

# Modern Rhesus (Rh) typing in transfusion and pregnancy

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## 1 Patients who are Rhesus (Rh) negative lack the D antigen on their red blood cells

Patients who are Rh negative, if transfused with Rh-positive blood, can become immunized for anti-D immunoglobulin (Ig).<sup>1</sup> These patients are at risk of severe transfusion reactions, and if they become pregnant, the fetus is at risk of severe anemia. A small number (0.5%) of patients have a serologic “weak D” phenotype, and when these patients need a transfusion, providers are left wondering if Rh-negative red blood cells and RhIg prophylaxis are needed.

## 2 More than 160 distinct molecular weak D types are known

Weak D types are clustered by ethnic origin. Types 1 to 3 are typical in White people, type 4 variants cluster in Black people and type 15 is found most often in East Asian people. Other weak D types are encountered sporadically.

## 3 Molecular typing of weak D improves patient safety without increasing costs

Although the technology for molecular typing has been established for 2 decades, only the serologic test is routinely applied. Molecular typing is reliable, and applying this precision medicine approach can avoid unnecessary therapies, but it must be specially requested in many hospitals.<sup>2</sup>

## 4 Patients with the 5 most prevalent weak D types can be safely treated as Rh positive

Patients carrying the molecular weak D types 1, 2, 3, 4.0 or 4.1 should be treated as Rh positive.<sup>3</sup> Pregnant women with these weak D phenotypes do not benefit from RhIg prophylaxis.<sup>4</sup> They should not be exposed to RhIg, which is pooled from thousands of immunized donors. This approach conserves the limited supply of Rh-negative blood.<sup>5</sup>

## 5 Patients carrying less common molecular weak D types should be treated as Rh negative

Less common types include the weak D type 4.2, though it is more prevalent among people of African descent.<sup>6</sup> An exhaustive list of weak D types that should be treated as Rh negative is maintained by the International Society of Blood Transfusion.<sup>7</sup> If providers are unsure about whether types should be treated as Rh positive or negative, an immunohematology reference laboratory should be contacted.

## References

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