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Antibodies in Pregnancy; Detection, Significance and Monitoring.

Presented by
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The *BCSH* Guideline for Blood Grouping and Antibody testing in Pregnancy, last published in 2006, was due for review in 2008.

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The Guideline may be split into two; “Blood Grouping in Pregnancy” and “*RCOG* Red Cell Antibody in Pregnancy Guidelines.”

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The 2006 Guideline recommended that the woman be typed for ABO and D at booking (usually about 12 weeks gestation) and her plasma screen for the presence of alloantibodies.

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This screen for alloantibodies is identical to that used for pre-transfusion testing. In other words, the use of the indirect antiglobulin test (IAT) is recommended, whilst the use of papain-treated red cells is not.

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The screening cells should comply with the current *BCSH* Guidelines for Pre-transfusion Compatibility Procedures in Blood Transfusion Laboratories.

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The minimum requirement is that one cell should be R_2R_2 and the other R_1R_1 (or $R_1{}^wR_1$) and express M, N, S, s, P1, K, k, Le^a, Le^b, Fy^a, Fy^b, Jk^a and Jk^b.

There should be homozygous expression of the S, s, Fy^a, Fy^b, Jk^a and Jk^b antigens.

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If no alloantibodies are detected at booking, then the ABO and D type and alloantibody screen should be repeated at 28 weeks gestation.

If none are detected at this stage, there is no requirement to retest during that pregnancy.

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If an alloantibody is detected at either of these stages, the specificity(ies) must be identified and, if appropriate, the titre or quantity of the antibody assessed.

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By no means have all antibody specificities been implicated in clinically significant haemolytic disease of the foetus and newborn.

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This may be because the corresponding antigen is not well developed *in utero*, for example, Lewis Blood Group System antigens.

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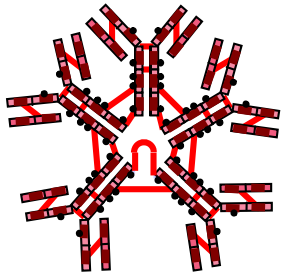
This may be because the antibody is IgM and so will not cross the placenta, for example, the anti-I of the I Blood Group System.



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This may be because the foetal antigen is expressed on the apical surface of trophoblasts in the placenta, and so the maternal antibody is adsorbed onto these, for example, the anti-Cr^a of the Cromer Blood Group System.

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IgG antibodies are actively transported across the placenta by attachment to a molecule that is specific to the IgG subclass, rather than crossing by diffusion.

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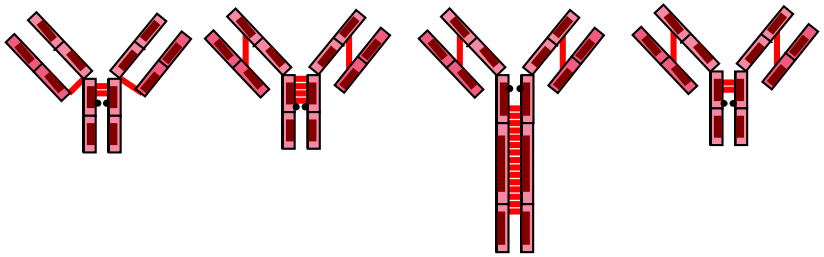
It may be that the antibody is IgG, but of the "wrong" IgG subclass to be transported across the placenta.



IgG1 IgG2 IgG3 IgG4

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A combination of these.

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Of course, the father may not carry the gene responsible for expression of the corresponding antigen, in which case it is highly unlikely that the foetus will express the corresponding antigen on its red cells.

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The three most commonly detected alloantibodies that cause clinically significant haemolytic disease of the foetus and newborn are anti-D, anti-c and anti-K.

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DucK

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It is recommended that these antibodies are monitored every 4 weeks until 28 weeks gestation, and then every 2 weeks until delivery.

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Antibody Levels and HDFN.

For anti-D:

- <4 $IUmL^{-1}$ low risk of HDFN.
- 4 –10 $IUmL^{-1}$ moderate risk of HDFN.
- >15 $IUmL^{-1}$ high risk of HDFN.
- >20 $IUmL^{-1}$ risk of hydrops very high.

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Antibody Levels and HDFN.

For anti-c:

- <7.5 $IUmL^{-1}$ low risk of HDFN.
- 7.5 - 20 $IUmL^{-1}$ moderate risk of HDFN.
- >20 $IUmL^{-1}$, high risk of HDFN.

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Antibody Levels and HDFN.

For other antibodies known to cause HDFN:

- For a titre of <32, there is low risk of HDFN.

- For a titre of 32 or greater, there is a higher risk of HDFN.

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For almost all specificities, other than anti-D, anti-c and anti-K, we check the titre at 28 weeks gestation and, unless this titre is particularly high, we would not test again during the pregnancy.