NHMRC: IMPACT CASE STUDY

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Australian Government
National Health and Medical Research Council

NHMRC

Improving vision with corneal transplants

Corneal transplantation is the most common form of transplantation surgery occurring in the world and, globally, it provides improved vision to many thousands of people each year. NHMRC-funded researchers at Flinders Medical Centre and Flinders University have made major contributions to improving clinical and eye bank practice both in Australia and internationally, through their establishment of the Australian Corneal Graft Registry (ACGR), the largest registry of its type in the world.

Origin

The cornea - a transparent layer of tissue that sits at the front of the eye - protects the more internal parts of the eye from abrasion and damage.

Because it plays this protective role, the cornea is itself prone to injury and damage. While the body possesses a number of mechanisms to heal and repair the cornea, when healing is unsuccessful, damage can lead to impaired vision and blindness. In 1905 the first successful human-to-human corneal transplant was performed.

Investment

NHMRC developed a code of practice for organ transplantation and also provided grants to Roy Wright and Barry Collin, then to Doug Coster and Keryn Williams. These grants supported research into corneal transplantation and the later establishment of the ACGR. Other sources of funding for the ACGR include the: Pank Ophthalmic Trust; ACCORD; Australian Health Ministers' Conference (AHMC); Commonwealth Department of Health and Ageing (DHA); Australians Donate; and the Australian Organ and Tissue Authority (OTA).

Research

Collin undertook groundbreaking research to demonstrate that lymphatic vessels can grow into the cornea following injury or surgery. This helped to explain why some corneal transplants were rejected.

Coster and Williams established the the first modern and comprehensive eye bank in Australia and the ACGR. Since 1985, the ACGR has captured information on over 48,000 grafts, using data contributed by more than 1,000 ophthalmic surgeons. For some grafts, follow up extends to over 35 years. The ACGR captures information on over 90% of grafts.

Translation

ACGR data has demonstrated that neither eye bank procedures nor donor age exert a significant influence on corneal graft survival. This evidence has enabled eye banks to increase their cost efficiency and, by showing that almost anyone can be a donor, has increased the pool of corneas available for transplantation.

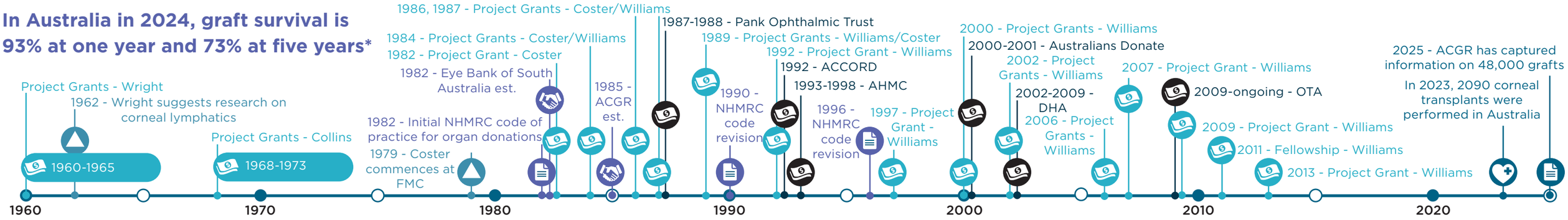
Registry data have also revealed that recipient factors are all-important to graft survival and that immunological rejection is a major cause of penetrating corneal graft loss, accounting for one-third of all graft failures.

Impact

Corneal transplantation is widely practised all over the world where donors are available. In 2023, 2,090 corneal transplants were performed in Australia. In Australia, survival of full-thickness corneal grafts (the most common type) is 93% at one year and 73% at 5 years.

The ACGR has played a key role in revealing those factors which are both important and unimportant to graft survival. ACGR data will be essential in providing evidence in support of future improvements.

In Australia in 2024, graft survival is 93% at one year and 73% at five years*



*For the most common type of graft (full-thickness)

Researchers

Prof Barry Collin AM
Prof Doug Coster AO
Prof Keryn Williams AC

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