	0	+	0	+ ·	0	+	0	+	0	HLA+	3	4	+-	
2	RiRi	+	0	+	0	1	+	+	+	0	0	+	0	+	0	+		0	0	-	
3	R ₂ R ₂	0	+	0	+	0	0	0	+	0	+	0	0	+	+	0		3	4	-	
4	r'r	+	0	0	4	1	0	0	+	0	+	0	0	+	+	0		3	4		
5	Park	+	0	*	0	0	0	0	+	0	0	+	+	0	0	+		0	0		
6	rr	+	+	0	+	3	0	+	0	0	0	+	+	0	+	0		3	4		
7	rr	0	*	0	+	3	0	1	+	0	+	0	*	0	0	+	Cob+	0	0		
8	rr	0	+	0	+	2	0	0	+	+	0	+	+	0	+	0		3	4		
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	+	+	0	HLA+	13	4		
10	rr	4	0	0	4	0	4	0	*	0	0	W	0	X	0	*		10	0		
Auto								_													
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		1	_	-	-	1														+	
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A mails o	dia Titan		_		_	1	_		_	1			_	Group	_			Pheno		_	_
Olution:	dy ritre	T			1			-		_	_	Cell	ld.	0.00					Jk(a-)		
C 107 (10 L)		ly Titre				_	+	-	-		+	Ces	la .	Conc	lusion	_		_	on(a)	_	_
Anti-	ly Titre				+	-		-	-	-	-	+		10,000,000,000	- 15 B 10 TO 10 TO				5		
Archive					_					-	-		A	nt.	- 71	ea b	2 10	1 4	C 14 5	-	
ANI					-	-		-			_				- 4	1717	. 0 00	Calla	T & 1		208
Archive															croto	A. CO.	and ill	2		0	
DAT B	Satch No S IgG IgA													=	Coto	-K	exch	sheet b	o hete	202	Bons
PS						IgM		C3c	ė I	C3	d	Ct	t i	Enter	ea into						
										Const.			,, _[Datab	ase by			Au	thorised by		
Reagen	t																				
Batch																					
No's	batch No																		atology/001 Ever	and Bear	



Answers

NHSBT	Reagen	ts Pa	anel	1					1	Antiboo	ly Inve	stigation	on Wo	rkshee	rt							
Sample	Name	Pati		12		Reques	tor					Data	base R	ef No.				Tested by				
Date of	Birth	T CLAS	en	2		Hosp n						Sam	ple No.					Date Teste	ed			
Product				Lot No.		Produc	t			Lot No.		Produc				Lot		Product			Lot No.	-
	Alsevers			R144 33		and the second second	CellSta	-		R143 3		Panel			war - di-		3350 3350	Panel in L	ISP ATE: 2016.0	6 20	R146 33	50
Panel P	apainised	-		R154 33		-	apainise		1	R153 3	T	-	-	sed in Ce		-	CONTRACTOR OF THE PARTY OF THE	IAT	EN2	0.20		Τ
	Bh	M	N	/5	- 5	P4	Lu	K	K	Кра	Les	Ler	Fy	Fyn	Jike	Jka	Other HLA+	3	0	+	_	+
1	R ₁ WR ₁	0	+	0	+	2	0	0	+	0	+	0	+	0	+	0	HLA	-	8	-		+
2	R ₁ R ₁	14	0	1	0	1	x	×	+	0	0	1	0	+	0	4		0	0	-		+
3	R ₂ R ₂	0	,4	0	x	0	0	0	1	0	1	0	0	*	×	0		0	0	-	-	+
4	r'r	+	0	0	+	1	0	0	*	0	+	0	0	+	+	0		0	0	-		+
5	r"r	+	0	+	0	0	0	0	+	0	0	+	*	0	0	+		3	0	-	-	+
6	rr	+	+	0	+	3	0	+	0	0	0	+		0	+	0		3	0	_		+
7	rr	0	+	0	+	3	0	+	+	0	+	0	+	0	0	+	Cob+	3	0			1
8	rr	0	+	0	+	2	0	0	+	+	0	+	+	0	+	0		3	0			1
9	rr	0	+	+	0	0	0	0	+	0	+	0	0	*	+	0	HLA+	0	0			1
10	rr	+	0	0	+	0	+	0	+	0	0	+	0	+	0	+		0	0			1
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		+																				T
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Diuton	ody Titre			_						T	Cell	ld		0				Fy(a	i- <i>)</i>			
Arti-		1	- 1		_	_						-		Conc	lusion							
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Arti					-			-	-	-		1) 1AT				
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	Satch No S IgG IgA					7,000	-	00				-	_					regar	ere or			
P.				IgA		IgM		C30	C	C3	d	CI	1	Enter	ed into			Au	thoriend h			
	-			_				_		_			т —	Datab	ase by	eresster.	***********	Au	LITORISED D	7	remainer.	-
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Batch No's																						



Thank you!

Any Questions?

1. Milkins, C., Berryman, J., Cantwell, C., Elliott, C., Haggas, R., Jones, J., Rowley, M., Williams, M. and Win, N. (2013), *Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories*. Transfusion Medicine, 23: 3–35. British Committee for Standards in Haematology