

# Blood matters in pregnancy...



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## GUIDELINES

# Guideline for blood grouping and antibody testing in pregnancy

British Committee for Standards in Haematology Blood Transfusion Task Force

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*\*National Blood Service, Manchester; †Department of Haematology, Derby City Hospital, Derby; ‡University of Salford, Salford, Greater Manchester; and §Department of Haematology, University Hospitals of Leicester, Leicester, UK*

- Sample acceptance criteria same as pre-transfusion testing

Adherence to a strict specimen-labeling policy  
decreases the incidence of erroneous blood grouping  
of blood bank specimens



*J.A. Lumadue, J.S. Boyd, and P.M. Ness*

- Rejected samples tested for 1 yr
- Results compared to historical data
- Poorly labelled samples 40x more likely to be from wrong patient



## Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories\*

British Committee for Standards in Haematology

C. Milkins,<sup>1</sup> J. Berryman,<sup>2</sup> C. Cantwell,<sup>3</sup> C. Elliott,<sup>4</sup> R. Haggas,<sup>5</sup> J. Jones,<sup>6</sup> M. Rowley,<sup>3,7</sup> M. Williams<sup>8</sup> & N. Win<sup>9</sup>

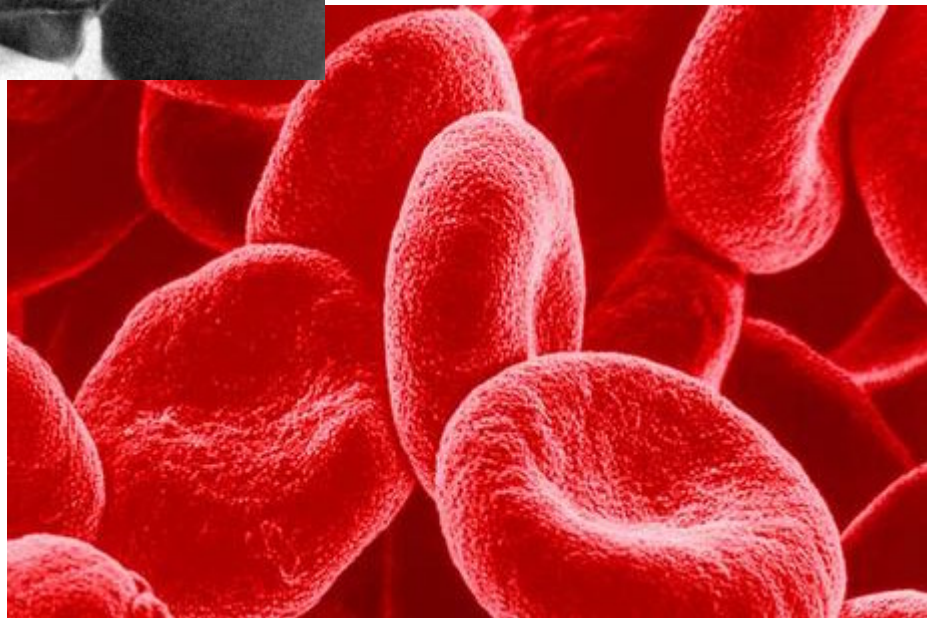
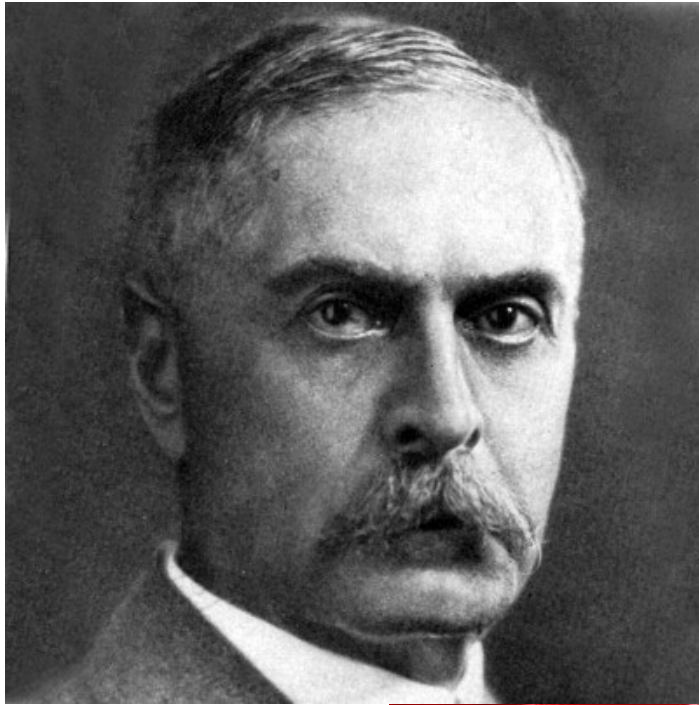
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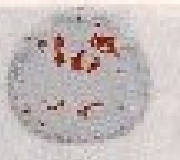

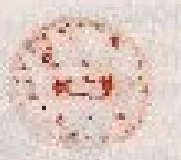


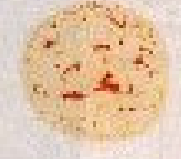
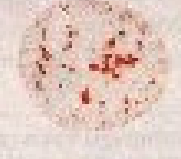


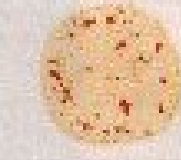





Serological studies should be performed using blood collected no more than 3 days in advance of the actual transfusion when the patient has been transfused or pregnant within the preceding 3 months.

# What we provide

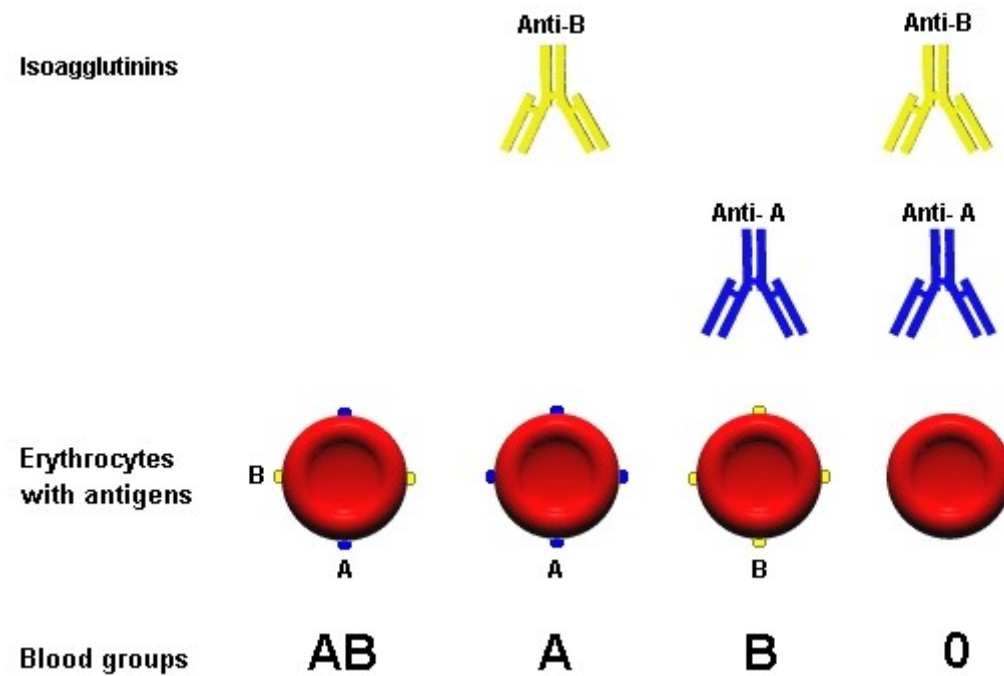
- Blood group & antibody screen
  - Routine testing
  - Testing following Ab production
- Anti-D
- FMH estimation
- Postnatal testing
- Support in obstetric haemorrhage



# Grouping

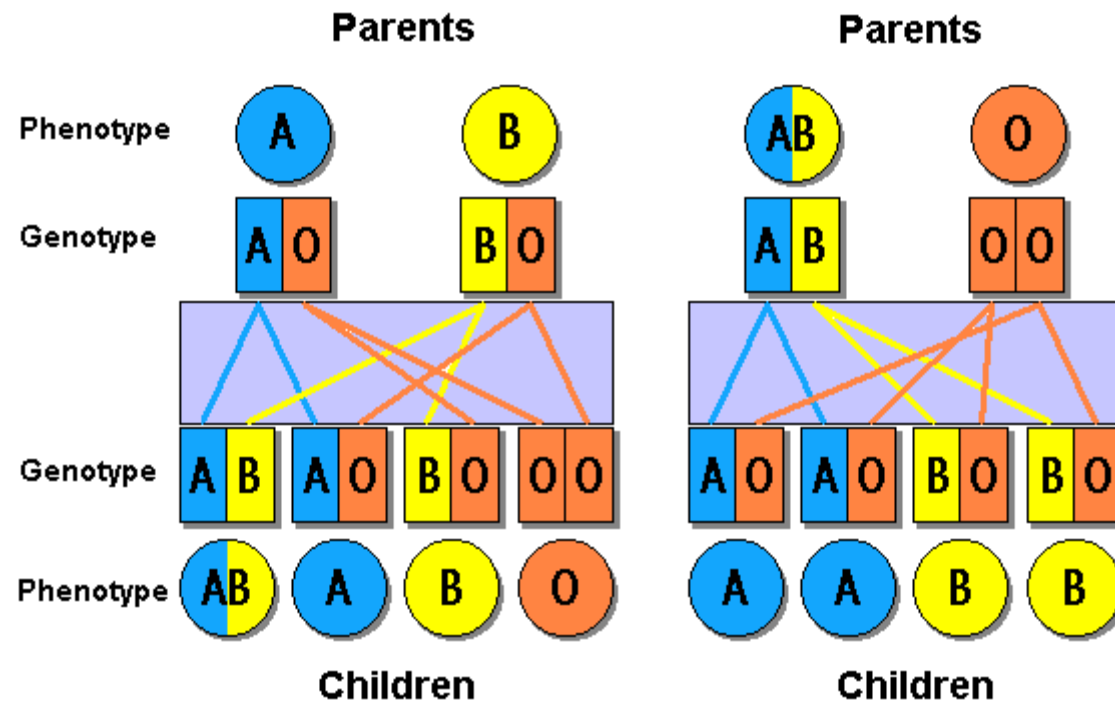
Blood group				
O	A	B	AB	
				A
				B
Antisera				
				AB
				O

# Grouping



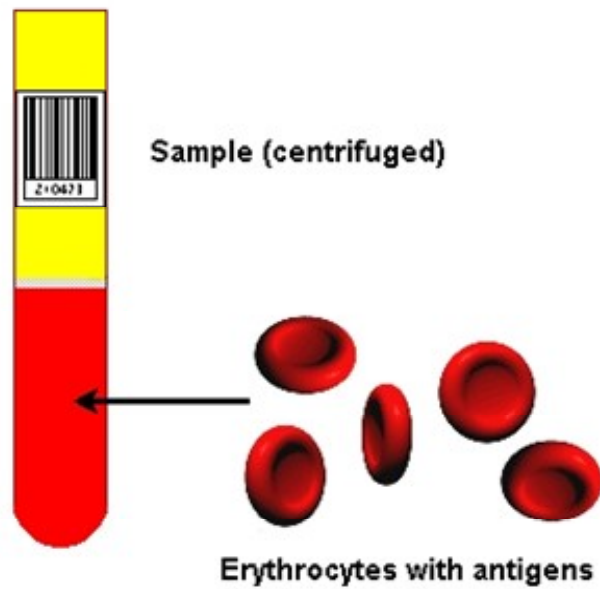


# Grouping

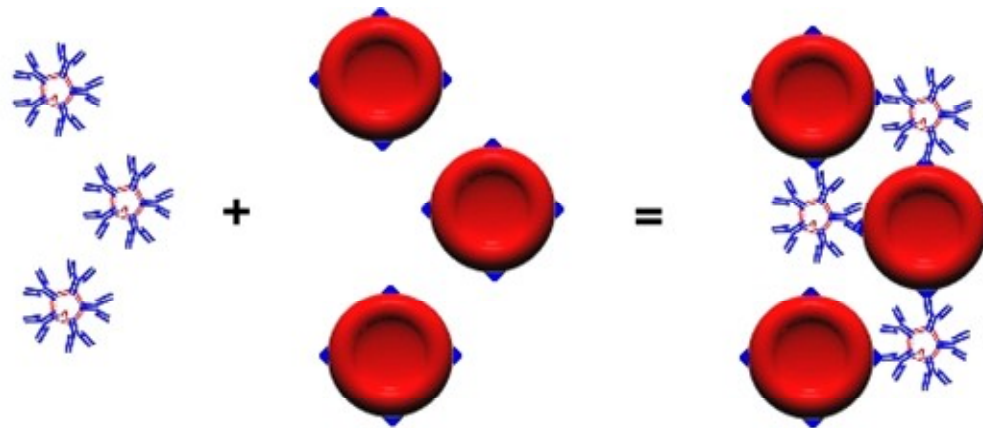


# How we test

## Antigen Detection



# How we test

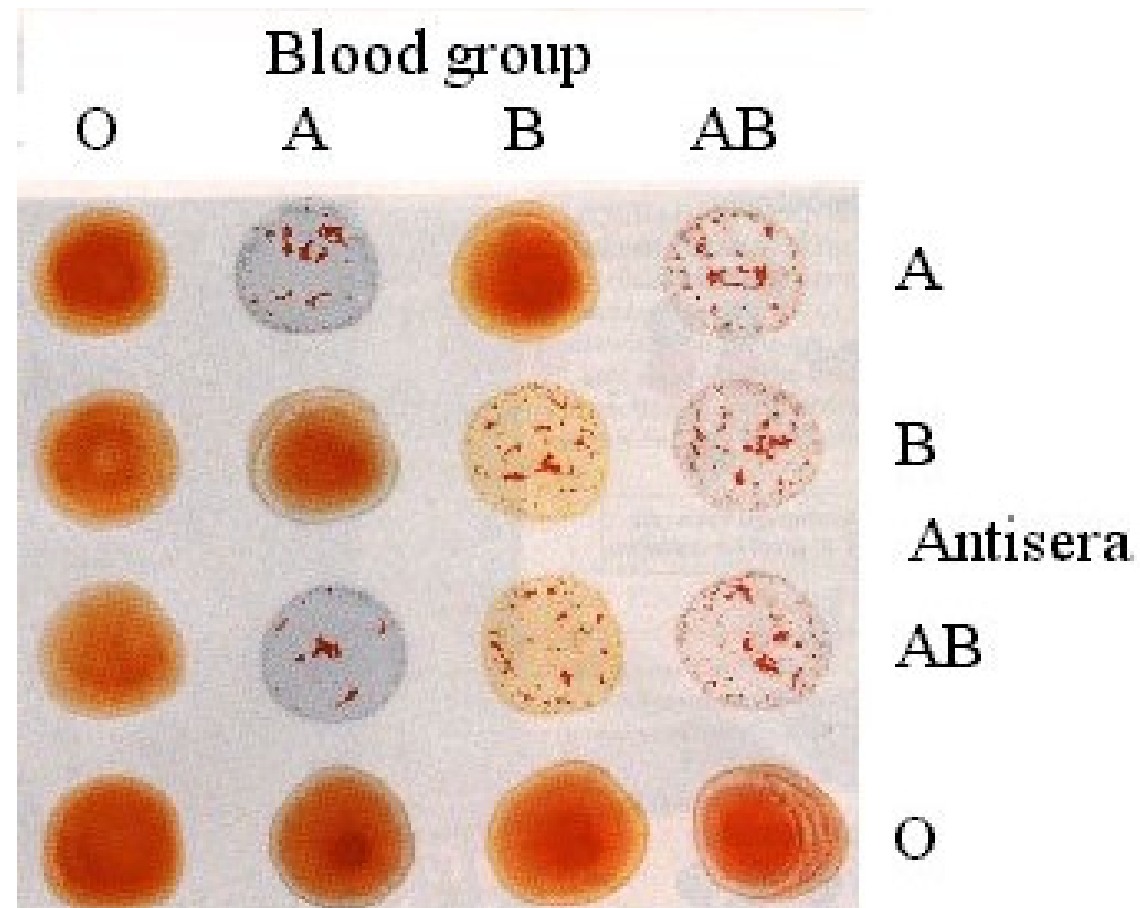


Example:  
Anti-A Antibody

Erythrocytes with antigen A

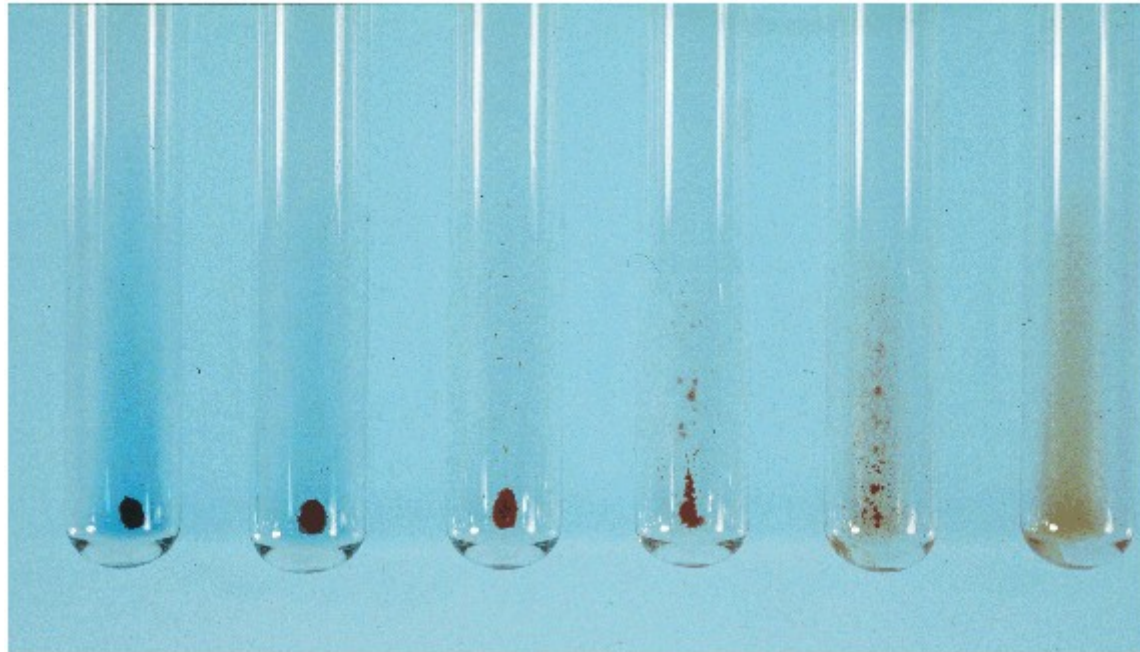
Agglutination

# How we test



# How we test

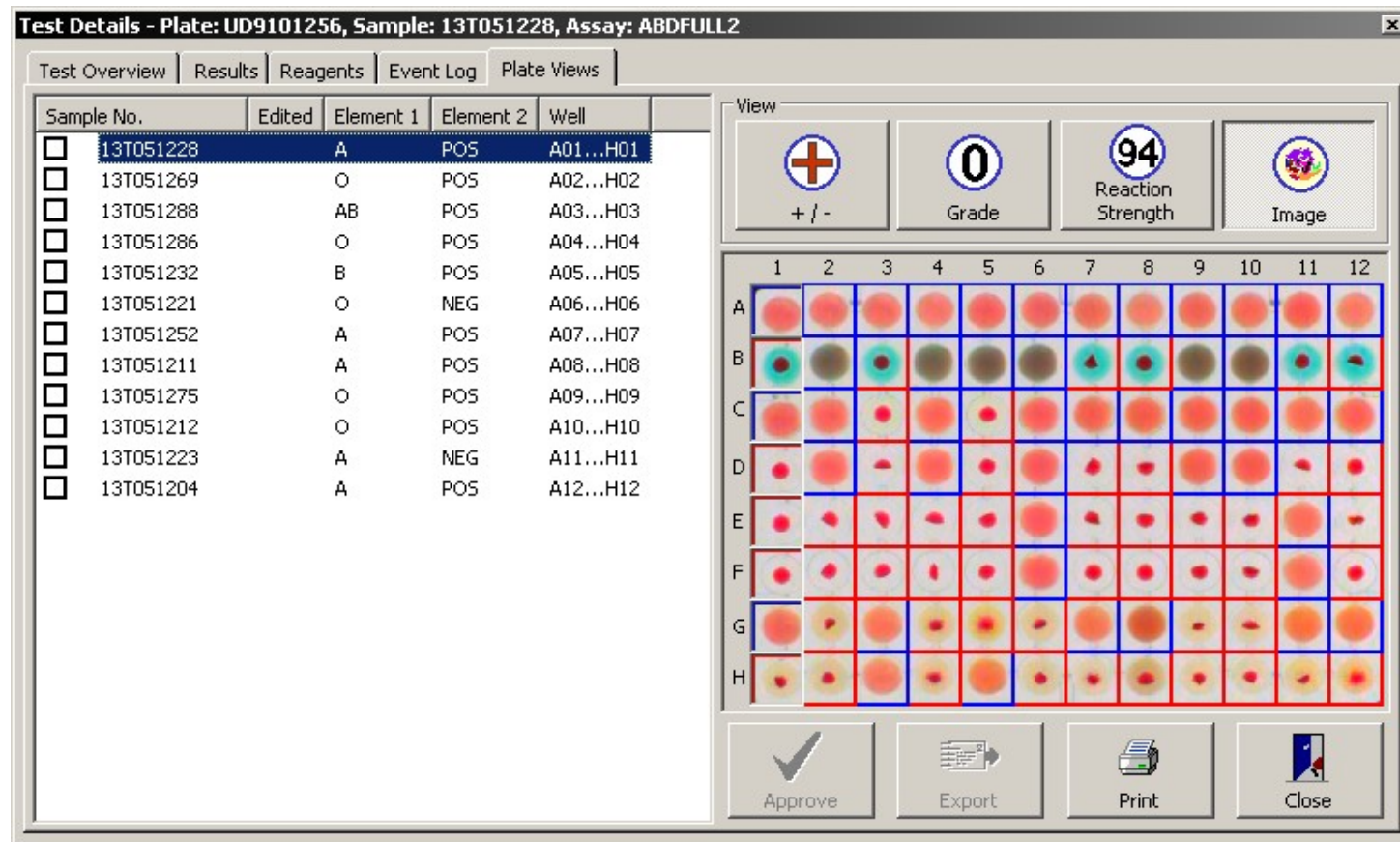
Tube Technique



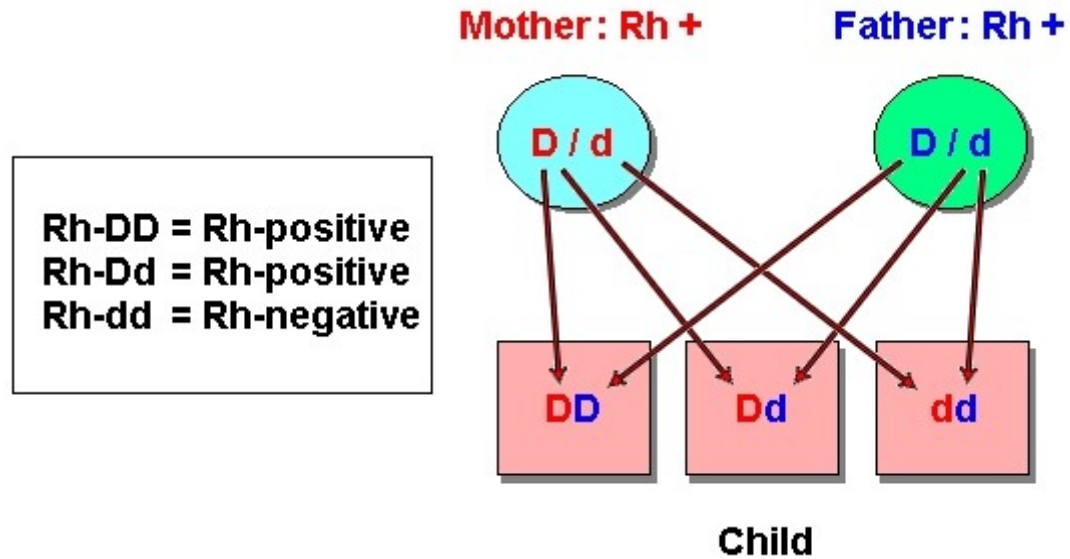
# How we test



# How we test

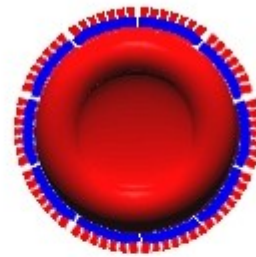


# Grouping

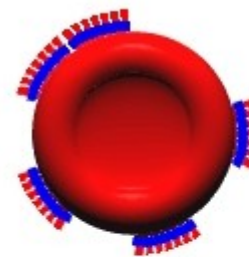




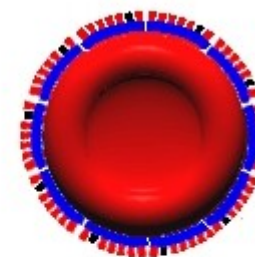
# Weak D



**Normal D-Antigen**



**D-weak**



**D-Variant**

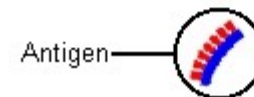
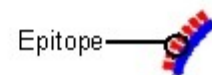
**Epitope:** Normal  
**Antigen frequency:** Normal

Normal  
Reduced

Mutated  
Normal or reduced

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Legend:



# Why do we group?

- To identify Rh(D) Negative women

## **Blood grouping and red-cell alloantibodies**

- Women should be screened for atypical red-cell alloantibodies in early pregnancy and again at 28 weeks, regardless of their rhesus D status.
- If a pregnant woman is rhesus D-negative, consideration should be given to offering partner testing to determine whether the administration of anti-D prophylaxis is necessary



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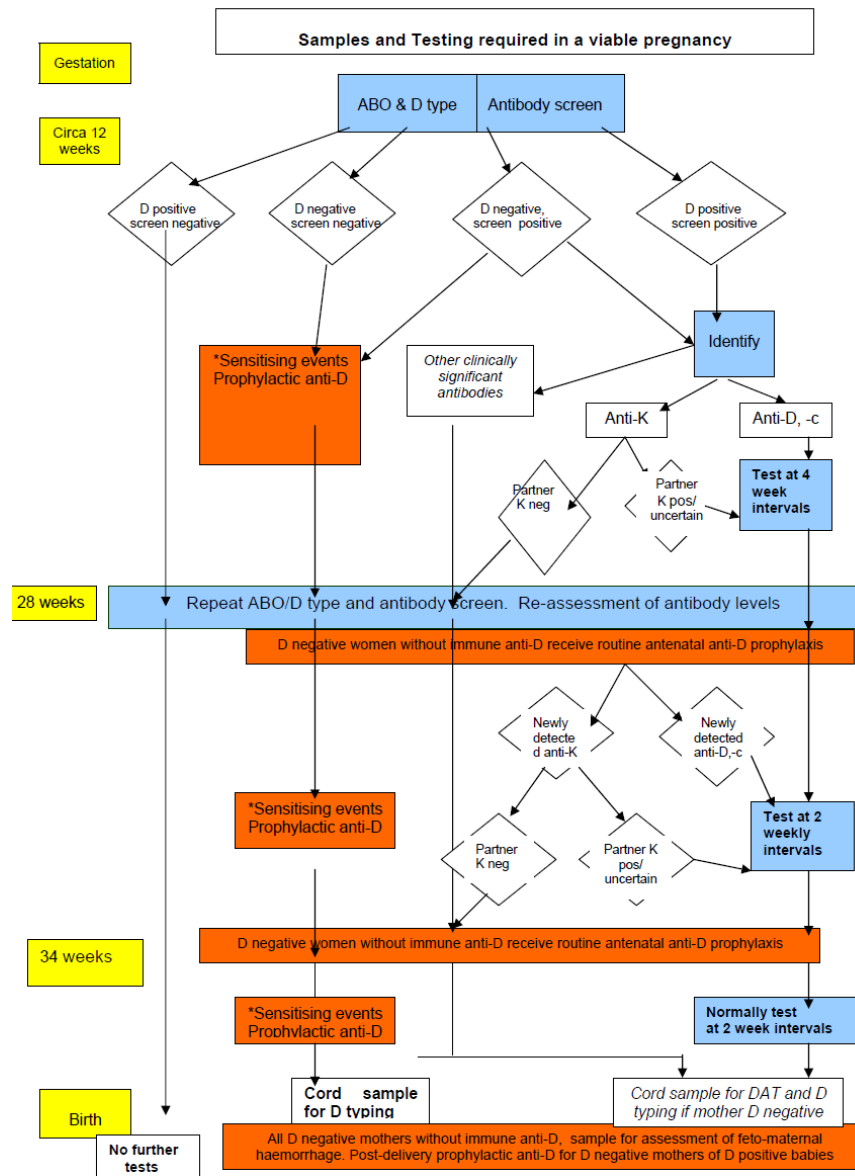
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- All pregnant women should be ABO & Rh(D) typed early in pregnancy (10-16/40)
- This should be repeated at 28/40
- No further ***routine*** grouping/screening required

# GUIDELINE FOR BLOOD GROUPING AND ANTIBODY TESTING IN PREGNANCY



# Why we don't ...

## **Group O**

- Powerful leaders
- Goal-oriented
- Enthusiastic
- Optimistic
- Ambitious
- Very cautious
- Good under pressure

## **Group B**

- Flexible thinkers
- Passionate
- Inconsiderate
- Unconventional
- Have excellent concentration

## **Group A**

- Perfectionist
- Orderly
- Detail-oriented
- Industrious
- Idealistic
- Soft-spoken
- Safe drivers

## **Group AB**

- Complicated personality
- Great organizers
- Sensitive, easily hurt
- Rational
- Imaginative

# Why we don't ...

## **Group O**

- 'First blood type'
- Hunter/Gatherers
- High protein
- Meat-based diet

## **Group A**

- Agrarian
- Vegetarian-type diet

## **Group B**

- Evolved after O & A
- Nomadic forebears
- Varied diet

## **Group AB**

- 'Last' blood group
- Diet should be a 'mixture of group A & B type diet'!

# Why we don't ...

- O 'Visceral & intense.  
Carnal & primitive'
- A 'Green & aromatic,  
reassuring & clean'
- B 'woody & spicy,  
nomadic & eclectic'
- AB 'Synthetic &  
individualist,  
uninhibited & visionary'

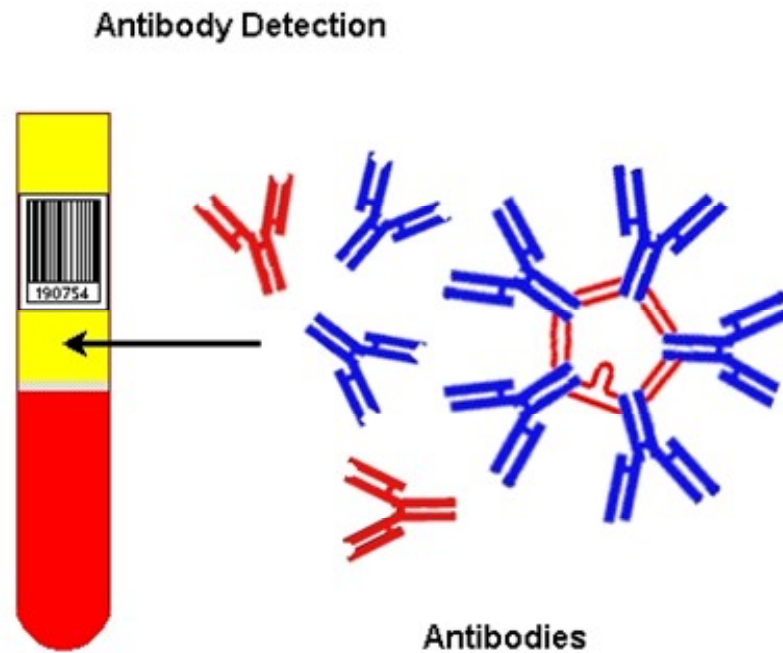




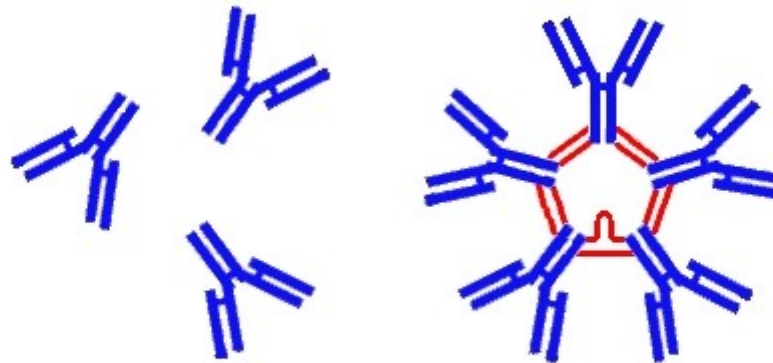
# Antibodies

- Stimulated by
  - Blood transfusion
  - Pregnancy
  - Environmental factors

# What we test



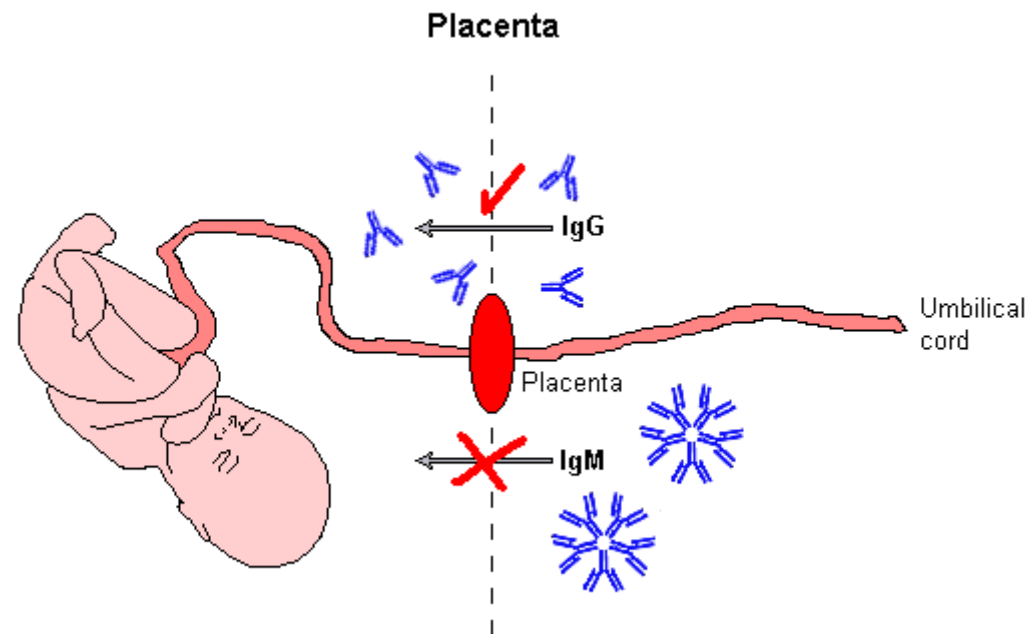
# What we test



IgG

IgM

# What we test

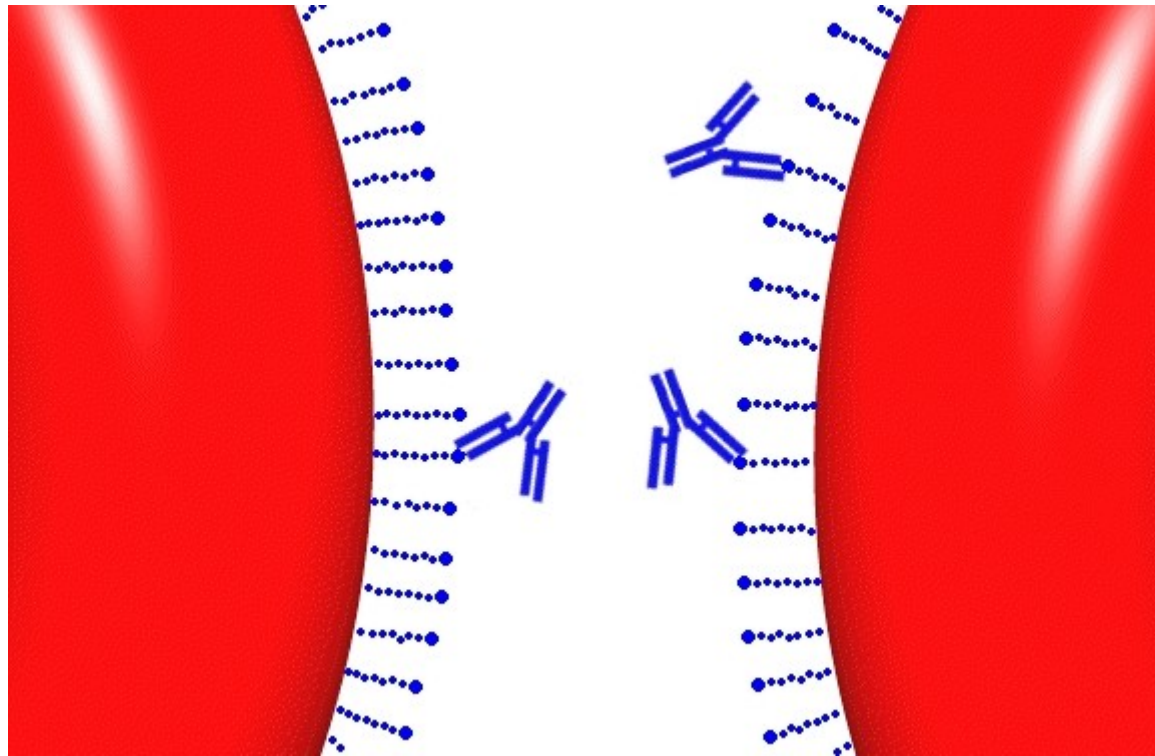


# What we test

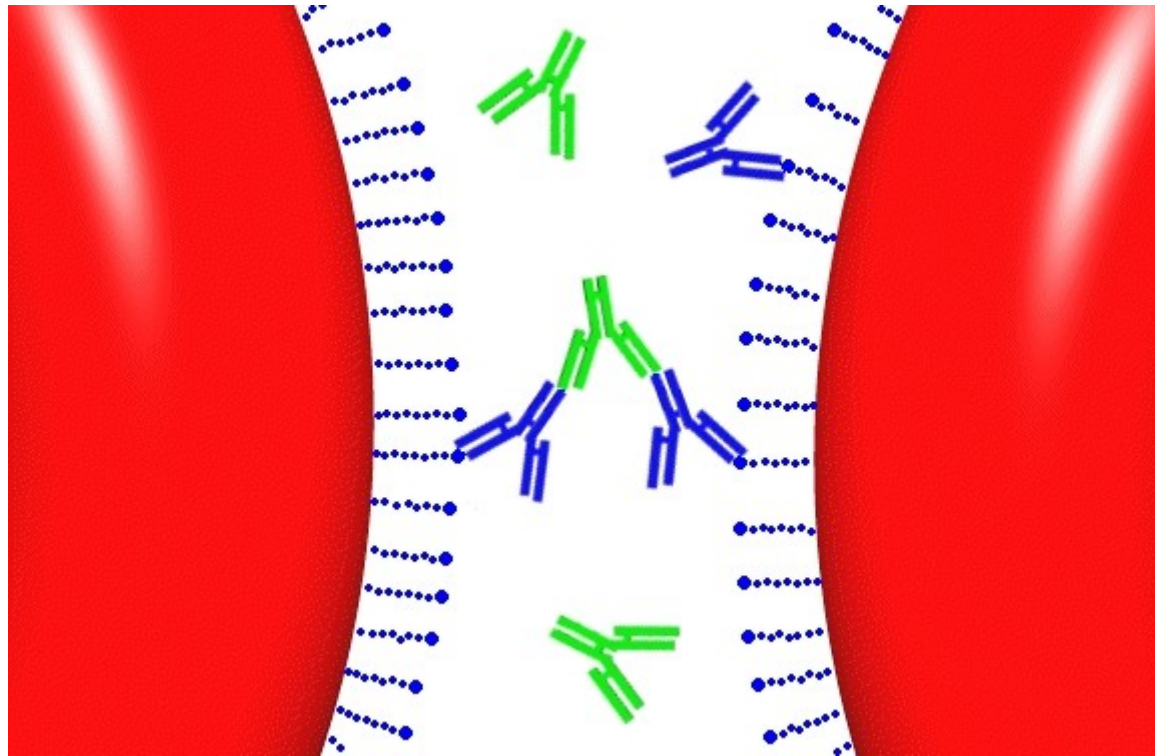
Antibody Binding



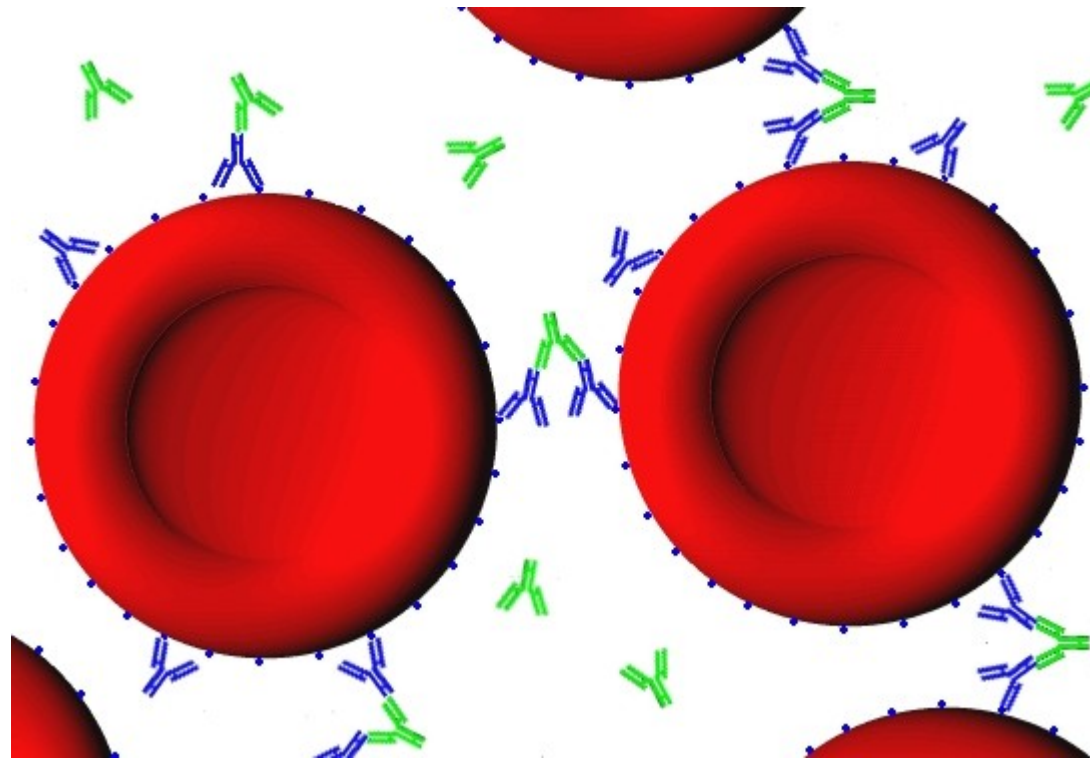
# What we test



# What we test

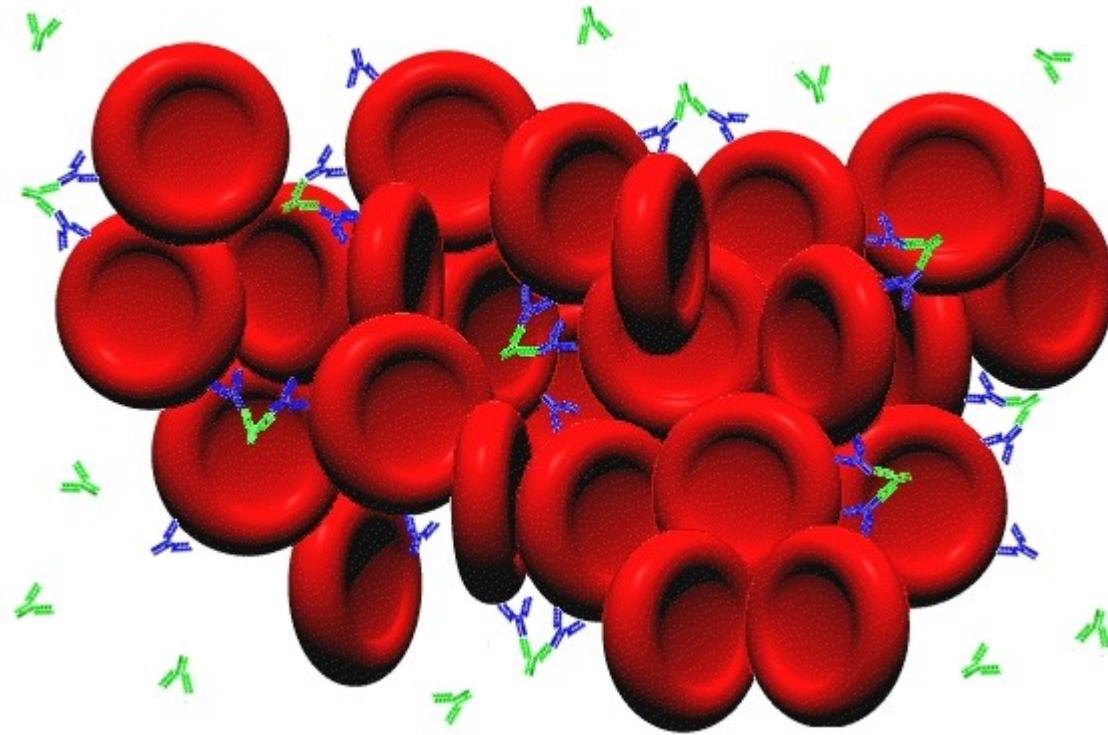


# What we test





# What we test



# Why do we Ab screen?

- To identify foetuses at risk of HDFN
- To predict the severity of HDFN and plan treatment
- To identify potential transfusion problems

# Ab's in pregnancy

- Anti-D, anti-c and anti-K are most often implicated in severe HDFN
- Anti-D and anti-c should be monitored by antibody quantitation in iu/mL
- All other antibodies titrated

# Ab's in pregnancy

- 'other' specificities
  - Next most likely to cause HDFN:  
C, E, Fy<sup>a</sup>, Jk<sup>a</sup>
  - In general, a titre of 32 or greater is likely to cause HDN, but there is no definitive link between titre and HDFN

# Ab's in pregnancy

- Where antibody detected is anti-D, c or K
  - Re-test monthly to 28/40, then every 2 weeks to delivery
  - At delivery test placental blood for DAT
    - If positive test Hb & bilirubin

# Ab's in pregnancy

- All other antibodies (other than D, c or K)
- Re-test once at 28/40
  - Sample should be screened for additional antibodies
- At delivery test placental blood for DAT
  - If positive test Hb & bilirubin

# Ab's in pregnancy

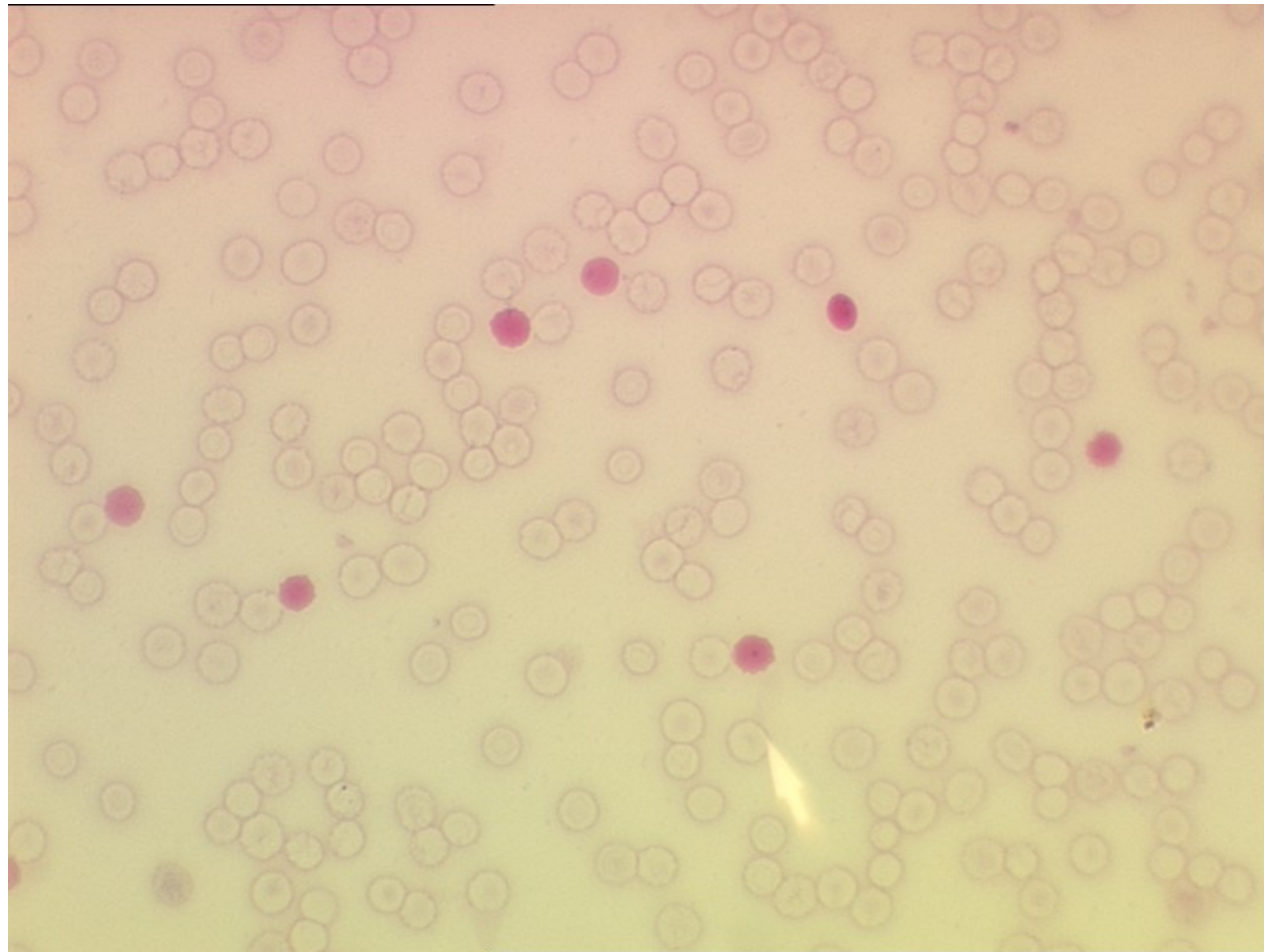
- Important to tell lab on admission
- Potential for delay in blood for mother
- Plan ahead – blood for baby

# Sensitising events Rh(D) Neg's

- $<12/40$  – No Kleihauer, No anti-D
- $<20/40$  – No Kleihauer, give anti-D
- $>20/40$  – Kleihauer, give anti-D
- Post delivery (Rh(D) Pos or UK)



# Kleihauer



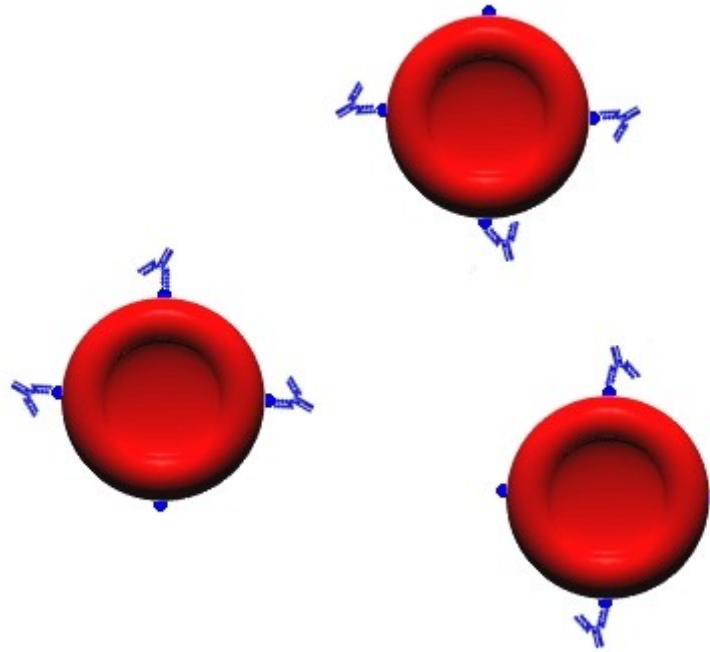
# Cord blood testing

- Cord bloods on all infants delivered to Rh(D) Neg women & those with clinically significant antibodies
- DAT only performed in the presence of maternal antibody or significant jaundice

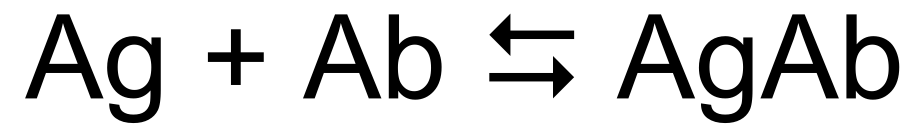
# Cord blood testing

- DAT positive alone is not diagnostic
- Problems post RAADP
- If DAT positive, lab should elute antibody

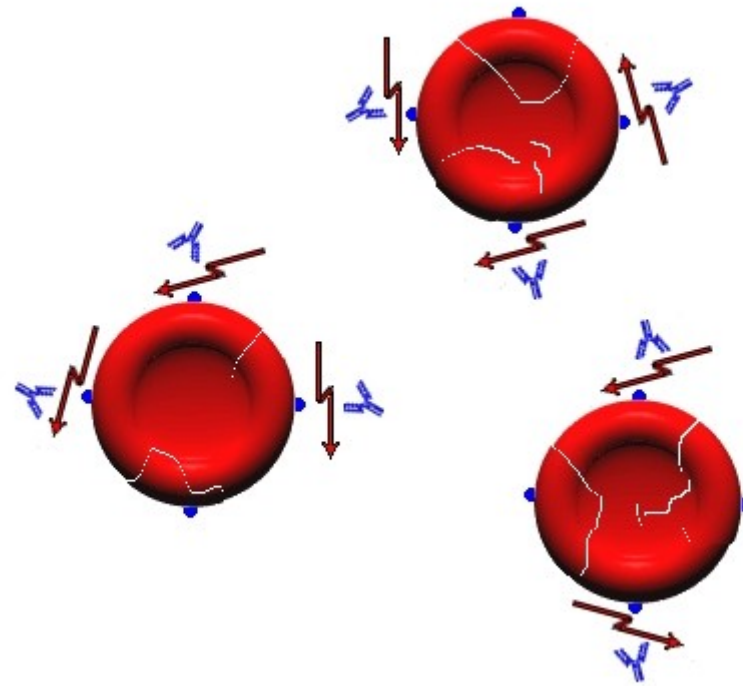
# Elution



# Elution



# Elution



# Support in major haemorrhage

- Be aware of your local MHP
- Transfusion lab key in successful outcomes
- Communicate effectively
- Product and test guidance

# Summary

- ABO Rh(D) type to identify women eligible for anti-D prophylaxis
- Screen all women for red cell antibodies
  - Monitor those of clinical significance
- Cord group on children of Rh(D) neg women (and those with clinically significant antibodies)



# Summary

- FMH estimation for events  $>20/40$
- Talk to the lab
  - (we're really not that bad...)