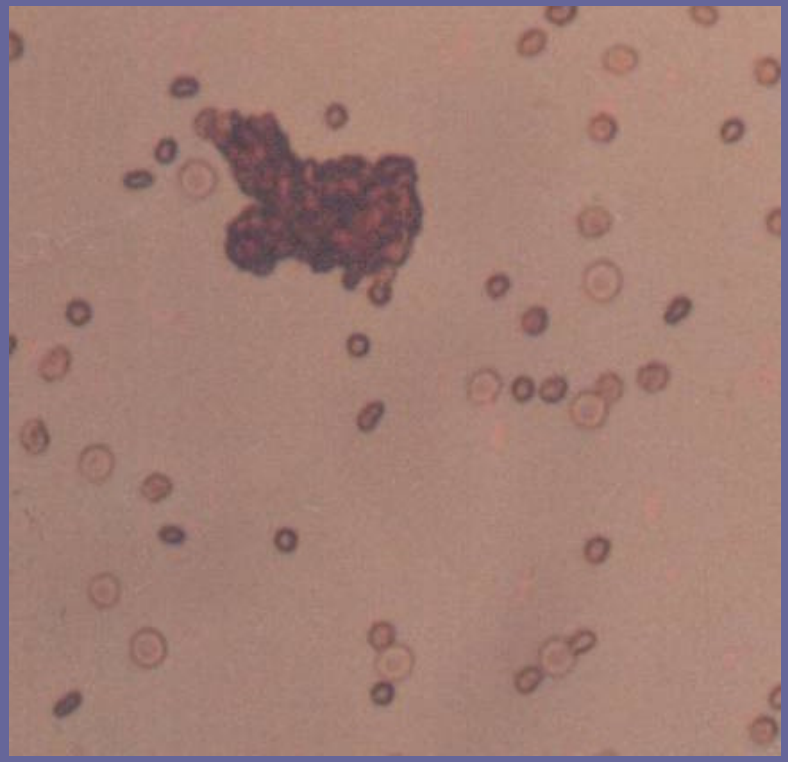
Mixed field reactions

Jenny White

UK NEQAS (BTLP)

What is this?



Clinical scenarios - dual populations

ABO subgroup	3
Tx ABO/D compatible but non-identical blood	1
HSCT / BMT	2
True chimera	4
ABO incompatible transfusion	3

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ABO Subtypes

MF vs. Anti-A

- A_3 (0.014% group A in France, 0.1% A in Denmark)
- A_{end} (0.003% group A in France)
- A_{finn} (up to 0.1% some parts of Finland)

MF vs. Anti-B

- B_3 (1/10,000 group Bs in France, 1/900 Bs in China)

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True Chimera

- Likely to be MF for antigens other than ABO
- Confirm with molecular testing for karyotype
- Last thought when finding MF

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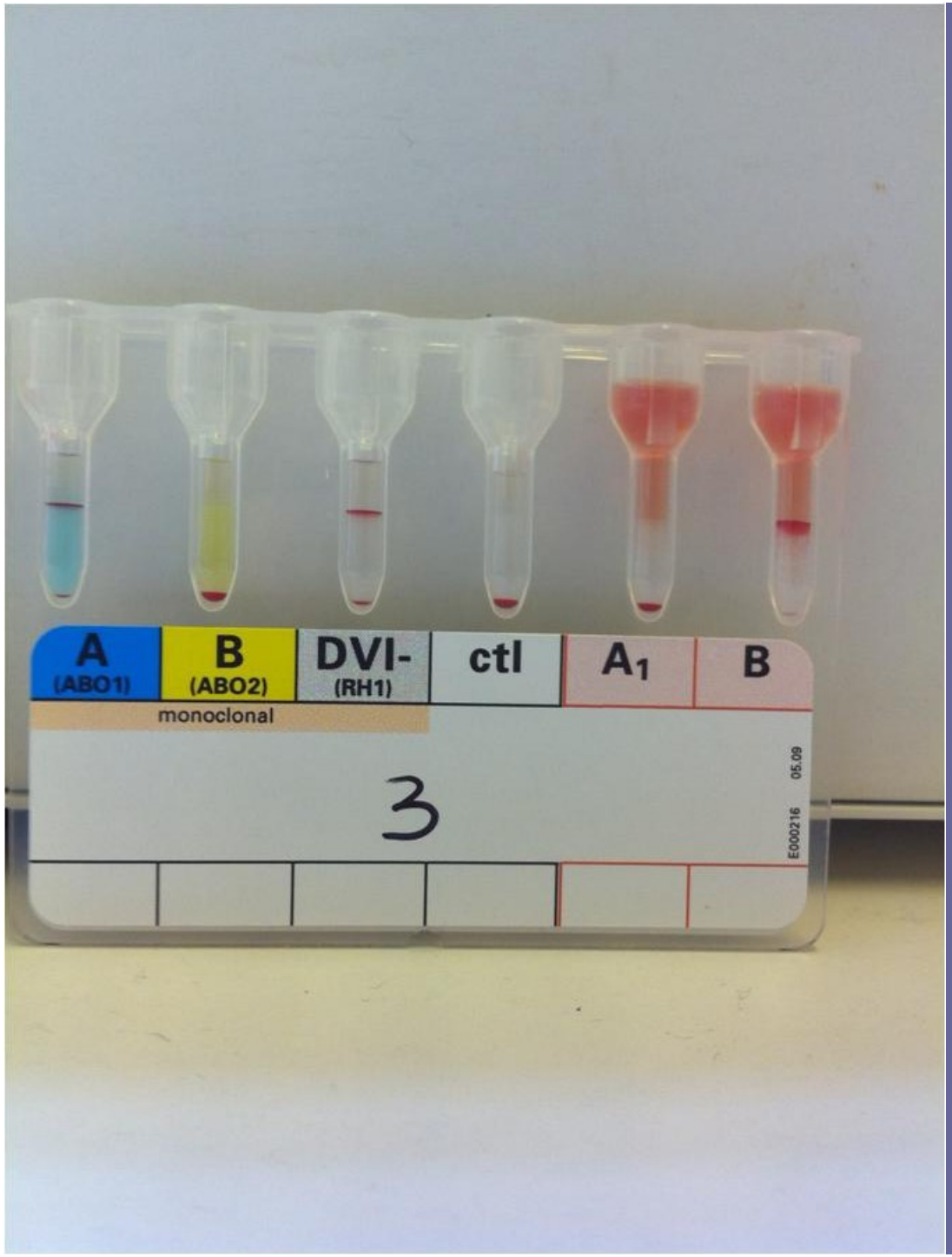

- Do you notice anything unusual about the reactions?

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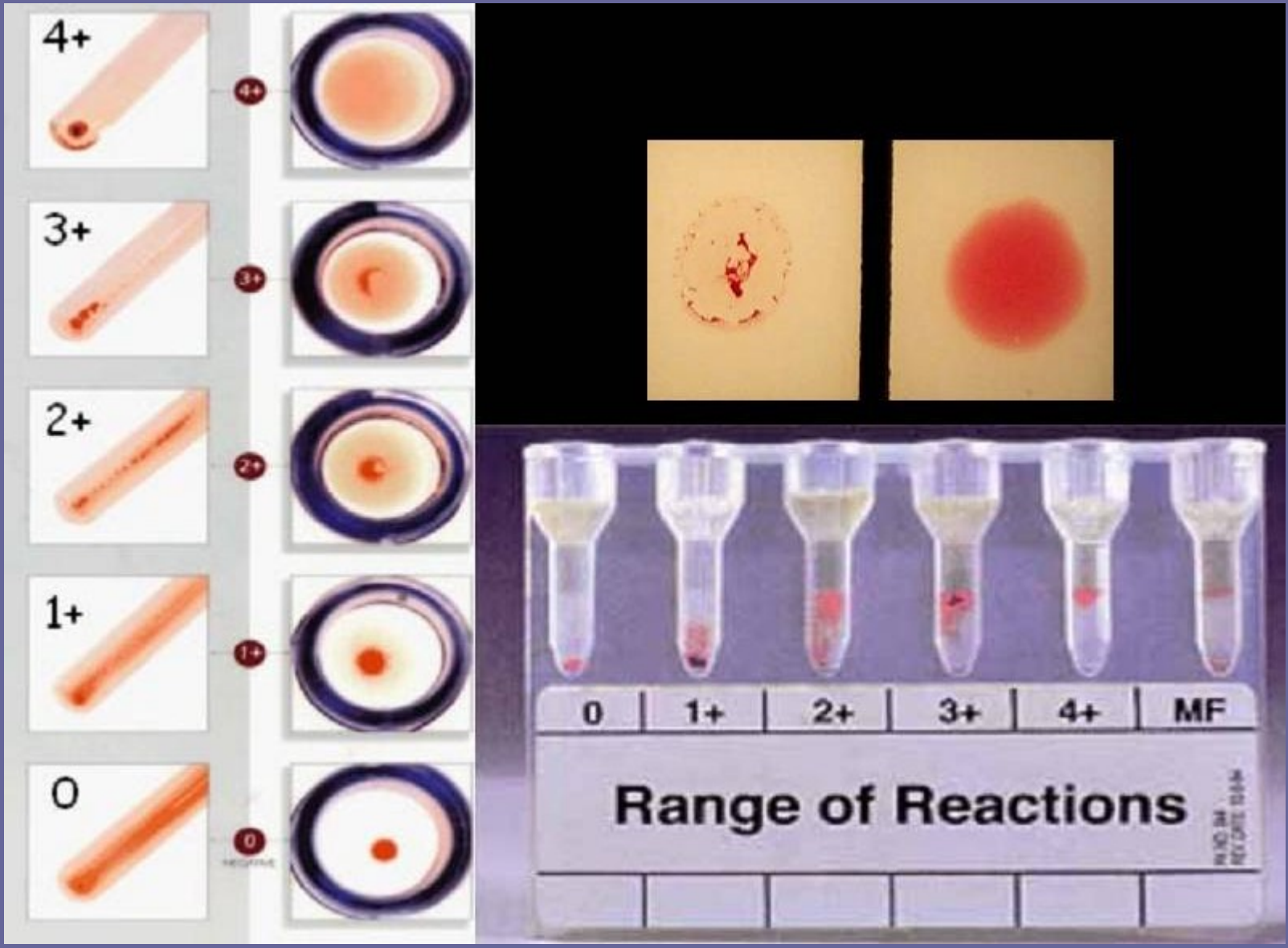

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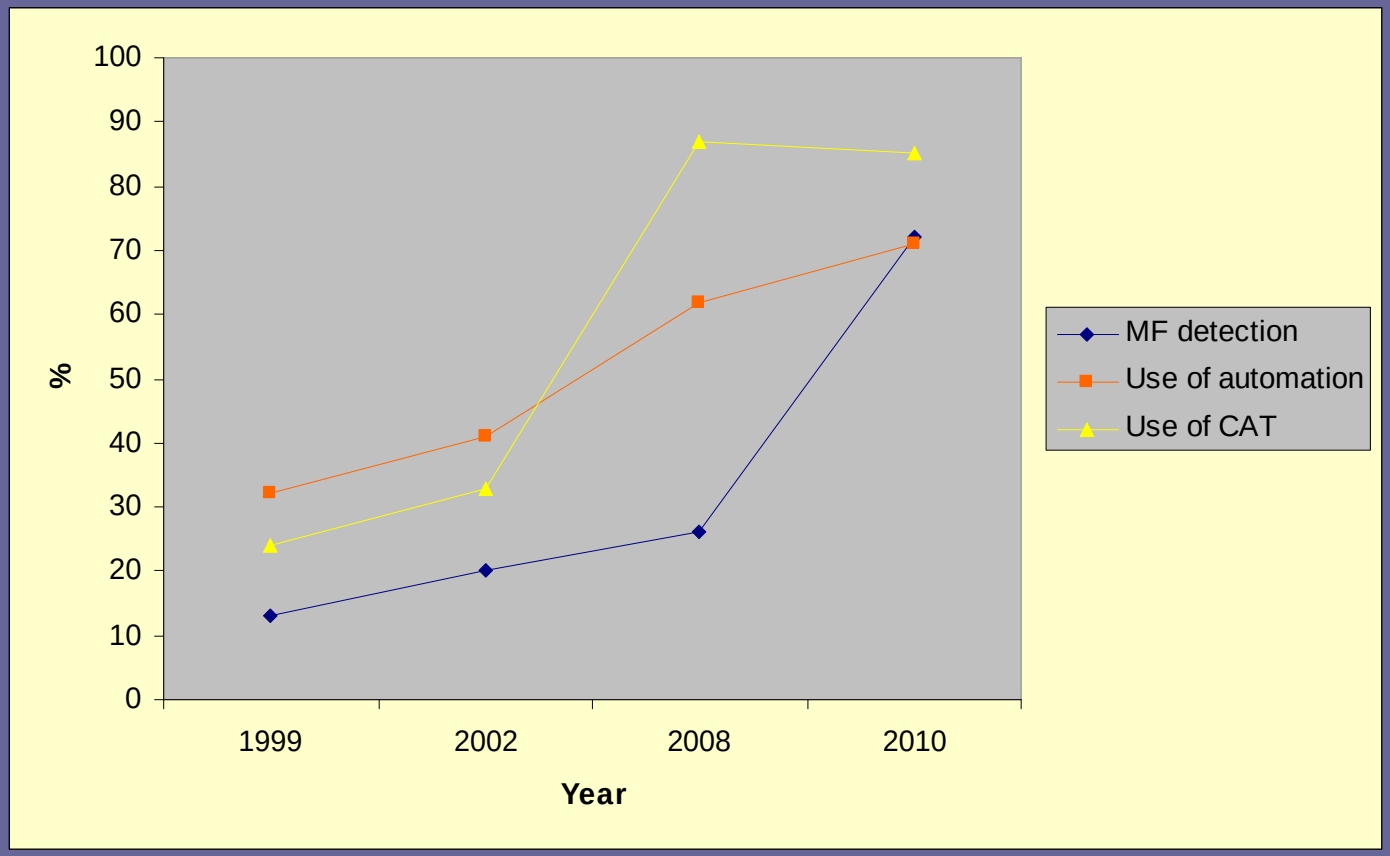
Detection 50:50 D+/D- MF, use of CAT and of automation



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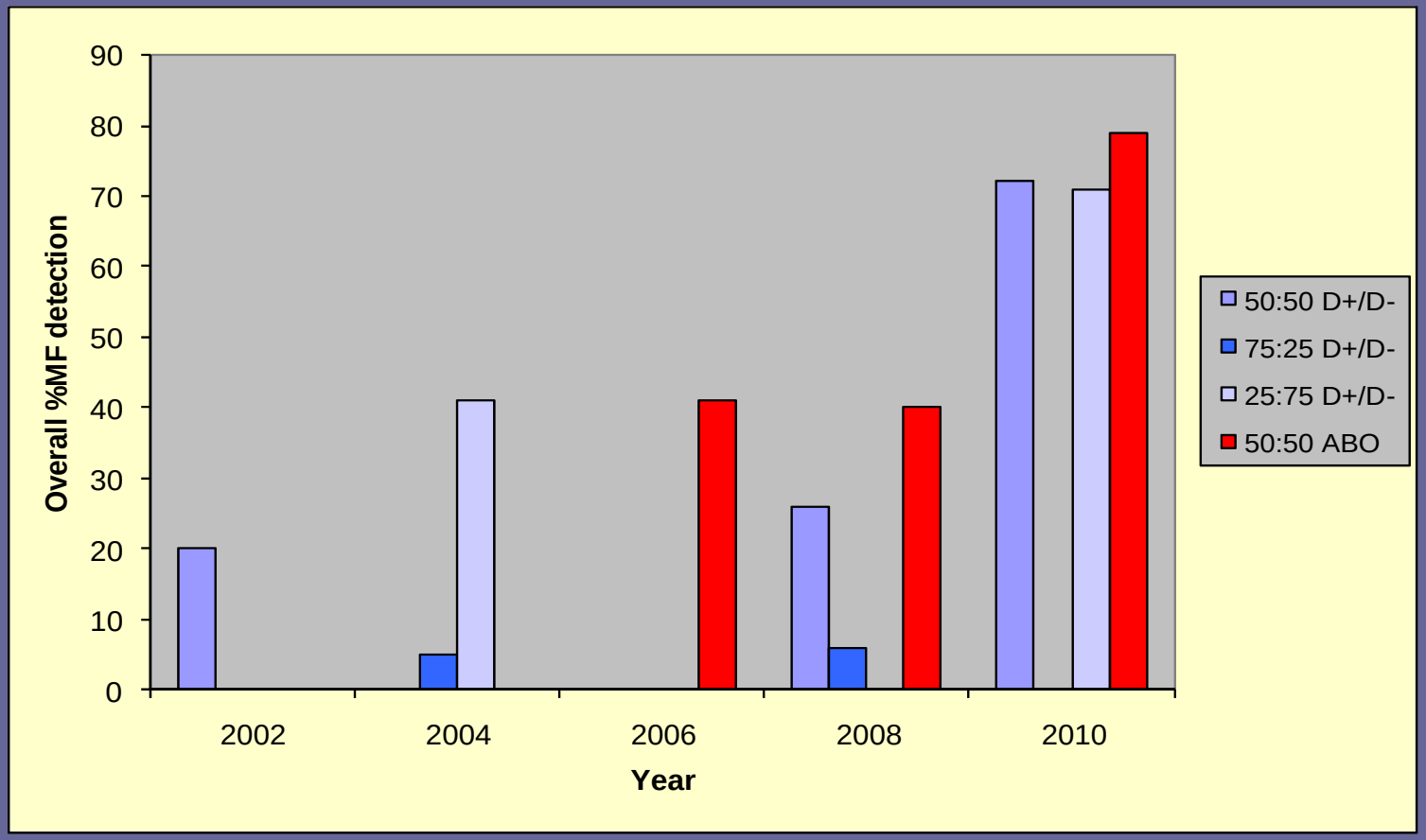
Trends Overall MF detection



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Where things could go wrong with dual populations

1. **MF reactions not recognised when present**

- Do you notice anything unusual about the reactions?

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Where things could go wrong with dual populations

1. MF reactions not recognised when present
2. DP not always detected by all technologies

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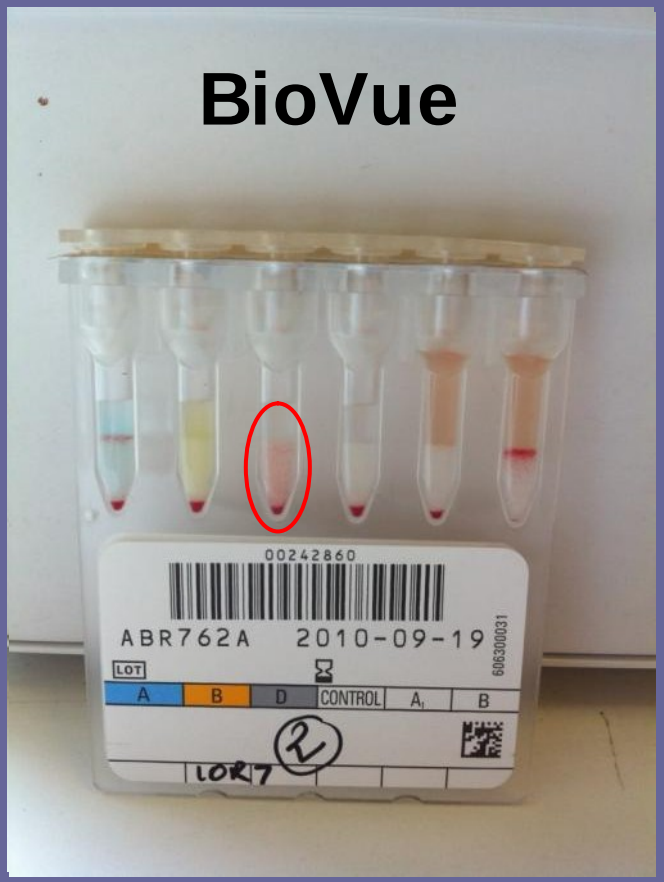
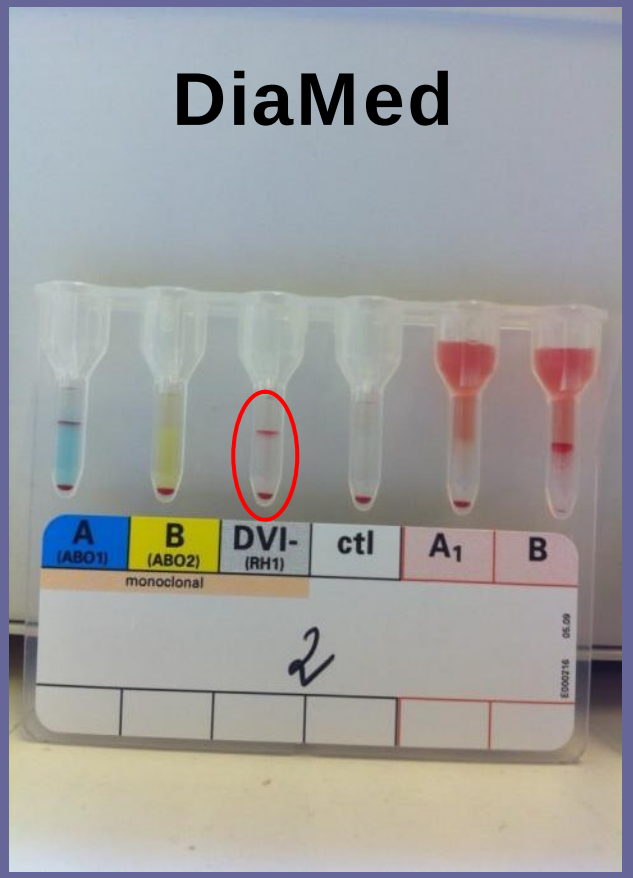
10R7 Patient 2: A+/O- (25:75)





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10R7 Patient 1: A+/O- (10:90)

BioVue

DiaMed

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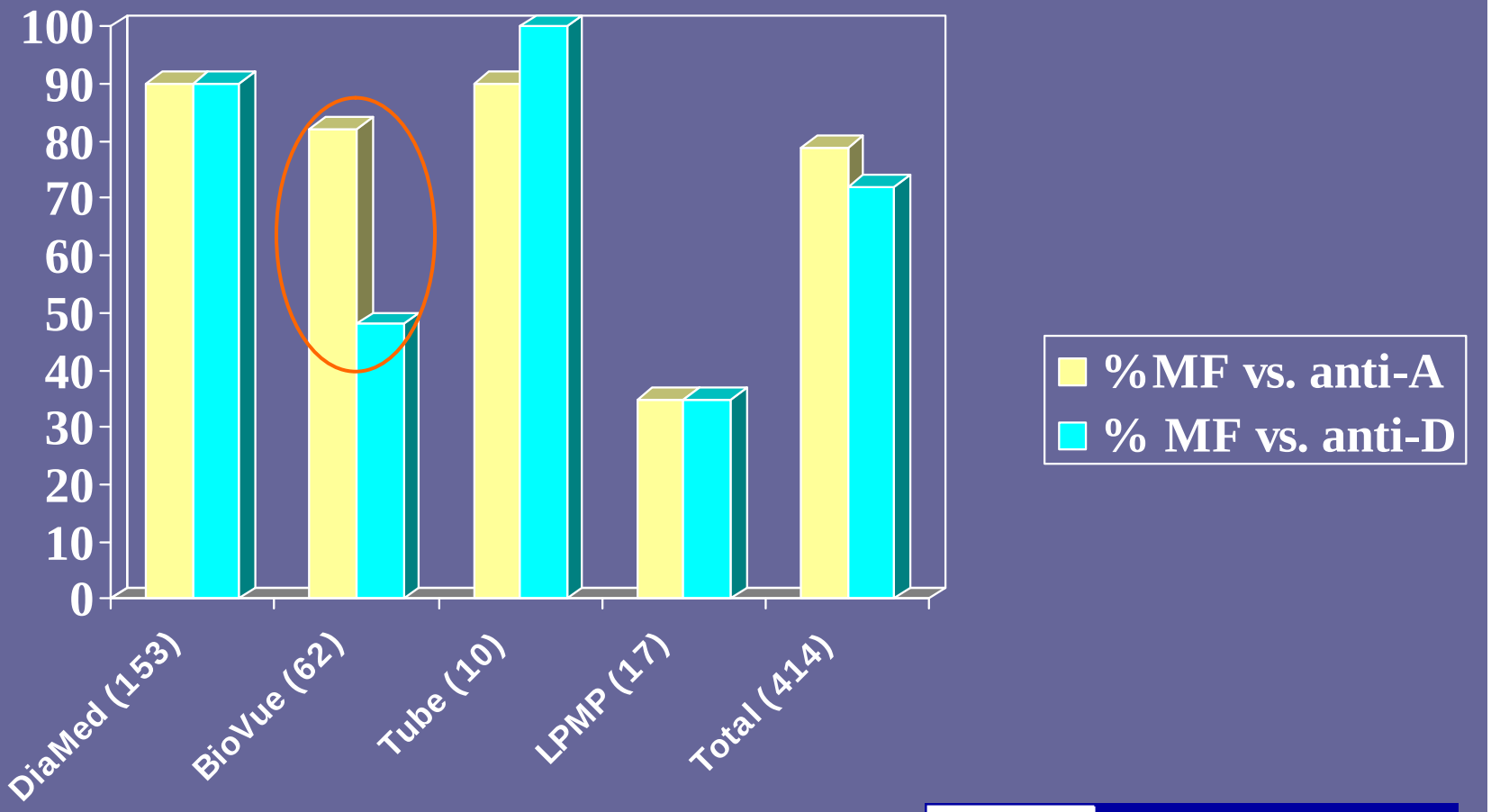
10R7 P3: A+/O- (50:50)



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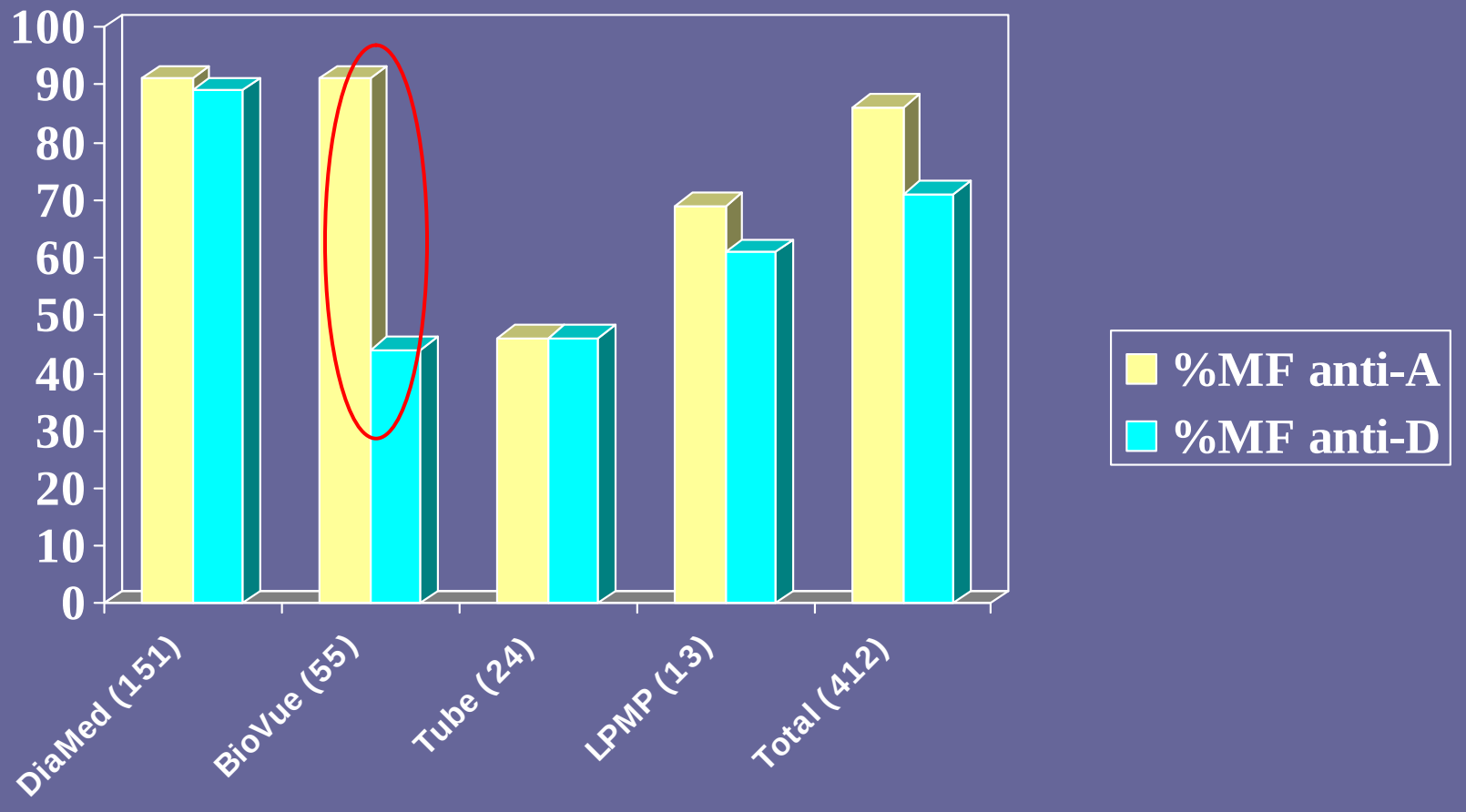
10R7 P2: A+/O- (25:75)



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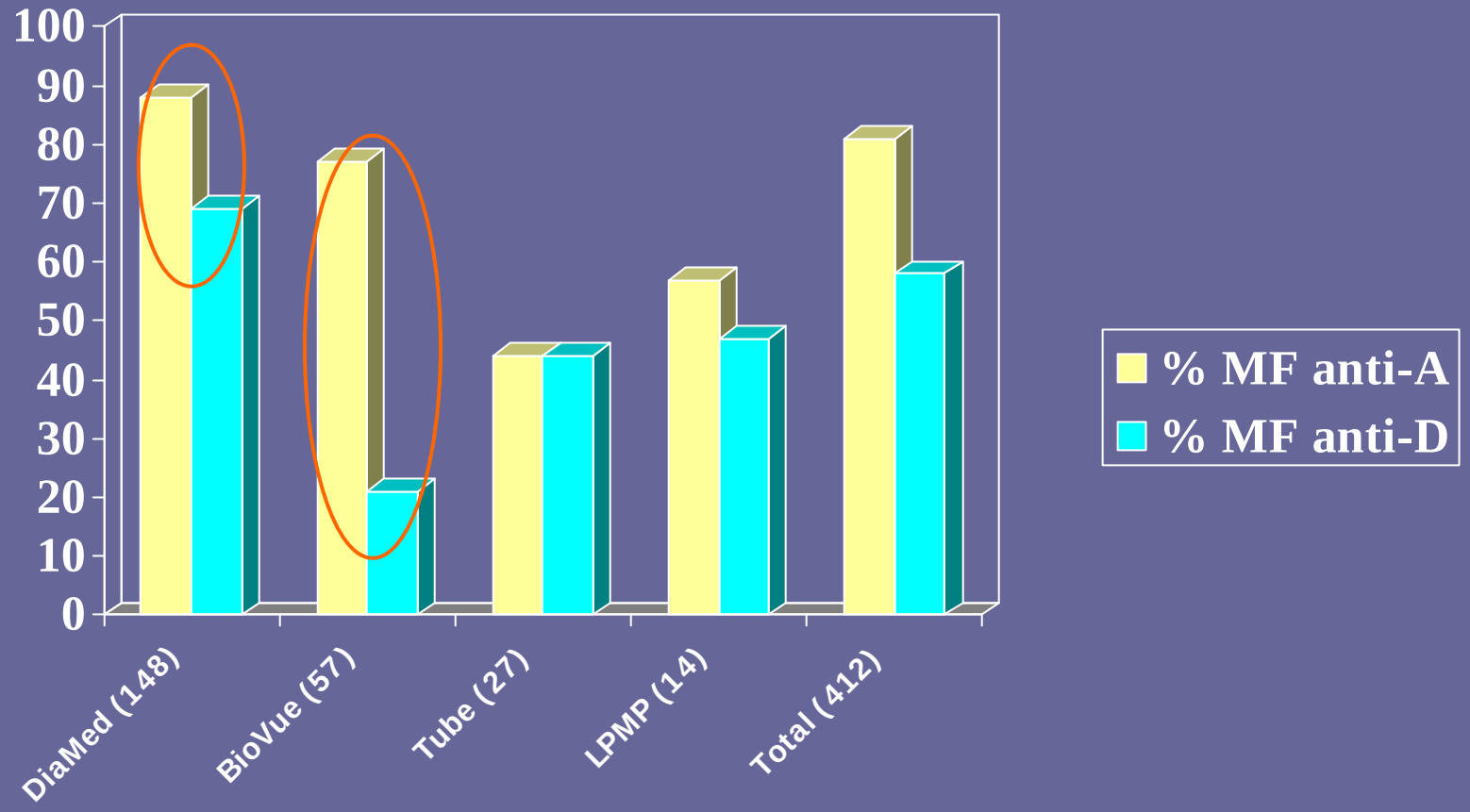
10R7 P1: A+/O- (10:90)



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Theories: less than 50:50 D+ cells

Shear forces can disrupt agglutination

- **? > effect where few cells are agglutinated**
- **? Affected by reagent avidity**
- **? Anti-A higher affinity than anti-D**
- **? DiaMed anti-D higher affinity than BioVue**
- **? Also DiaMed (10:90 A+/O-) - automation**
  - **? Readers not detecting few dispersed weak agglutinates**

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Theories: 50:50 or more D+ cells

- 'Negative' cells trapped amongst agglutinates formed by D positive cells and anti-D
- Appears to be exacerbated by presence of potentiators
- Increasing effect with increasing proportion of D positive cells

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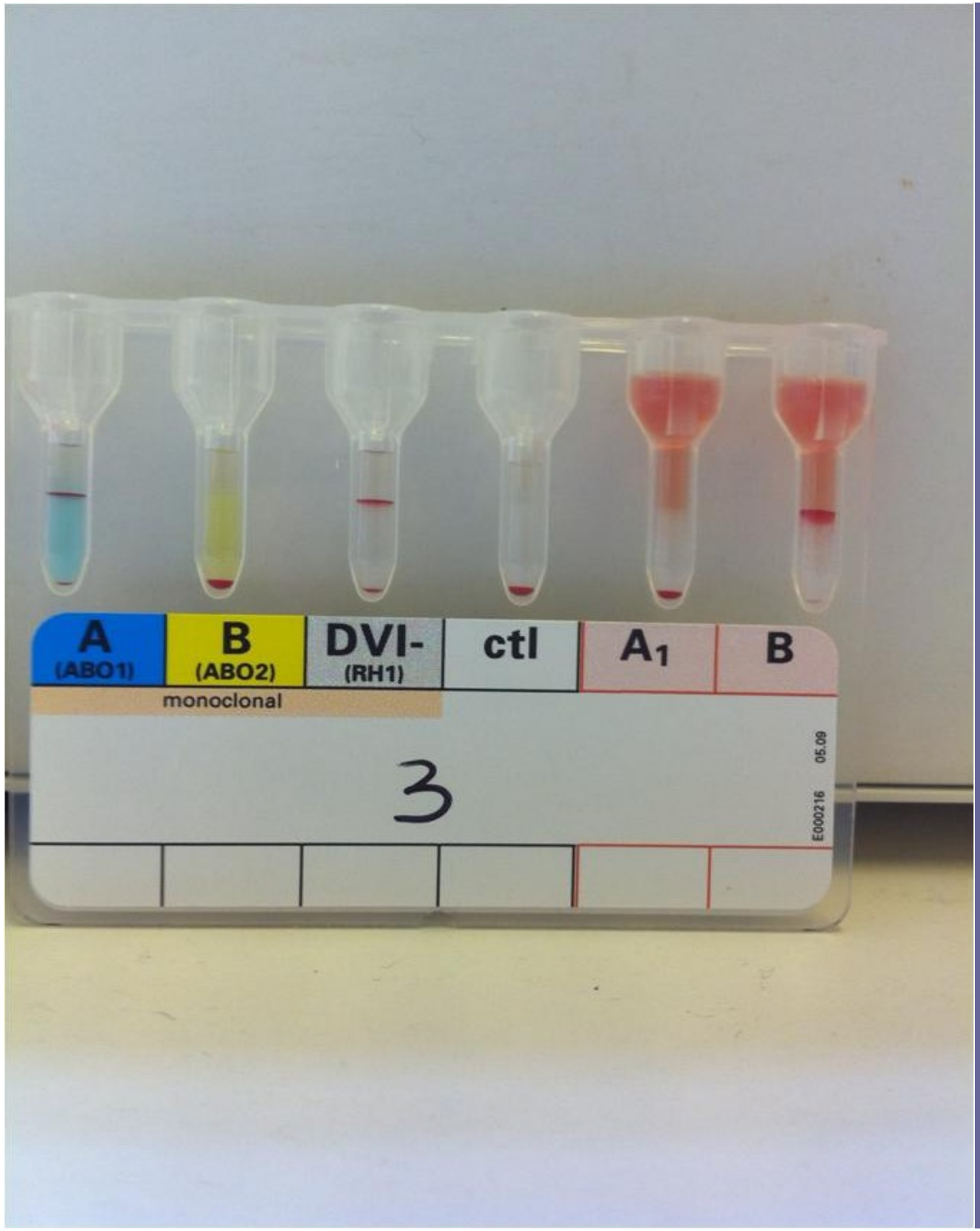

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Patient: Anne Omaly, age 34

Anti-A	Anti-B	Anti-D	Control	A cells	B cells
MF	0	MF	0	0	3+

Clinical Details and Transfusion history

NONE!

Blood Group	?	Why	Why not?
A Positive	x	A+ given O-? Rev. A	No history
A negative	x	A- given O+?	No history + vs. policy D
O positive	x	O+ given A-	Unlikely - or is it!
O negative	x	O- given A+	as above
Can't say	√	Could be any or something else	No history or clinical details

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UK NEQAS data - interpretation 10R7 MF A+/O- (25:75)

- 22.5% detecting MF vs. anti-A reported group A
- 15% detecting MF vs. anti-D reported D pos or D variant.

Patient: Anne Omaly, age 34

Anti-A	Anti-B	Anti-D	Control	A cells	B cells
MF	0	MF	0	0	3+

Clinical Details and Transfusion history

NONE!

No confirmed blood group

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What to do next?

- **Get clinical and transfusion history...**
- **Check condition of patient (?Tx reaction)**
- **Find out how urgent request is**
- **Issue group...**
  O D negative red cells
  A or AB FFP and platelets
  until blood group confirmed

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1. Clinical Details and Transfusion history

Group A+ at St Elsewhere's (antenatal notes)

Transfused 2 units O- red cells 4 weeks ago following ruptured ectopic

Anti-A	Anti-B	Anti-D	Control	A cells	B cells
MF	0	MF	0	0	3+

Group Red Cells to transfuse	?
A D positive	√
A D negative	x
O D positive	x
O D negative	x
Other	x

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2. Clinical Details and Transfusion history

Same patient (Anne Omaly, age 34)

Group A D positive recipient of HSCT from an O D negative donor

2 months ago at referral centre

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Knowledge required (1)

- **HSCT changing blood groups**
  - Risk of delayed haemolysis
  - Antibodies from residual host lymphocytes
  - Antibodies from donor
  - Require careful selection of group of components to be compatible with recipient and donor
- **Standard patient requirements**
  - Antigen negative blood where clinically significant abs present
  - Avoid sensitisation to D
  - Female with child bearing potential

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Knowledge required (2)

Incompatibility	Donor	Recipient	Red cells	Platelets	FFP
Major ABO	A	O	O	A	A
	B	O	O	B	B
	AB	O	O	A	AB
	AB	A	O or A	A (HT neg)	AB
	AB	B	O or B	B (HT neg)	AB
Minor ABO	O	A	O	A	A
	O	B	O	B	B
	O	AB	O	A	AB
	A	AB	O or A	A (HT neg)	AB
	B	AB	O or B	B (HT neg)	AB
Combined ABO	A	B	O	B	AB
	B	A	O	A	AB

Based on BCSH and NBS guidance

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OR maybe...

If any ABO mismatch

- Give group O red cells
- Group AB plasma
- Platelets AB, or compatible with recipient and donor

If patient or donor is D negative

Patient or donor is D negative

- select D negative red cells and platelets

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Clinical Details and Transfusion history

HSCT 2 months ago

Recipient A D positive, female, age 34

Donor O D negative

Anti-A	Anti-B	Anti-D	Control	A cells	B cells
MF	0	MF	0	0	3+

Red cells	?
A D positive	x
A D negative	x
O D positive	x
O D negative	√
Other	x

FFP	?
A	√
B	X
O	X
AB	√
Any D type?	√

Platelets	?
A	√
B	X
O	X
AB	√
Any D type?	X

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Where things could go wrong with dual populations

1. DP not always detected by all technologies
2. MF reactions not recognised when present
3. Safe ABO/D interpretations are not always made based on MF reactions

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Potential Consequences

1. Transfusion reaction not recognised or exacerbated if incorrect group given

2. Continuing unnecessary use of O D negative blood, possibly leading to incorrect blood group being recorded in LIMS

3. HSCT not recognised in shared care situation, wrong blood group given leading to haemolysis, also other special requirements not met.

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