NHMRC: IMPACT CASE STUDY

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Australian Government
National Health and Medical Research Council

NHMRC

Rhesus immunisation in Australia

Haemolytic disease of the fetus and newborn (HDFN) occurs during pregnancy when a woman's immune system produces antibodies that attack the fetus' red blood cells (RBCs). Once a major cause of infant mortality, today HDFN is almost non-existent in Australia due to the use of prophylactic Rh D immunoglobulin, routine antenatal screening for Rh blood groups and appropriate clinical management of mother and baby. Guidelines, initially produced by NHMRC, have assisted with translation of this research into clinical practice.

Origin

In 1940, the Rhesus antigen was discovered, this is a protein found on the surface of RBCs that determines a person's Rh D blood group. Rh incompatibility occurs during pregnancy when a pregnant woman with Rh D negative blood is exposed to Rh D positive blood of the fetus. This can cause the woman's immune system to attack the fetus' RBCs, leading to serious consequences for the child. Treatment was developed by researcher John Gorman and colleagues in 1958.

Investment

Dr Vera Krieger was a clinical biochemist who received NHMRC funding between 1939 and 1955. In 1941, Krieger began investigating the Rh factor and its connection to poor pregnancy outcomes. Krieger contibuted to the understanding of HDFN in Australia. In 1946, she published pamphlets providing guidance to medical professionals on how to manage patients with HDFN. These described the discovery of the Rh factor, how Rh D antibodies are produced during pregnancy and the treatment methods available at the time.

Research

In response to the need for Rh D antibody testing during pregnancy, Krieger established Australia's first antenatal Rh antibody testing clinic — at The Royal Women's Hospital in Melbourne — which was expanded to all gynaecological patients by the mid-1940s. From 1966 to 1968, Krieger and colleagues oversaw the Australian component of international clinical trials of Rh D immunoglobulin treatment, concluding that this was an effective prophylaxis against HDFN and could reduce, and possibly eliminate, blood type incompatibility diseases.

Translation

The Rh D Program
In 1967, Australia became the first country to implement an Rh D program to collect plasma from Rh D negative donors and manufacture Rh D immunoglobulin. In 1969, Australia offered free treatment to all pregnant Rh D negative women at risk of HDFN.

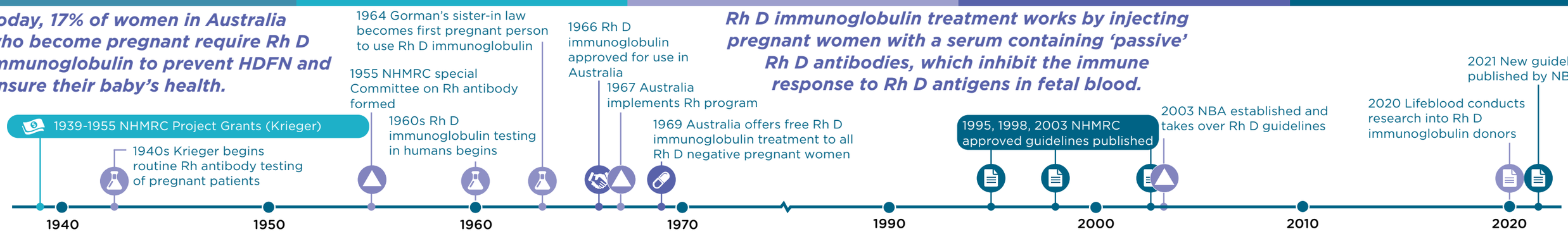
Guideline Development
NHMRC developed its first guidelines for the use of Rh D immunoglobulin in obstetrics in 1995, which were reviewed in 1998 and 2003. After its establishment in 2003, the guidelines were managed by the National Blood Authority (NBA).

Impact

Clinical incidence of HDFN is almost non-existent in Australia thanks to the discovery of Rh D immunoglobulin treatment, in conjunction with routine antenatal screening for Rh D blood groups and appropriate management of mother and baby. There are significant challenges in maintaining the supply of Rh D immunoglobulin in Australia due to the retirement of ageing donors, fewer new donors and ethical concerns about increasing the Rh D immunoglobulin levels in current donors.

Today, 17% of women in Australia who become pregnant require Rh D immunoglobulin to prevent HDFN and ensure their baby's health.

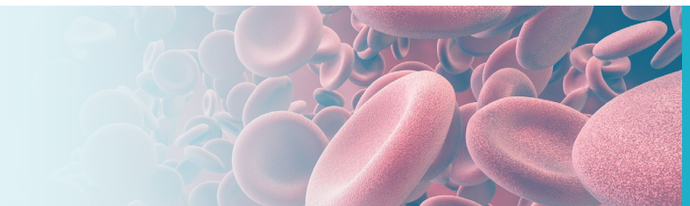
Rh D immunoglobulin treatment works by injecting pregnant women with a serum containing 'passive' Rh D antibodies, which inhibit the immune response to Rh D antigens in fetal blood.



Researchers

Dr Vera Krieger
Prof John Gorman

NHMRC Maternal Health Committee



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