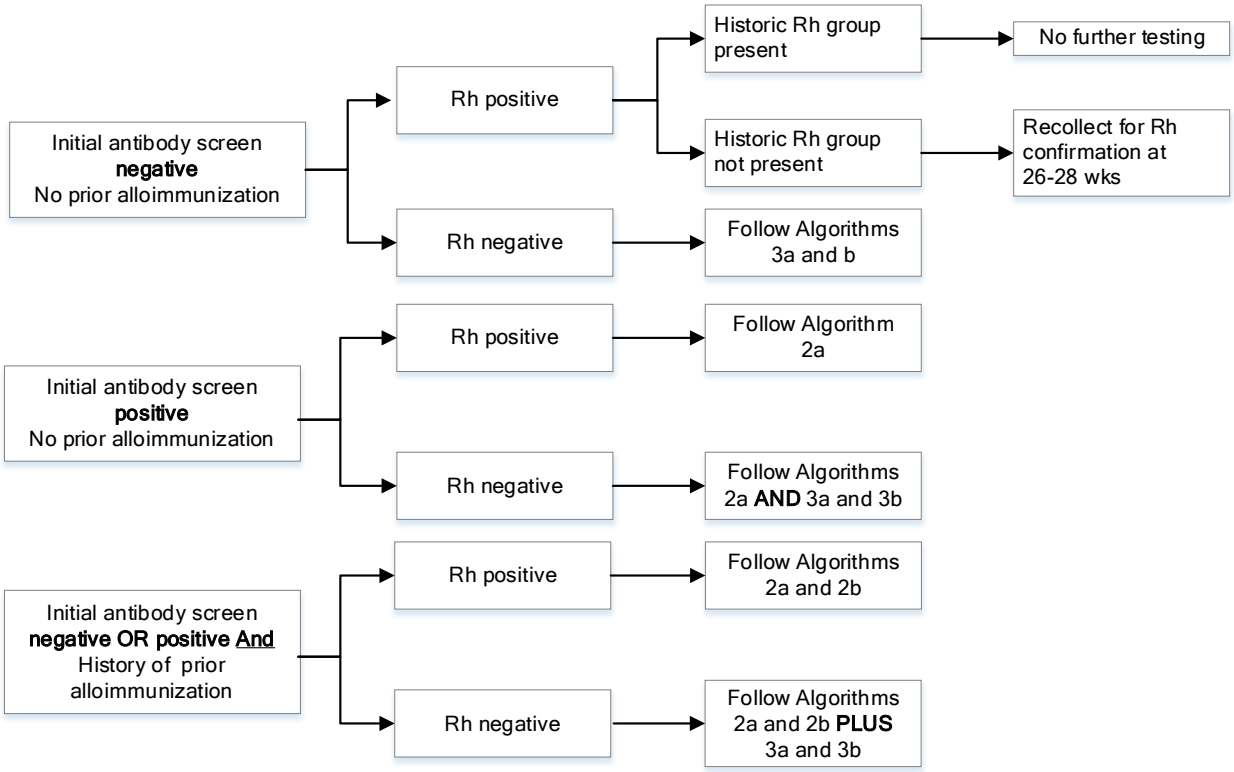
Saskatchewan Health Authority

Algorithm 1

Prenatal Transfusion Testing Overview



wks = weeks

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Appendix 1
Relationship of minor red cell antigens/antibodies to hemolytic disease of fetus and newborn

Red Cell Group Antibody[1, 2]	Severity of Disease	Notes
Rhesus group (D, C, c, E, e)	Antibodies of the Rh system can cause mild to severe HDFN	Anti-D and anti-E are most commonly encountered antibodies in this group. Anti D and anti c can cause severe HDFN Multiple other rare antibodies against Rh system also cause severe HDFN (G, ce, Ce, Cw, EW, HrO, Hr, Rh29, Rh32, Bea, Evans, Tar, Rh46, Gao)
Kell group	Antibodies of the Kell system can cause severe HDFN	Most common immune red cell antibody outside of the ABO and Rhesus groups. Kell antibody is critical regardless of titer and is associated with suppression of fetal/neonatal erythropoiesis leading to prolonged anemia Severe HDFN due to antibodies against other antigens of the Kell group(k, Kpa, Kpb, Jsa, Jsb, Ula, Ku, K22) have been reported
MNS system	Anti S, s and U can cause HDFN Anti-N is not associated with HDFN	Anti-M is usually a cold reacting antibody but IgG reacting anti M can cause HDFN at high titers by suppressing fetal erythropoiesis. It rarely reaches critical titers in pregnancy
Diego system	Anti Di, Di^b and Wr^a can cause HDFN of varying severity	Rare antibodies
Duffy system	Anti- Fy^a and Fy^b can both cause HDFN	Anti-Fya, in combination with Rh antibodies can cause severe anemia in neonate. Anti Fy^b rarely causes mild HDFN
Kidd system	Jka and Jkb can both cause HDFN	Anti Jkb rarely causes mild HDFN
Lutheran	Lua and Lub can both cause HDFN	Antibody is absorbed by the placenta and is weakly expressed. Hence the HDFN is usually mild especially with Lua
Lewis	Antibodies against Lewis antigens are not associated with HDFN	Not expressed on fetal RBC and are not active at 37°C
I	Antibodies against I antigens (I and i) are not associated with HDFN	
P1	Antibodies against P1 are not associated with HDFN.	Antibodies against the rare p phenotype can cause HDFN and spontaneous abortions
HLA antibodies	Not associated with HDFN	
ABO system	May cause neonatal jaundice but very rarely fetal anemia	Antibodies are bound to placental tissue therefore less likely to cross the placenta A and B antigens are poorly antigenic in the fetus

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References

1. Reid, Marion E., Christine Lomas-Francis, and Martin L. Olsson. The blood group antigen factsbook. Academic press, 2012.
2. AABB Tormey, C. A., et al. "Technical manual." (2017): 683-94.