ISBT CANCUN 2012

32nd International Congress of the ISBT

in joint cooperation with the 10th Congress of AMMTAC

Cancun, Mexico, July 7 - 12, 2012

The Global Experience International Rare Donor Panel

Joyce Poole

International Blood Group Reference Laboratory, Bristol, UK

NHS Blood and Transplant

University of BRISTOL

The Global Experience
International Rare Donor Panel

My Talk (1)

- History of the IRDP
- What we do in Bristol
- The UK frozen blood bank
- A complex case study involving rare blood provision
- Activity over past two years

The Global Experience
International Rare Donor Panel

My Talk (2)

- A difficult request
- When a donor becomes a patient

Possible Discussion Points?

- Phenotypes in short supply
- Genotype v phenotype?
- Is rare blood being utilised properly?

IRDP – the early years

Always administered at IBGRL (London, Oxford, Bristol)

1965 Conceived under initiative of ISBT

1968 First edition published
300 donors from 10 countries

1985 500 donors from 22 countries
Distributed to 110 centres worldwide (paper copy)

IRDP - the 1990's

1991 Over 3,000 donors

In house computer - easy addition and deletion of donors

MODEM access

1998 Over 4,000 donors from 24 countries

1999 Internet access

The IRDP today

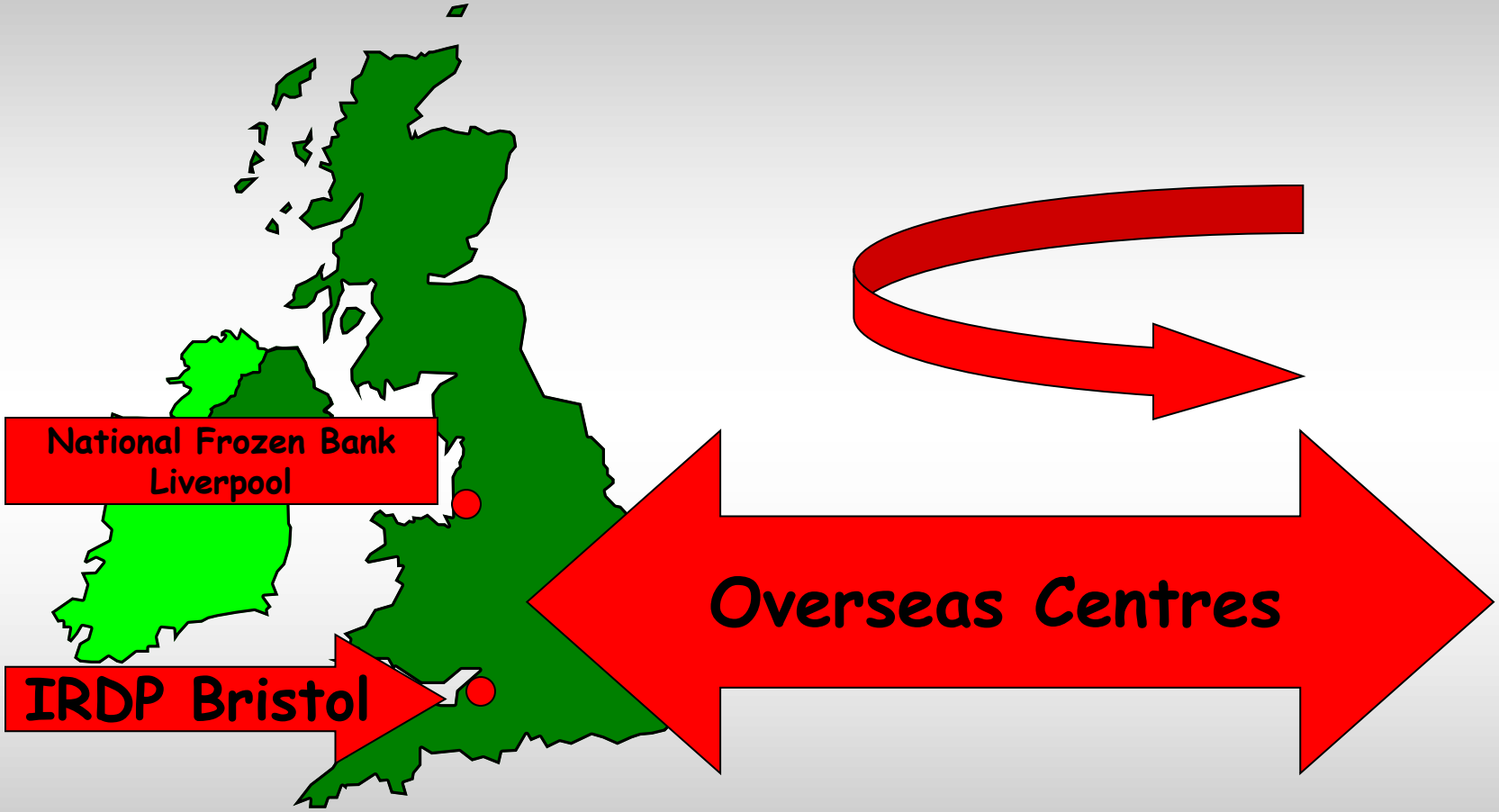
- 47 years old
- Not all donors independently listed
- Additional non UK Fy(a-b-)
- Additional USA and Japanese donors
- Additional French and Spanish panels
- Probably other countries too!

The IRDP today

What do we do in Bristol?

- Compile information on rare donors from around the world that other centres have identified
- Keep data on blood centres, donors and contact personnel
- Information available to other blood centres via internet
- Co-ordinate requests when required

IRDP collaboration



Rare Donor Working Party

National Frozen Bank Liverpool UK

- Database >9000 donors
- Currently 606 units frozen
- Lists distributed monthly
- -80^{0}c glycerol method of freezing
- Shelf life of 10 years (with exceptions)
- 72 hour shelf life post recovery

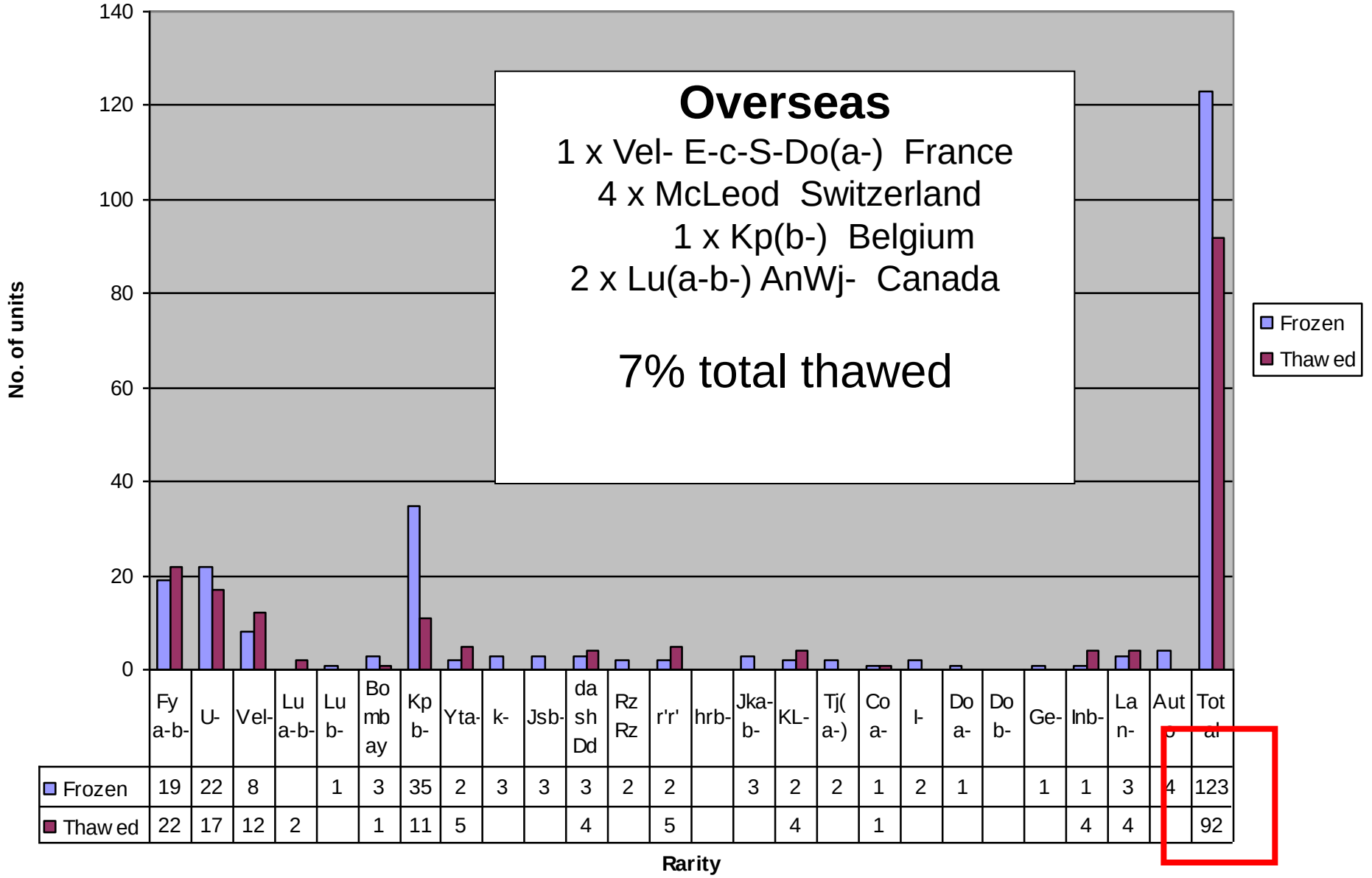
National Frozen Bank Liverpool UK

Exceptions to 10 year expiry

- Feasibility assessed thanks to a useful study done in Paris
- T Peyrard *et al* Immunohaematology 2009;25:17-21
- 'Safe and efficient' to transfuse rare blood units older than 10 years
- Useful for particularly rare phenotypes in short supply

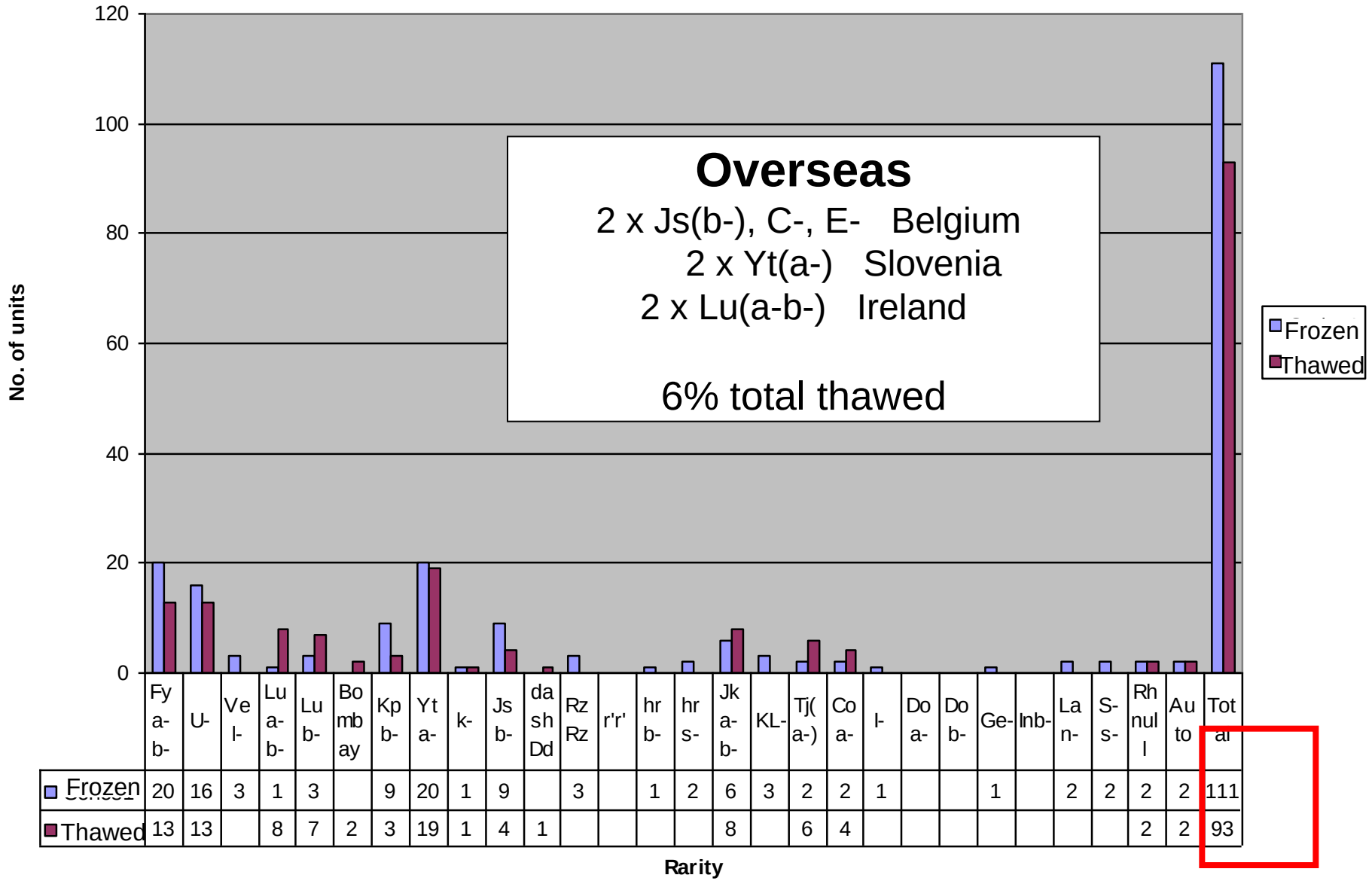
Typing		O R1R1	O R1R1	O R2R2	O R2R2	O Pos	O Pos	O Ro	O Neg	O Neg	A R1R1	A R2R2	A Pos	A Pos	A Ro	A Neg	A Neg	B Pos	B Ro	B Neg	B Neg	
		ACP215	-80	ACP215	-80	ACP215	-80	ACP215	ACP215	-80	ACP215	ACP215	ACP215	-80	ACP215	ACP215	-80	ACP215	ACP215	ACP215	-80	
BOMBAY	#	5	2			2	1		0													
PARA BOM	#																					
Coa-		10				10		1	7													
Fy(a-b-)		8		10		18		28	13													
[also Jk(a-)]								[6]	[3]													
I -		3				15			3	4			1									
In(a+b-)	#	0							0					2								
Jk(a-b-)	#	0				4	5		0		2		2		1	1					1	
Js(a+b-)	#					8		3	1				2		5				3			
k-		10		10		10			11		1		1									
KL-	#					8	1		0	1												
Ko	#				2	0			0													
Kmod						0	1		0													
Kp(a+b-)		3		7		16			11							6						
Lan -				4		8	2		5													
Lu (a-b-)		16		2		9			9		1											
Lu(a+b-)		11		5		8		3	1													
pp (Tja-)	#					5			0													
U-	#	1				13		9	3				1		0			8		1		
[also Jk(a-)]																						
S-s-						1																
Weak U+											2		3						1			
Gya-	#	4							0													
Do(a-)		5		3				7	8													
Do(b-)		3		1				2	3													
Vel -		3				14		2	12		1		1									
Yta-		7				7		2	11													
r'r									17							4						
r''r''									23							1						
RzRz	#					14	1						6									
R2RZ	#					1																
-D-						1							11									
.D.																						
Rh null																						
R1wR1w		10																				
hrs -	#					1																
hrb-	#								2													
Ge -2-3,4	#								0													
Ge -2	#					5			0													
Jr(a)-						1			0													
			2																		Total	6
		99		42	2	179	11	57	140	5	7	0	28	2	6	12	0	8	4	1	1	6
otal		583																				
taL		23						STOCK	LOW													
		606							MED													
									HIGH													

National Frozen Blood Bank activity 2010

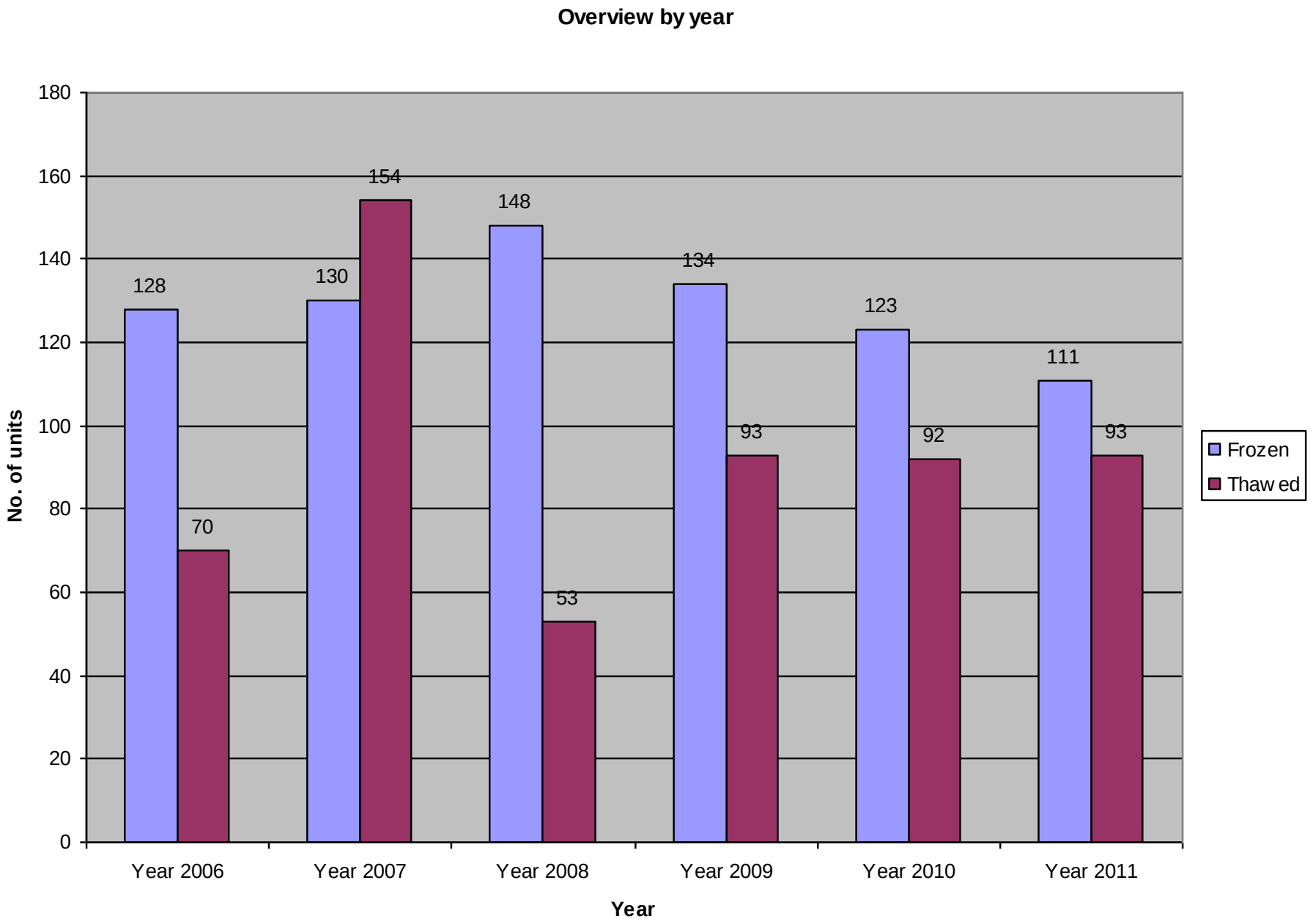


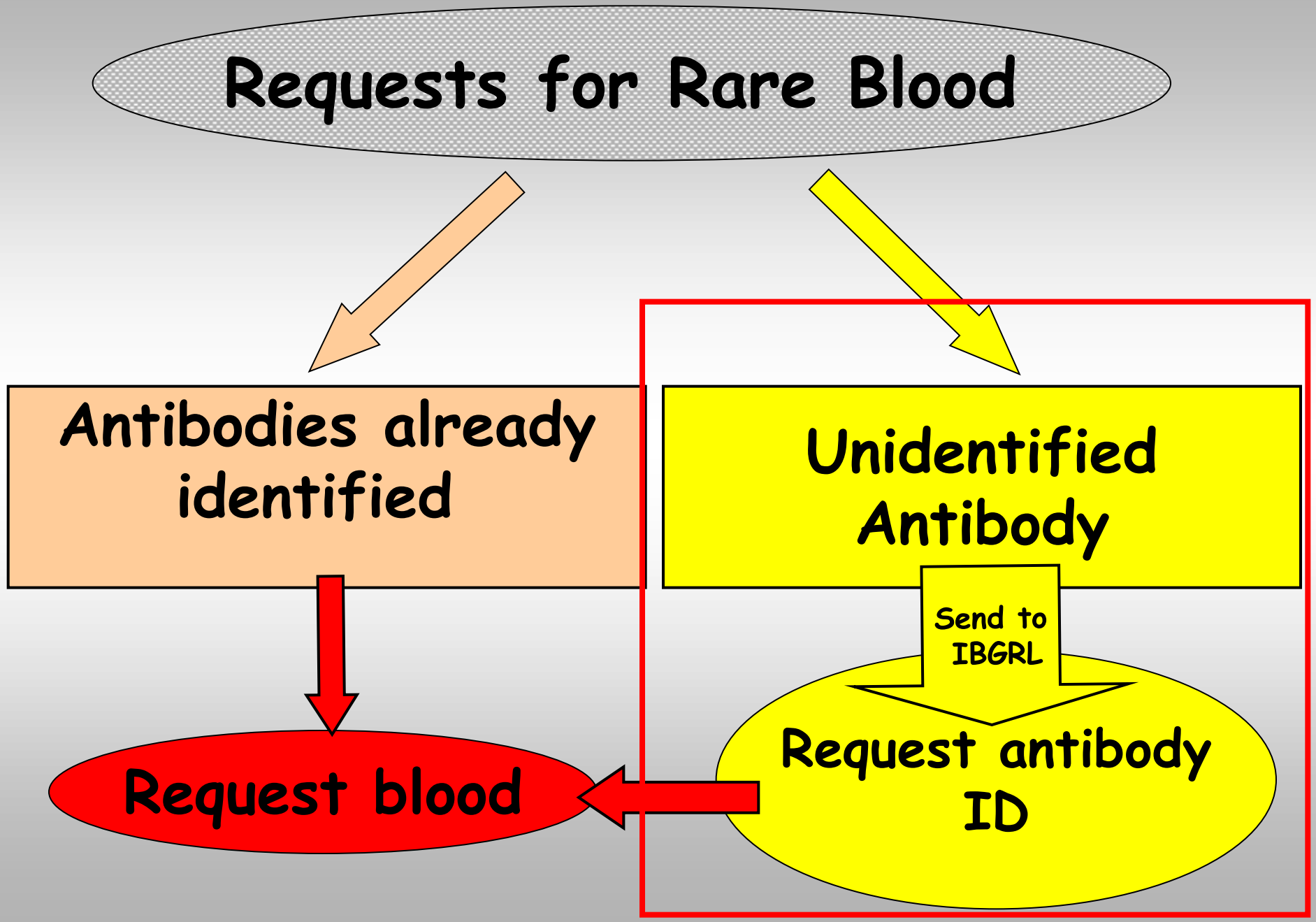
	Fya-b-	U-	Vel-	Lua-b-	Lub-	Bombay	Kpb-	Yta-	k-	Jsb-	dash Dd	RzRz	r'r'	hrb-	Jka-b-	KL-	Tj(a-)	Coa-	I-	Doa-	Dob-	Ge-	Inb-	Lan-	Aut	Total
Frozen	19	22	8		1	3	35	2	3	3	3	2	2		3	2	2	1	2	1		1	1	3	4	123
Thawed	22	17	12	2		1	11	5			4		5			4		1					4	4		92

National Frozen Blood Bank activity 2011



	Fy a- b-	U-	Ve l-	Lu a- b-	Lu b-	Bo mb ay	Kp b-	Yt a-	k-	Js b-	da sh Dd	Rz Rz	r'r'	hr b-	hr s-	Jk a- b-	KL-	Tj(a-)	Co a-	I-	Do a-	Do b-	Ge-	Inb-	La n-	S- s-	Rh nul l	Au to	Tot al
Frozen	20	16	3	1	3		9	20	1	9		3		1	2	6	3	2	2	1			1		2	2	2	2	111
Thawed	13	13		8	7	2	3	19	1	4	1					8		6	4								2	2	93


Overview by year
180
160
140
120
100
80
60
40
20
0
No. of units
128
70
130
154
148
53
134
93
123
92
111
93
Year 2006
Year 2007
Year 2008
Year 2009
Year 2010
Year 2011
Year
Frozen
Thawed


Requests for Rare Blood
Antibodies already identified
Unidentified Antibody
Send to IBGRL
Request antibody ID
Request blood

IBGRL Case Study

- Urgent request for blood for an 82 year old female patient (VW) with heart disease
- Blood samples referred to IBGRL red cell reference lab from South Africa
- VW had strong antibody reacting with all cells tested
- ? Antibody specificity

IBGRL Case study

- Patient first tested in 1999
- Anti-Fya + unidentified antibody
- Transfused 3 units
- Sept 2011 transfused 3 units Fy(a-)
- Oct 2011 all cells incompatible

IBGRL Case Study

- Eluate of antibody [off Fy(a-) cells] was compatible ONLY with Rh_{null}
- D--/D-- cells incompatible
- Conclude: Rh-related antibody (+ anti-Fya)
- Rh phenotype : dce/dce [no D gene to sequence]
- Sequence *RHCE* gene

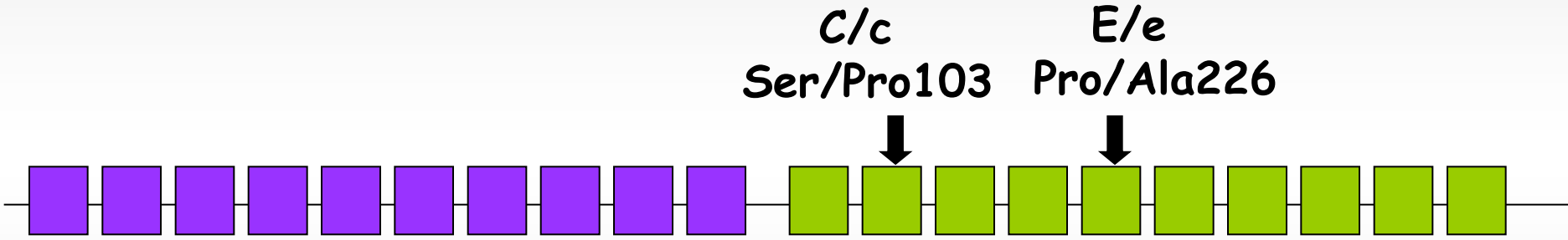
IBGRL Case Study

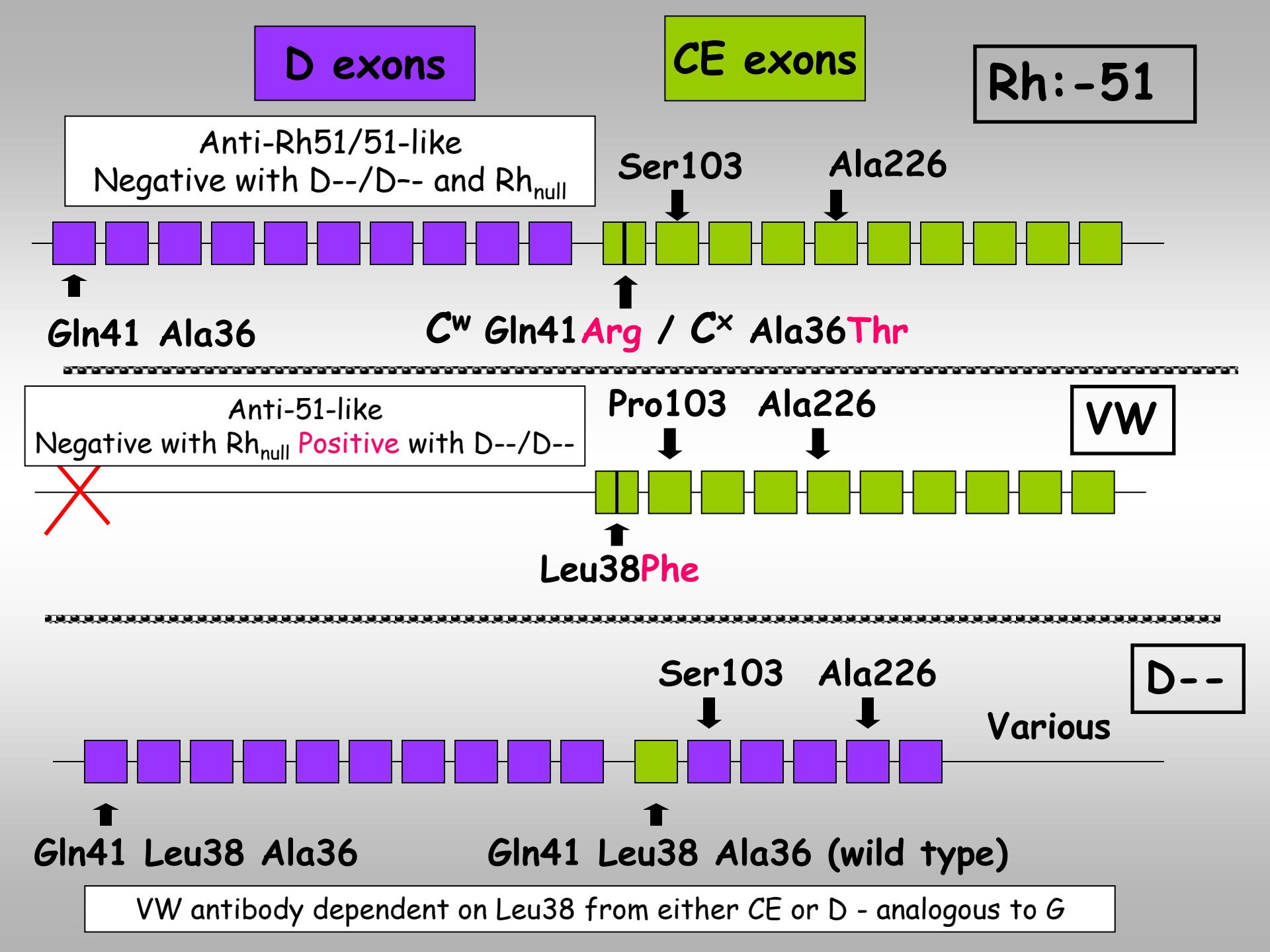
- Sequencing of her *RHCE* gene revealed a novel homozygous mutation in exon 1 (114A>C) giving rise to a Leu38Phe amino acid change
- This mutation is in the same region as mutations for C^w(Gln41Arg) and Cx (Ala36Thr)
- Homozygous C^w and C^x lack high incidence Rh51 antigen
- VW cells Rh:-51

RHD & *RHCE* exons 1-10

D exons

CE exons




D exons
CE exons
Rh:-51
Anti-Rh51/51-like
Negative with D--/D-- and Rhnull
Ser103
Ala226
Gln41 Ala36
Cw Gln41Arg / Cx Ala36Thr
Anti-51-like
Negative with Rhnull Positive with D--/D--
Pro103
Ala226
VW
Leu38Phe
Ser103
Ala226
D--
Various
Gln41 Leu38 Ala36
Gln41 Leu38 Ala36 (wild type)
VW antibody dependent on Leu38 from either CE or D - analogous to G

IBGRL Case Study Transfusion Support

- Referring laboratory had also found Rh_{null} cells to be compatible whilst we were working on this case!
- Received one unit from a local (South African) Rh_{null} [Fy(a-)] donor
- The patient required no further transfusions
- Complex investigation - time consuming to solve

When a rare donor becomes a patient (1)

- There is only one group O Rh_{null} UK donor (KS)
- She gave a unit for a baby in an emergency 6 years ago
- Second unit specifically for another patient one year later
- Two units were frozen at the UK National frozen blood bank

When a rare donor becomes a patient (2)

- In April 2011 we were notified that KS was 24 weeks pregnant with a Hb 6.6dl
- Blood may be needed imminently and for delivery
- No frozen units available in UK
- We contacted several overseas centres for Rh_{null} availability

When a rare donor becomes a patient (3)

- Two donors were located and put on standby
- One from South Africa with Hb 12.2g/dl was put on medication to boost her Hb
- ? Bleed at slightly low Hb if necessary
- One from Brazil
- At 36 weeks gestation the situation became more urgent

When a rare donor becomes a patient (4)

- Patient had a large uterine fibroid and complications of delivery were anticipated
- The 2 units on standby were requested to cover surgery
- Both the South African and Brazilian donor units were shipped to N Ireland

When a rare donor becomes a patient (5) Outcome

- Healthy baby delivered by CS at term
- No blood was required
- Rh_{null} units frozen at the National Frozen blood bank
- Effectively replaced the 2 units of KS that had been used for another patient!

Rh_{null} individuals often have borderline/low Hb and may not always be able to donate even if willing

How often is rare blood obtained for a specific patient actually required?

IRDP Internet Searches for rare donors

2010/2011

Australia (2)	New Zealand
Canada	Portugal
Czech Republic	Sweden (2)
Finland	Switzerland
France	The Netherlands
Germany (2)	UK
Ireland	USA
Israel	
Malaysia	
	Total 1220

( ) more than one centre

IRDP Countries whose lists were searched (not on previous slide)

Austria

India

Japan

South Africa

Spain

Thailand

Requests via IBGRL email

2010/2011

Request	Group	Supplied
Iran	Oh	
Israel	Orr Jr(a-)	Japan
USA	hr^s-, Hr-, S-, M- O C-K-Jk(b-)Kp(a-) Ge:-3 O At(a-) Fy(a-)	
Pakistan	I-i+	
Netherlands	Ko	
Canada	Orr Jr(a-) Di(b-) I-i+ E- AnWj- Rh_{null} Ko	USA USA USA USA ?S Africa Finland

Requests via IBGRL email

2010/2011

Request	Group	Supplied
Slovenia	Yt(a-) E-Jk(a-)	UK
Germany	FY:-3,Jk(b-),M-,Le(a-),Do(a-)	
UK	Orr Oh	?Spain/France
	Tc(a-)	Not needed
	McLeod Jk(b-)	Not needed
	D- Rh:-34, Rh:-31	?France /USA

A difficult urgent request

March 2011

- UK sickle cell patient for exchange
- Previously detected antibodies:
  - Anti-E+Fy3+s+Le^a+Js^a
  - C-E-K- s-Fy(a-b-) Js(a-) requested
- Most Fy(a-b-) are ss!
- Js^a typing not routine due to reagent shortage

A difficult urgent request

- We could not supply enough known Js(a-) units in the UK
- The American Rare Donor Programme went to great lengths to provide blood for this patient
- 6 liquid units were shipped from the USA to London
- Promise of further frozen units if needed

A difficult urgent request

- This was a fantastic effort by the ARDP personnel to provide the required number of extremely rare phenotype units in a short period of time
- Over a weekend!
- Js^a typing at last moment
- The patient was in a critical condition
- Successful outcome

Donor screening by molecular techniques

- This case prompted IBGRL to evaluate the best use of a Luminex® based assay on trial in-house
- >1000 Fy(a-b-) donors have now been additionally tested for Js^a/Js^b, V/VS, Do^a,Do^b
- As a result we can better provide for sickle cell patients with difficult (but not uncommon) antibodies

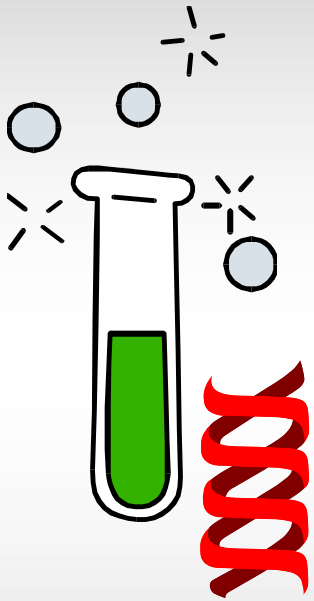
Requests- summary

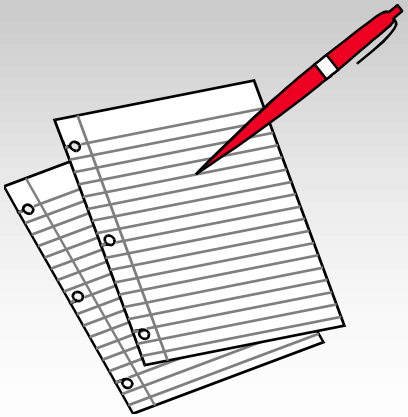
- May not seem many requests
- We are acting as 'middle man' in a small proportion of total cases
- A lot of activity that we do not see
- Many other countries are involved in rare blood provision

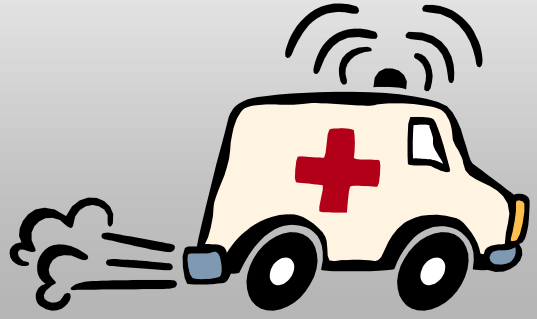
Rare Donor Working Party

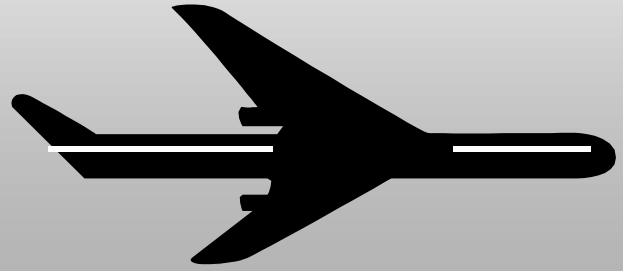
- Invaluable to the working of the IRDP
- Many more countries are now represented
- Each presented data on their activities at this meeting
- Meets every two years (minimum) at ISBT meetings
- Opportunity to discuss many issues related to rare blood provision

Rare Donor Working Party









Acknowledgements

- Working party members
- Everybody who is involved in rare donor provision
- Especially Sandy and Cindy at the ARDP
- The donors!

THANK YOU

Possible Discussion Points?

- Phenotypes in short supply
- Genotype v phenotype?
- Is rare blood being utilised properly?