School of Optometry and Vision Science

FINAL REPORT

Cost **Study Title - Long:**	Data Compilation and Analysis to Inform Development of Strategy to Improve Access to Public Cataract Services in Australia
Study Title - Short:	Access to Public Cataract Services in Australia
Study ID Number:	SOVS2020-60
Version Number:	3
Version Date:	18 August 2021
Authors:	Jessie Huang Blake Angell Anna Palagyi Peter McCluskey Andrew White Judith Abbott Lisa Keay On behalf of Vision2020

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report describes the current and future demand for public cataract services in Australia; inequities in service delivery; and health system and personal costs associated with long wait times for surgery. With population ageing, meeting current and future demand for public cataract services will require strategic investment and planning.

- It is estimated that **243,139** Australians are currently living with visually significant cataract (visual acuity worse than 6/12), including 10,616 Aboriginal and Torres Strait Islander people and 232,523 non-Indigenous Australians. With population ageing, this is projected to increase to **308,516** Australians in 2030.
- In 2018-19, there were over **245,000** admissions for cataract surgery, of those **72,270** admissions were in public hospitals. Currently, about **29%** of cataract surgeries for non-Indigenous Australians and **80%** of cataract surgeries for Aboriginal and Torres Strait Islander people are performed in the public hospital system. Hence, any delays in public care disproportionately impact Aboriginal and Torres Strait Islander people with cataract.

Waiting times for initial assessment ('Wait for the wait') following referral to hospital outpatient departments can be long and are highly variable between and within states (i.e. local health districts). 'Wait for the wait' data is inconsistently reported, however estimated wait times are:

- Best case: 50% of patients are assessed within 2-3 months and 90% are seen within 7-10 months.
- Worst case: 50% of patients are waiting more than 12 months and 10% are waiting for more than 20 months.

The waiting period on elective surgery waiting lists is well-documented and reported by the Australian Institute of Health and Welfare. National averages show that patients are waiting 3 months at the 50th percentile and 11 months at the 90th percentile. Aboriginal and Torres Strait Islander people experience slightly longer delays compared to other Australians (50th percentile: ~4 months). Yet again, considerable variability exists across the jurisdictions.

- Best case: 50% of patients are admitted within 1-2 months and 90% have cataract surgery within 3-5 months
- Worst case: 50% of patients are waiting 7-8 months and 10% are waiting longer than 12 months.

Based on these data, public patients currently face median waiting times, from referral to admission for surgery, ranging from **3 to 18 months**. A smaller proportion of patient waiting more than 2 years for cataract surgery.

Restrictions on elective surgeries due to **COVID-19** have significantly impacted cataract services in 2020, creating a backlog in an already over-burdened system. On April 1st 2020, all elective surgery was placed on hold, with gradual resumption occurring at different rates across jurisdictions, further increasing wait times.

To expedite surgery for public patients who are currently waiting for an initial ophthalmological assessment or surgical admission in the 2019-20 financial year, it is estimated that an additional 74,150 surgeries would be required. The total cost to the health system would be $275.3M, however this is offset by avoidance of treatment costs for falls and road traffic injuries as per economic modelling below:

Economic modelling of waiting times of 1, 3, 6 and 12 months

From the **health system perspective**, reducing waiting time for cataract surgery (from referral to surgery admission) to 1-month for each eye, is estimated to result in **cost savings** to government of **$4.88M, $11.69M and $11.49M** compared to 3-, 6- and 12-month waiting periods. Cost savings resulted from lower rates of falls associated with shorter waiting times. Reducing wait times from 12-months to 1-month would avoid 61,941 falls (including >3,700 fractures).

Societal and individual costs not accounted for in this health systems cost analysis include: reduced quality of life due to poor vision; depressive symptoms; failing to meet vision standard for a driver's licence (31% or >13,000 drivers); driving cessation (25%); and property damage associated with increased crash risk whilst waiting for cataract surgery.

Recommendations

To address current and projected increases in visually significant cataract in Australia, government investment in public cataract services should be a health policy priority to reduce avoidable vision impairment and associated negative health consequences. This report recommends investment in:

- Streamlined pathways to access cataract surgery including standardised referral and triage processes to ensure referrals are appropriately targeted
- Higher volume cataract surgery services for public patients in public (or private) hospitals to meet demand and reduce waiting time for surgery

- Financial incentives to promote high quality outcomes and efficiency in public hospital services while maintaining eye surgery training programs for ophthalmology trainees
- Increased provision of surgical services linked to outreach and regional cataract assessment services to address current inequity in access and longer wait time for public cataract services for Aboriginal and Torres Strait Islander peoples
- Greater uniformity and transparency in reporting wait times for patients seeking care in public hospitals. Ideally, with data collection following a national standard to allow better insight of true waiting times for patients.

INTRODUCTION AND REPORT OBJECTIVES

Cataract is a leading cause of visual impairment and blindness in Australia.[1] Cataract causes bilateral visual impairment in 20% of Aboriginal and Torres Strait Islander people aged 40 years and older and 14% of other Australians aged 50 years and older.[1] Cataract, characterised by cloudiness of the eye's natural lens, results in blurred, dimmed and reduced vision. The most common cause is age-related (in adults 40 years old and over) and, to a lesser extent, cataract may develop earlier in life (i.e. juvenile and congenital cataract) or in association with trauma, eye disease (e.g. uveitis) and systemic disease (e.g. diabetes).

Due to an ageing population, the number of Australians with cataract is projected to increase.[2, 3] In addition to reduced vision and quality of life, cataract can result in injurious falls[4], depressive symptoms[5], loss of drivers licence[6] and increased risk of motor vehicle crashes[7]. Surgical treatment of cataract is highly effective and safe, restoring vision through extraction of cataract and implantation of an intraocular lens. Demand for cataract surgery is projected to increase with Australia's ageing and growing population. As such, public healthcare delivery systems will need to continue to evolve to manage the projected increase in cataract surgery demand and reduce the risk of avoidable vision impairment and blindness in the community.[2]

This report aims to:

1. Consolidate existing data on access to public cataract services at national and jurisdictional levels in Australia
2. Estimate the current demand for public cataract surgery across Australia
3. Estimate the cost of delivering additional surgeries to meet current demand
4. Estimate costs to the Australian healthcare system associated with delays to cataract surgery.

ADMISSIONS FOR CATARACT SURGERY IN PUBLIC HOSPITALS

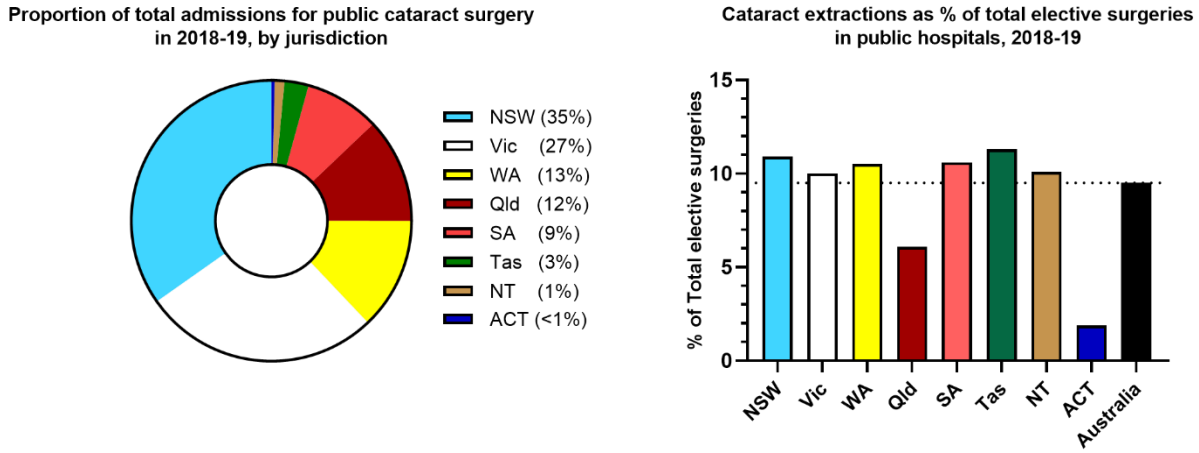
National

According to the Australian Institute of Health and Welfare[8] (AIHW), cataract surgery is the most commonly performed elective procedure in public hospitals In Australia. Cataract surgery accounted for 72,270 (9.5% of total) public hospital elective surgery admissions in 2018-19 financial year (FY). The number of admissions for cataract surgery has shown a steady increase at a rate of 2.6%* per annum since 2014-15 FY. This rate of growth is consistent with the increase in Australians aged 60 years over according to population projections (estimated at 2.8% per annum).[3]

States and Territories

Of all jurisdictions, New South Wales performed the most cataract surgeries in the 2018-19 FY (n= 25,120, 35% of the national total, Figure 1), followed by Victoria (n=19,757, 27%). Less populous states accounted for smaller proportions: Western Australia (n=9,314, 13%), Queensland (n=8,747, 12%), South Australia (n=6,241, 9%) and Tasmania (n=2,010, 3%). The Northern Territory (n=813) and Australian Capital Territory (n=268) accounted for the fewest surgeries. Admissions for cataract surgery accounted for more than 9.5% (national average rate) of total admissions for elective surgery in most jurisdictions, except for Queensland and the Australian Capital Territory.

Figure 1 A: Admissions for cataract extraction in Australian public hospitals, according to States and Territories. B: Cataract extractions as a proportion of all elective surgeries performed in Australian public hospitals in 2018-19.



* Note: Reported changes over time do not account for changes in coverage of hospitals reporting to the National Elective Surgery Waiting Times Data Collection over time (from 92% in 2014-15 to 95% in 2018-19).

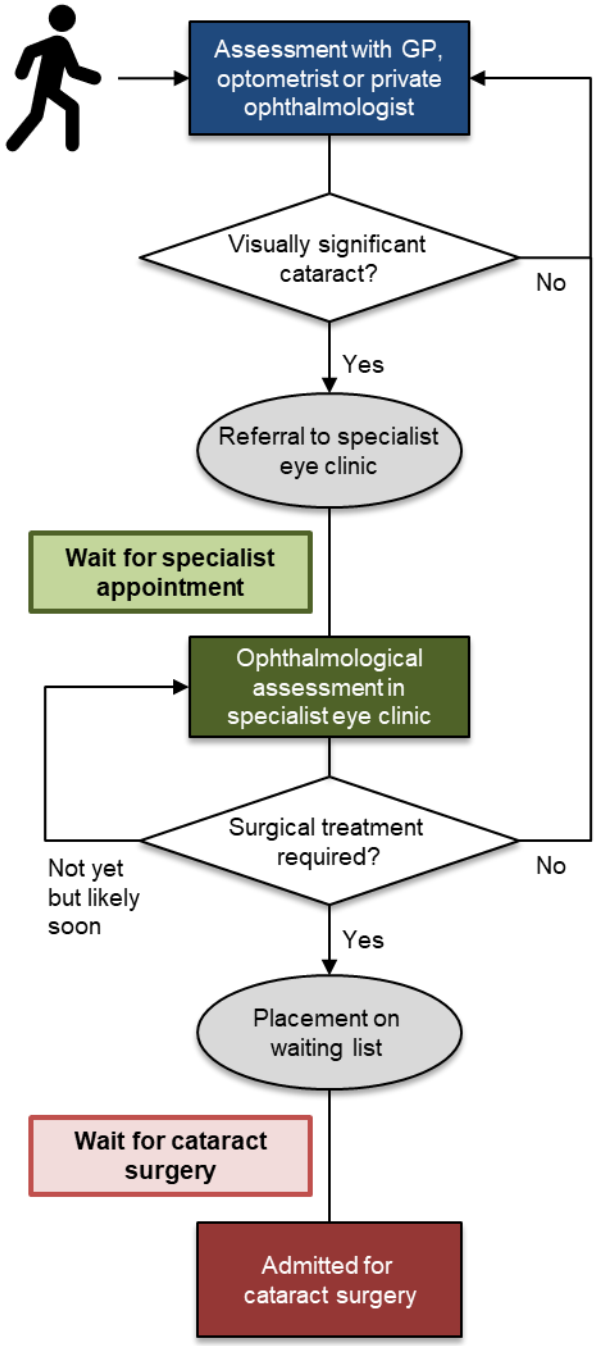
ESTIMATING THE CURRENT DEMAND FOR PUBLIC CATARACT SURGERY

A patient's journey to accessing public cataract services is shown in Figure 2 and typically involves two waiting periods. Following initial assessment by a general medical practitioner (GP), optometrist or medical specialist, if visually significant cataract is diagnosed, the patient is referred to an ophthalmologist with an appointment at a public hospital or to a public hospital eye clinic for assessment.

The waiting period from referral to assessment for cataract surgery suitability by an ophthalmologist is shown as the **Wait for Specialist Appointment** (Figure 2). In public hospitals with an ophthalmology department, these assessments are conducted in an outpatient eye clinic. Otherwise, in some rural and remote areas, where hospital outpatient services are not available, patients may be assessed in a private ophthalmology clinic, often incurring an out-of-pocket fee.

Following the wait for specialist appointment, if cataract surgery is necessary the patient is placed on a surgical waiting list. This second waiting period, the **Wait for Cataract Surgery** (Figure 2), reflects time elapsed from the date a patient is added to the elective surgery waitlist to their date of admission.

Figure 2 Flow chart showing a public patient's journey to admission for cataract surgery within a public hospital.



Initially, the patient presents to a general medical practitioner (GP), optometrist or medical specialist for an eye exam.

If diagnosed with visually significant cataract, the patient is referred to an ophthalmologist (with a public hospital appointment). The patient is assessed either in a hospital outpatient eye clinic or a private specialist eye clinic. The time between referral and pre-surgical assessment reflects the 'Wait for specialist appointment'.

Following ophthalmological assessment, if cataract surgery is indicated, the patient is placed on a waiting list for surgery. The time elapsed between placement on the waiting list and hospital admission for surgery is the 'Wait for cataract surgery'.

Wait for specialist appointment

Referrals for cataract surgery received by public outpatient eye clinics are triaged and placed on a waiting list for an appointment. The **Wait for Specialist Appointment** represents the time elapsed between receipt of a referral by the hospital and the date of the appointment. Waiting times demonstration significant variation and are dependent on the urgency of the referral (see below), hospital and jurisdiction. Referrals for cataract surgery are typically triaged as requiring non-urgent or routine appointments – Category 3 in most cases and Category 2 only with specific indications e.g. only one functional eye, significant co-morbidities, uveitis). The Queensland Health Clinical Prioritisation Criteria for cataract referrals also lists the following factors that may influence referral categorisation: identification as Aboriginal or Torres Strait Islander; and impact of visual impairment due to cataract on employment, education, activities of daily living, ability to care for others, personal frailty or safety.[9]

Referral Triage (Urgency)

Upon receipt, all referrals are assessed for urgency according to the patient's reported condition. Although, the criteria used for triaging referrals demonstrate slight differences across States, they have been collated here for simplicity:

- **Category 1** (urgent): recommended to be seen within 30 days. Patients requiring urgent attention, as their condition will require more complex or emergent care and will have significant impact on quality of life if care is delayed.
- **Category 2** (routine[†, ‡] or semi-urgent[€]): recommended to be seen within 90 days. Condition has potential to require more complex care and have some impact on quality of life if care is delayed.
- **Category 3** (non-urgent[†, €] or routine[‡]): recommended to be seen within 365 days. Patients whose condition(s) are unlikely to deteriorate quickly and do not have the potential to become an emergency, or to require more complex care if assessment is delayed.

[†] South Australia, [‡] Victoria, [€] Tasmania

The number of people waiting for non-urgent outpatient appointments and associated waiting times are not publicly reported in New South Wales, Western Australia, the Australian Capital Territory and Northern Territory. Patients waiting to be seen are often said to be on "the hidden waiting list" or the "waiting list for the waiting list". There is a need for greater transparency and uniformity in reporting wait times for patients seeking care in public hospitals. Ideally,

uniform data would be collected and reported using a national standard, allowing better insight of true waiting times faced by patients.

In Victoria, South Australia, Queensland, and Tasmania, some data on waiting times is available. However, reporting methods (measures and time periods) are inconsistent across the States, precluding comparison across jurisdictions. Nevertheless, the available wait time data is reported in the following section.

Victoria

In 2019, 10,424 new routine appointments (including presentations other than cataract) were reportedly conducted in ophthalmology outpatient hospital departments across Victoria. The median wait time for new routine appointments was 71 to 103 days (Table 1). The 90th percentile wait time ranged from 215 to 311 days (about 7 to 10 months). For data according to Local Hospital Network see Appendix I: Wait time statistics for Specialist Appointment in Victoria.

Table 1 Number of new routine (category 2 & 3) ophthalmology department outpatient appointments and associated wait time data in Victoria, 2019

		Calendar Quarter 2019			
Victoria (State-wide)		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Routine (category 2 & 3)	Number of new routine appointments	2581	2948	2844	2051
	Days waited at the 50th percentile	103	79	80	71
	Days waited at the 90th percentile	311.4	217	268.5	215

South Australia

Wait times for routine and non-urgent (category 2 & 3) ophthalmology appointments are publicly reported for four hospitals in South Australia (major metropolitan hospitals: Flinders Medical Centre, Royal Adelaide Hospital; and large metropolitan hospitals: The Queen Elizabeth Hospital and Modbury Hospital). In 2019, the median wait time ranged from 369 to 522 days (about 11 to 16 months).

Table 2 Wait times† for ophthalmology specialist appointments for routine (category 2) and non-urgent (category 3) referrals at four metropolitan hospitals in South Australia, 2019

		At Census Date 2019			
Hospital		30/04/19	30/06/19	30/09/19	31/12/19
Flinders Medical Centre	Days waited at the 50th percentile	456	486	369	384

Royal Adelaide Hospital	Days waited at the 50th percentile	498	489	516	522
The Queen Elizabeth Hospital	Days waited at the 50th percentile	447	462	480	498
Modbury Hospital	Days waited at the 50th percentile	372	372	399	408

†Wait times are based on patients yet to be assigned an appointment date at each census date. (Days waited was calculated by multiplying the reported number of months[10] by a factor of 30).

Queensland

In the last quarter of 2019, the percentage of appointments occurring within the clinically recommended time frame was 33% for category 2 referrals (i.e. within 90 days of referral) and 79% for category 3 referrals (i.e. with 365 days).[11] The 90th percentile wait times were 308 days (about 10 months) and 609 days (about 20 months) respectively; median wait times are not reported. For local data according to individual Queensland hospitals, see Appendix II: Wait time statistics for Specialist Appointment in Queensland**.**

Table 3 Wait time statistics for new appointments (Category 2 & 3) in ophthalmology outpatient services in Queensland, October to December 2019

Queensland (State-wide)		**Oct-Dec 2019**
Category 2	Percentage of appointments within clinically recommended time	33%
	Days waited at the 90th percentile	308
Category 3	Percentage of appointments within clinically recommended time	79%
	Days waited at the 90th percentile	609

Tasmania

Ophthalmology outpatient services are available in the Southern Region and the North West Region of Tasmania. However, data on wait times is only available for ophthalmology services in the Southern Region at the Royal Hobart Hospital. In contrast to Queensland, South Australia and Victoria, the Tasmanian Health Service reports the number of days waited at the 75th percentile, which correspond to 180 days (about 6 months) for category 2 referrals and 375 days (about 12 months) for category 3.

Table 4 Wait time statistics for appointments at the Royal Hobart Hospital for category 2 and 3 referrals

Southern Region (Royal Hobart Hospital)	**Last updated 06/03/2020**

Category 2	Days waited at the 75th percentile	180
Category 3	Days waited at the 75th percentile	375

New South Wales

Despite the lack of wait time data reported by government agencies, there are media reports that patients face 10 to 15-month wait periods for new appointments in public hospital eye clinics in Sydney. An audit of 400 consecutive cataract referrals to Sydney Eye Hospital and Westmead Hospital ophthalmology clinics revealed that 65% of patients referred for cataract assessment had not been seen within 1 year of referral.[12] Of the patients who attended an initial hospital appointment within the study observation period, the average wait time was 10 months.[12] Importantly, this report also revealed that 49% referred patients did not proceed to surgery. The most common reasons for not proceeding to surgery included non-visually significant cataract as assessed by the ophthalmologist or patients reporting minimal to no functional vision loss or an unwillingness to have surgery. Unnecessary or poorly targeted referral contribute to the burden and wait times for ophthalmology outpatient services. Hence, there is an opportunity to improve efficiency through improved targeting of cataract referrals, possibly through the use of standardized referral pathways.

Wait for cataract surgery

Patients who are recommended for cataract surgery following specialist assessment are added to a public hospital waiting list for elective surgery. Like the process for new referrals, patients are assigned one of three clinical urgency categories by their treating doctor that indicates when surgery is required. For elective surgery, the following urgency categories are used nationally[13]:

Urgency category	Meaning
Category 1	Procedures that are clinically indicated within 30 days
Category 2	Procedures that are clinically indicated within 90 days
Category 3	Procedures that are clinically indicated within 365 days

Wait time for Cataract Surgery (Figure 2) is calculated as the number of days between addition to the waiting list and removal from a waiting list. This wait time data is well documented, supplied by state and territory health authorities to the AIHW for compilation into the National Elective Surgery Waiting Times Data Collection (NESWTDC)[8]. The following indicators are reported:

- Number of admissions
- Days waited at the 50th percentile

- Days waited at the 90th percentile
- Proportion of patients who waited more than 365 days

National

Median wait time for cataract surgery was 83-93 days between 2014-15 to 2018-19. A small proportion of patients faced significantly longer wait times, with 10% (approximately 7,000 per year) waiting longer than 11 months (330-337 days) and about 2% (approximately 1,500 per year) waiting more than 12 months.

Table 5 Waiting time statistics for cataract surgery (based on dates of addition and removal from elective surgery waiting lists) in Australian public hospitals, 2014–15 to 2018–19

		2014-15	2015-16	2016-17	2017-18	2018-19
Australia	Number of admissions	65,182	67,755	71,377	70,202	72,270
	Days waited at the 50th percentile	83	93	85	87	84
	Days waited at the 90th percentile	331	334	330	335	337
	Proportion waited over 365 days	1.8%	2.5%	1.4%	1.9%	2.1%

Aboriginal and Torres Strait Islander peoples and Non-Indigenous Australians

Aboriginal and Torres Strait Islander people are three times more likely to suffer from visually significant cataract compared to other Australians.[14] In 2018-19, Aboriginal and Torres Strait Islander peoples experienced longer delays to cataract surgery compared to other Australians, typically waiting 36% longer, with a median wait time of 113 days compared to 83 days (Table 6).

Table 6 Waiting time statistics for admissions for cataract surgery for Aboriginal and Torres Strait Islander people and non-Indigenous Australians in public hospitals, 2018-19

	Aboriginal and Torres Strait Islander people	Other Australians
Number of admissions	2,127	70,143
Days waited at the 50th percentile	113	83
Days waited at the 90th percentile	343	337
Proportion waited more than 365 days	2.1%	2.1%

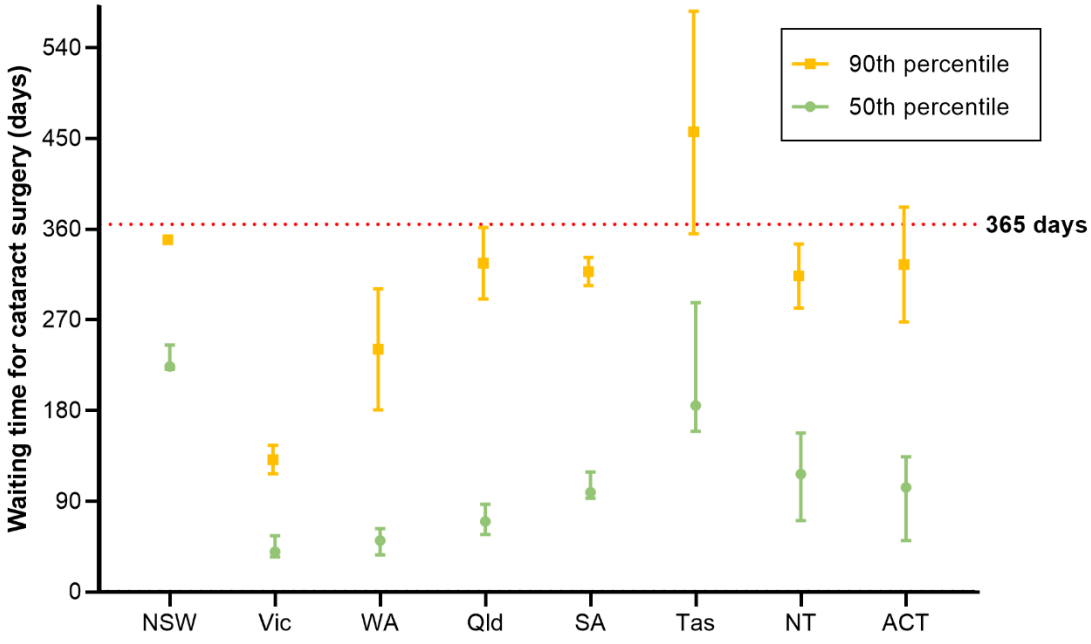
Note: The quality of the data reported for Indigenous status has not been formally assessed, hence this information should be interpreted with caution.

States and Territories

Wait time for cataract surgery admission in public hospitals between 2014-15 to 2018-19 are shown for each State and Territory in Figure 3 and Appendix III: Admissions and Wait times for Cataract Surgery according to Jurisdiction**.**

- Shortest waiting times were in Victoria with median (range): 1 to 2 months and 90th percentile (range): 3 to 5 months; followed by Western Australia showing a median (range): 1 to 2 months and 90th percentile (range): 6 to 11 months
- Longer waiting times were shown in Queensland, South Australia and the Northern Territory (median (range): 2 to 5 months and 90th percentile (range): 9 to 11 months.
- Longest waiting times were in New South Wales, with median (range): 7 to 8 months and 90th percentile (range): 11 to 12 months. Similarly, Tasmania also showed long waiting times but significant fluctuation, with median: 4 to 10 months and 90th percentile (range): 11 to 20 months.
- Reliability of waiting time data for Australian Capital Territory was questionable due to incomplete data collection (i.e. no data for 2015-16) and relatively fewer cases reported in 2018-19 (268 admissions) compared to previous years (>1,000 admissions).

Figure 3 Median and 90th percentile wait times for cataract surgery admission from elective surgery waiting lists in each State and Territory between 2014-15 to 2018-19. Error bars: interquartile range.



For further detail, data on admissions and wait times according to Local Hospital Network is shown in Appendix IV: Admissions and Wait times for Cataract Surgery according to Local Hospital Network.

Number of patients currently waiting for public ophthalmology consultation or cataract surgery

Due to the paucity of available data on access and wait times for ophthalmology consultation in public hospital outpatient clinics, it is not possible to estimate with confidence the number of people currently waiting for an initial specialist appointment.

The number of patients waiting for surgery can be estimated based on previous admissions and the proportion of patients admitted for surgery within 365 days.

- In 2018-19, there were 72,270 admissions for cataract surgery. The proportion of patients waiting more than 365 days for cataract surgery was 2.1% in 2018-19. This proportion has remained generally stable over the past five years (range:1.4-2.5%). Hence, the number of patients added to the waiting list is approximate to the number of admissions for surgery. Based on this reasoning and an annual increase in cataract surgery admissions by 2.6%, it is estimated that approximately 74,150 patients were on a wait list for cataract surgery in 2019-20 FY.
- On April 1st, 2020, the Australian Government mandated all elective surgery to be put on hold due to COVID-19. This pause and the gradual resumption of cataract services at reduced capacity has led to an additional backlog of surgeries on an already over-burdened system.

ESTIMATING THE COST OF DELIVERING ADDITIONAL SURGERIES TO MEET CURRENT DEMAND

According to the National Hospital Cost Data Collection (NHCDC, Version 10.0, Round 22, 2017-18), the cost of total cost of performing cataract surgery (AR-DRG: C16Z: Lens Interventions) was $2,865 per eye. This is inclusive of direct costs of $2,249 and Overhead Costs of $616. Accounting for inflation using Reserve Bank of Australia Inflation Calculator, the total cost of cataract surgery in the 2019-20 FY, is estimated at $2967 per eye.

Cataract surgery patients require a pre-operative assessment and up to three post-operative reviews. According to the NHCDC 2017-18, the cost of a non-admitted medical consultation provided by an ophthalmologist was $240. In 2019-20, this would be $248.5 after adjustment for inflation.

Hence, the total cost of cataract surgery including one pre-operative assessment and two post-operative reviews is estimated at $3712.5 per eye in 2019-2020. Using the estimate of 74,150 patients who were on a wait list for cataract surgery in 2019-20 FY, the total cost of eliminating the wait list would be $275.3M.

ESTIMATING THE UNMET NEED

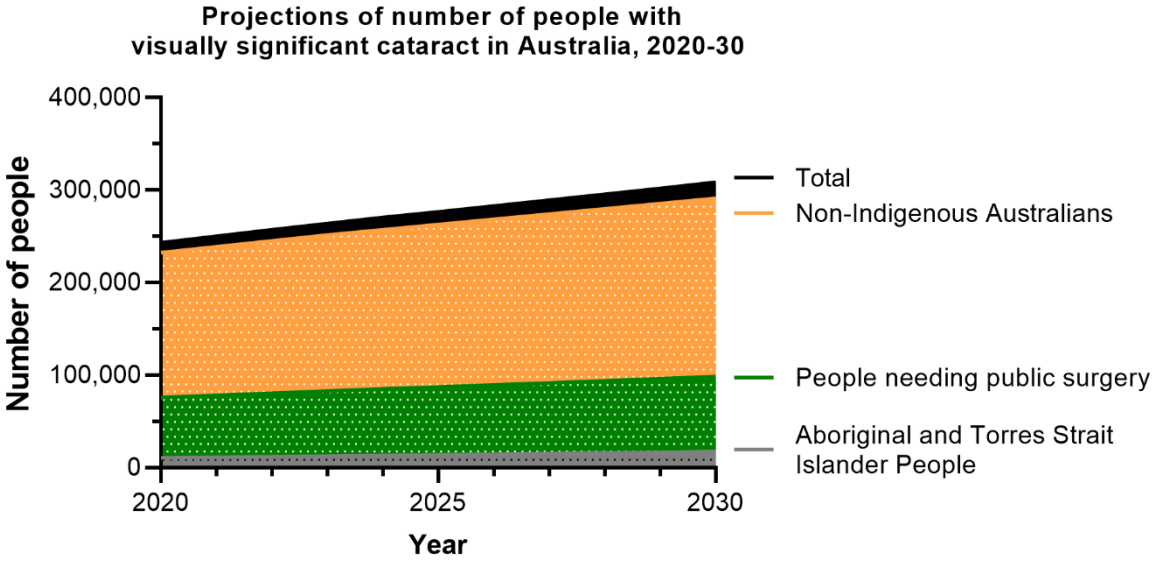
Estimating the number of people likely to need public cataract services

Prevalence of cataract in Australia

The National Eye Health Survey (NEHS) 2016 revealed that visually significant cataract affects 2.7% of non-Indigenous Australians over 50 years of age and 4.3% of Aboriginal and Torres Strait Islander people over 40 years of age. In the NEHS, visually significant cataract was defined as any eye with best corrected visual acuity of worse than 6/12 where cataract was the primary cause of vision loss.[14] Visual acuity levels inadequately represent the impact of cataract on a person's quality of life and the decision to perform cataract surgery is made using a range of subjective and objective assessments. Despite this, the criterion of 6/12 was selected as it is a fundamental standard for the legal requirement to drive in Australia.[14]

Based on population projections[3] and cataract prevalence data, it is estimated that 243,139 Australians are currently living with visually significant cataract, including 10,616 Aboriginal and Torres Strait Islander people and 232,523 non-Indigenous Australians. Assuming a stable prevalence rate, with population ageing, the number Australians with visually significant cataract is projected to increase to 308,516 in 2030.

Figure 4 Projected prevalence of visually significant cataract (visual acuity worse than 6/12 in one or both eyes) and the number of cases requiring public cataract services in Australia, 2020-30



Series A: Current levels of public and private cataract surgery

According to the Australian Atlas of Healthcare Variation 2017, it is estimated that 29% of patients undergoing cataract surgery are admitted as public patients, the remaining 71% are private patients. Based this national average, it is estimated that 67,432 non-Indigenous Australians currently have visually significant cataract and would require surgery in the public healthcare system (Table 7: Series A).

On the other hand, Aboriginal people are more likely to access cataract surgery in the public hospital system, estimated at 80%.[15] This in part, is likely attributable to the lower proportion of Aboriginal and Torres Strait Islander adults having private health insurance, estimated at 20% (among people living in non-remote areas in 2012–13).[16] Hence, it estimated that 8,493 Aboriginal and Torres Strait Islander people currently have visually significant cataract and would need surgery in the public system.

Based on current levels of public (versus private) cataract surgery, a total of 75,924 Australians currently living with visually significant cataract need public cataract services. Assuming surgery is needed for both eyes, this would total 151,848 surgeries.

Series B and C: Increased levels of public cataract surgery

Two alternative series were also explored based on an assumption that increased accessibility and reduced wait time for public surgery would shift patient preference towards public cataract

services. Furthermore, recent trends in private health insurance coverage for Australians has demonstrated a reduction from 47% in 2014-15 to about 44% in 2018-19.[17]

In Series B, demand public cataract services is estimated to increase by 10%, hence 32% of non-indigenous patients and 88% of Aboriginal and Torres Strait Islander patients will elect treatment in the public system. Similarly, in Series C, the demand is estimated to increase by 20%, resulting in 35% of non-indigenous patients and 96% of Aboriginal and Torres Strait Islander patients electing public cataract services.

Table 7 Current and projected number of Australians with visually significant cataract needing public cataract services in 2020, 2022, 2025 and 2030

	2020	**2022**	**2025**	**2030**
Series A: Current levels of public patients (non-Indigenous: 29%, Aboriginal and Torres Strait Islander: 80%)				
Non-Indigenous	67,432	71,113	76,253	84,406
Aboriginal and Torres Strait Islander	8,493	9,458	10,953	13,969
Total	**75,924**	**80,570**	**87,206**	**98,375**
Series B: 10% increase in public patients (non-Indigenous: 32%, Aboriginal and Torres Strait Islander: 88%)				
Non-Indigenous	74,407	78,469	84,142	93,138
Aboriginal and Torres Strait Islander	9,342	10,403	12,048	15,366
Total	**83,749**	**88,872**	**96,190**	**108,503**
Series C: 20% increase in public patients (non-Indigenous: 35%, Aboriginal and Torres Strait Islander: 96%)				
Non-Indigenous	81,383	85,826	92,030	101,869
Aboriginal and Torres Strait Islander	10,191	11,349	13,143	16,763
Total	**91,574**	**97,175**	**105,173**	**118,632**

ESTIMATING THE COSTS OF NOT DOING CATARACT SURGERY

Compared to public cataract surgery, accessing surgery in a private setting typically involves a significantly shorter wait time, with surgery performed shortly following diagnosis. Depending on the level of private health insurance cover, private patients will incur out-of-pocket cost of up to $2,500 on average for those without insurance. As such, Australians who cannot afford the out-of-pocket costs associated with private treatment or do not have appropriate private health insurance coverage (up to 56% of all Australians[20] and 80% of Aboriginal and Torres Strait Islander peoples[19]) rely on treatment in public hospitals. Longer wait times for public surgery and their sequelae described below, disproportionately impact patients who rely on public care.

Consequences of cataract-related vision loss

Falls and Fall-related injuries

The strongest evidence relating cataract surgery to falls is from a randomized controlled trial of older women (aged 70 years and over) in the UK. Major findings were:

- First eye cataract surgery reduced the risk of falls and fall-related fractures.[18]
- Second eye surgery improved visual function (stereopsis), however did not result in a significant further reduction in falls risk.[19]
- Based on the reduction in falls and improved quality of life, first eye cataract surgery was considered to be cost-effective over the patient's lifetime.[20]

In Australia, a prospective, observational study of older patients (≥65 years) awaiting cataract surgery in public hospitals revealed that:

- While waiting for cataract surgery, the incidence of falls was 1.2 falls per person-year.[4]
- First eye surgery significantly reduced the rate of incident falls (33%).[21]
- Major changes in refraction in the operated eye, contributing to a refractive imbalance between the operated and unoperated eye, resulted in two-fold risk in falls.[21] Hence, in susceptible patients, delays between first and second eye surgery may contribute to risk of injurious falls.[22]
- Although, previous studies have demonstrated conflicting results, there is emerging evidence that second eye surgery may result in a further reduction in falls risk.[22-24]

Motor Vehicle Crashes

- Patients with bilateral cataract are twice as likely to be involved in a car crash compared to patients who have undergone cataract surgery.[25]
- In Australia, first and second eye cataract surgery were associated with a reduction in motor vehicle crashes (fatal, hospitalised, medical attention and property damage only crashes).[26]
- The reduction in motor vehicle crashes in the year following first eye cataract surgery (compared to the year prior to cataract surgery), resulted in significant societal cost savings.[22]
- An economic model comparing 12 months wait and expedited cataract surgery with respect to quality-adjusted life years (QALYs) and number of falls avoided in New Zealand, found that expedited cataract surgery was cost-effective over a patient's lifetime.[27]
- Based on falls avoided and QALYs gained, expedited cataract surgery (assuming a 12-month reduction in wait time) has been shown to result in societal cost savings over the patient's lifetime.[28]

Costs of delaying surgery

Health System Costs

There is good evidence that first and second eye cataract surgery is cost-effective from a societal perspective, with respect quality-adjusted life years gained.[20, 29-31] It is also of interest whether delays to cataract surgery impact on health system costs borne by Governments. In this section, an economic analysis of health system costs associated with different cataract surgery wait times are estimated.

Health system costs are estimated over 3-year period, including costs to Governments for providing bilateral cataract surgery and other health system costs (associated with treating falls and motor vehicle crash related injuries) incurred while patients wait for surgery. This cost analysis assumes that 75,924 Australians are currently living with visual significant cataract and would elect cataract surgery in the public hospital system. The cost of cataract surgery and outpatient hospital visits are based on national averages; the incidence and average cost of treating injuries related to falls[21, 23, 32] and motor vehicle crashes are estimated based on recently published evidence from Australia. A discount rate of 5%[33] was applied to health system costs including cataract surgery and treatment of injuries arising from falls and motor vehicle accidents.

Table 8 Parameters included in the economic evaluation of delays to cataract surgery from the public health system perspective

Cost of Cataract Surgery	**Cost**	**Data Source**
Non-admitted ophthalmology consultation: 3 per eye (1 pre-op and 2 post-op)	$248.5† per consult	NHCDC[34] (Tier 2 class: 20.17-Ophthalmology)
Routine cataract surgery	$2,967† per eye	NHCDC[34] (AR-DRG: C16Z- Lens Interventions)
Costs of Health Impact		
Falls whilst:	Incidence rate (per person-year)	
- waiting for 1st eye surgery	1.17 (95% CI: 0.93-1.46)	Palagyi et al[21]
- waiting for 2nd eye surgery	0.88 (95% CI: 0.66-1.17)	Palagyi et al[21]
- following 2nd eye surgery	0.58 (95% CI: 0.53-0.79)	Keay et al[23]
	Cost per fall	
Average cost of a fall	$409 (95% CI: 173 to 642) †,‡	Hewitt et al[32]
Reported motor vehicle crashes whilst:	Crash rate (per person-year)	Meuleners et al[26]
- waiting for 1st eye surgery	0.0164	As above
- waiting for 2nd eye surgery	0.0064	As above
- following 2nd eye surgery	0.0127	
	Cost per crash	AAA Report[35]
Average cost of injurious crash	$2,076†	

† Costs are shown for year 2019 and were adjusted for inflation using the RBA inflation calculator[36]
‡ Average cost of a fall was based on the Usual Care group in Hewitt et al[32]
Abbreviations: NHCDC: National Hospital Cost Data Collection, AR-DRG: Australia Refined Diagnosis Related Groups, AAA: Australian Automobile Association

Due to the variability in wait times (from the time of referral to admission for surgery) experienced by patients within and across jurisdictions, five different scenarios are presented:

- *Scenario A*: 1 month for first eye surgery, 1 month for second eye surgery
- *Scenario B*: 3 months for first eye surgery, 3 months for second eye surgery
- *Scenario C*: 6 months for first eye surgery, 6 months for second eye surgery
- *Scenario D*: 12 months for first eye surgery, 12 months for second eye surgery

Detailed cost calculations are presented in Appendix VI: Economic analysis of costs associated with different wait times for cataract surgery.

Over a three-year period, in Scenario A:

- 75,924 patients would undergo bilateral cataract surgery within the first year,

- 137,739 injurious falls requiring treatment would occur, and
- 2,869 police-reported motor vehicle crashes resulting in fatalities, hospitalised and non-hospitalised injuries and/or significant property damage.
- Estimated health system costs would total $622.82M (

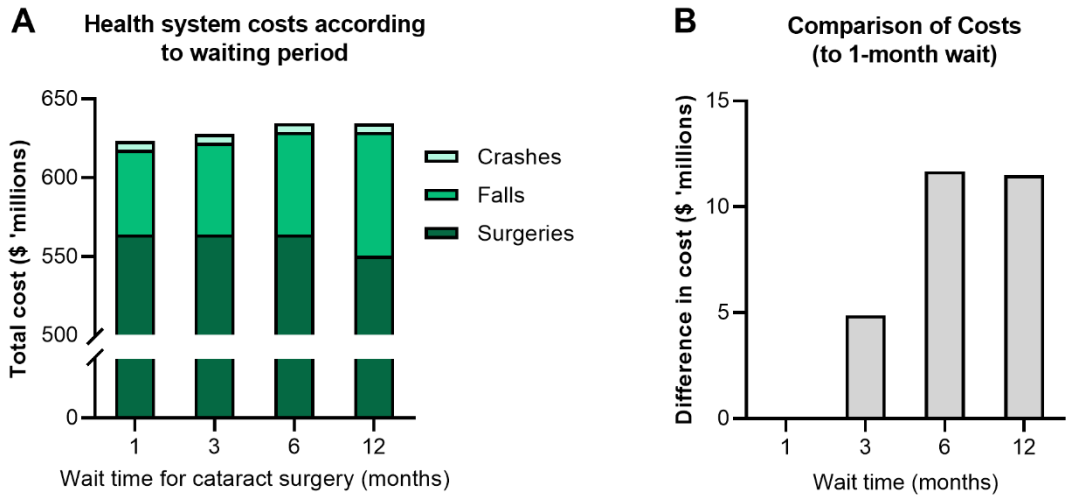


*Figure **5** Economic analysis of health system costs associated with different waiting periods for public cataract surgery. A: Estimated health system costs associated with waiting periods of 1, 3, 6 and 12 months were $622.86M, $627.74M, $634.55M and $634.35M, respectively. In the 12-month wait scenario, surgery costs were reduced due to discounting, however the cost of treating fall-related injuries increased. B: Comparison of health system costs associated with a 1-month waiting period for each eye, to 3, 6 and 12-months*

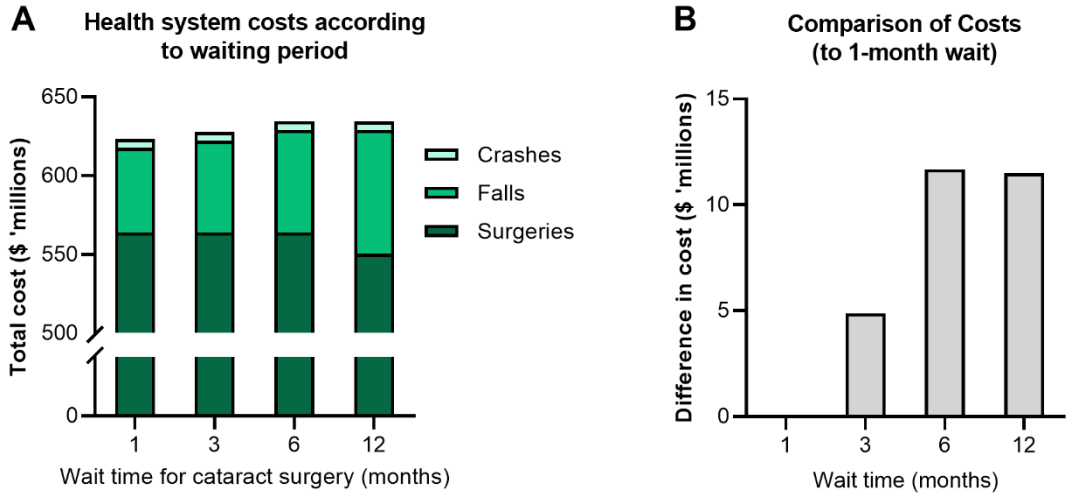


Figure ***5***A).

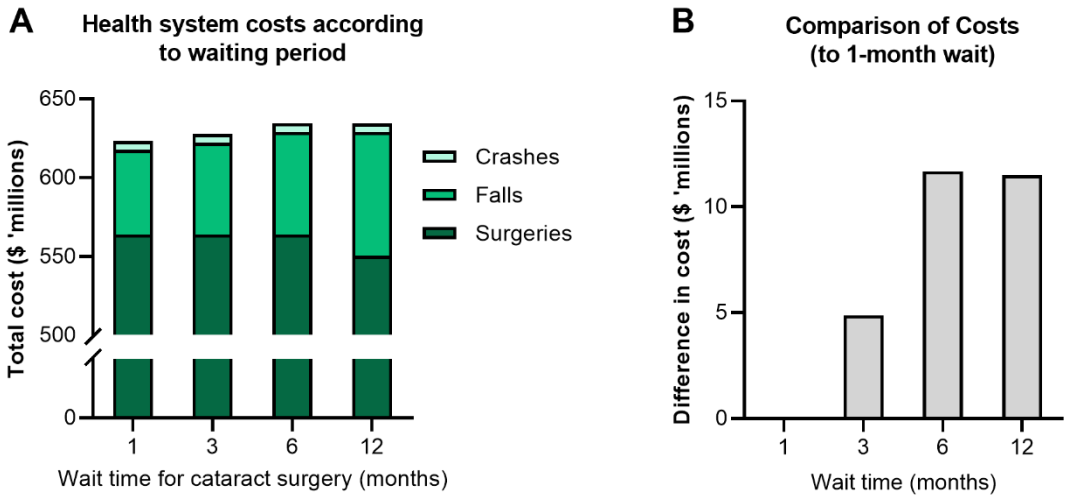


Figure 5 Economic analysis of health system costs associated with different waiting periods for public cataract surgery. A: Estimated health system costs associated with waiting periods of 1, 3, 6 and 12 months were $622.86M, $627.74M, $634.55M and $634.35M, respectively. In the 12-month wait scenario, surgery costs were reduced due to discounting, however the cost of treating fall-related injuries increased. B: Comparison of health system costs associated with a 1-month waiting period for each eye, to 3, 6 and 12-months showed a difference of $4.88M, $11.69M and $11.49M, respectively.

In Scenarios B & C, patients would also undergo bilateral cataract surgery within the first year. Hence, the cost of surgery would be the same as Scenario A. However, the cost of treating additional falls (+11,262 and +28,155) whilst patients wait for surgery, resulted in slightly higher total health system costs compared to Scenario A (

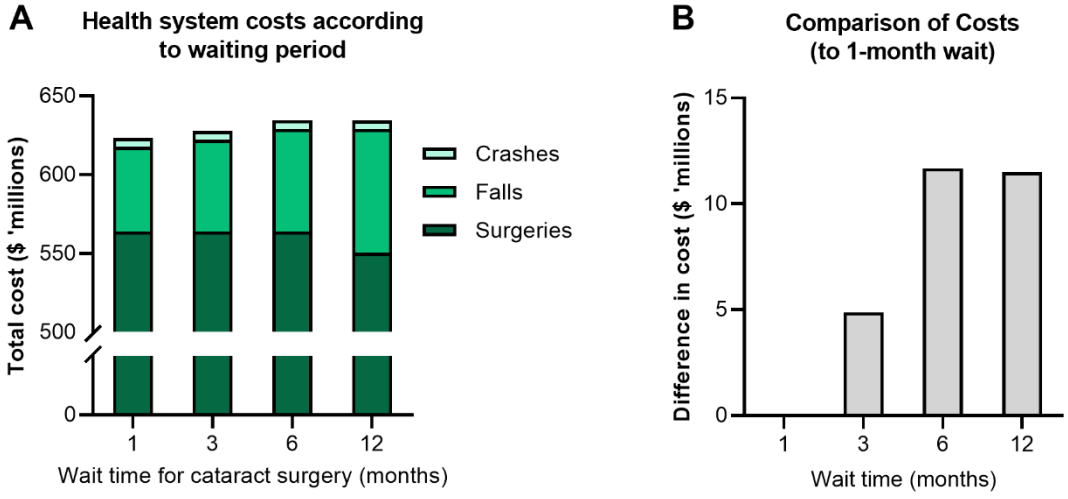


Figure ***5***B, +$4.88M and +$11.69M, respectively). A small decrease in motor vehicle crashes was noted in Scenarios B & C (-31 and -78) compared to Scenario A. This was due to a lower crash rate between first and second eye surgeries compared to the period following second eye surgery as reported by Meuleners et al[26]. Possible reasons included increasing age and increased exposure to more risky driving situations after both eye surgeries.[26]

Scenario D shows a slight reduction in the cost of surgery due to the second eye surgery occurring in the second year and a discount rate of 5% applied. However, this was offset by the cost of treating injuries associated with an additional 61,941 falls (including >3,700 fractures[37, 38]) over a three-year period, hence total health system costs were +$11.49M higher than Scenario A.

Sensitivity Analysis

Sensitivity analysis was performed by adjusting costs in accordance with the uncertainty of these data (using the 95% confidence interval ranges where available or an alternative suitable range commonly used in economic evaluations, ±25%). Detailed results are presented in Appendix VII: Sensitivity Analysis. The cost of motor vehicle crashes had minimal effect on the estimated overall health system costs. Conversely, adjusting the cost of falls resulted in significant differences in health system cost estimates. Total health system costs using the lower estimate of falls costs were estimated between $589.03M to $596.93M, whilst using the upper estimate, costs were estimated at $653.80M to $679.11M.

Beyond health system costs: Individual and societal costs

Cost-effectiveness of cataract surgery

According to the number of quality-adjusted life-years (QALYs) gained, there is strong evidence that cataract surgery compared to no intervention is cost-effective.[29-31] Although, the number of QALYs gained following initial cataract surgery slightly exceeds that with second eye surgery, both procedures are considered cost-effective.[29, 30] In the United States, an analysis of cost-effectiveness of cataract surgery reported estimated a 4567% financial return on investment to society over 13 years.[39] Furthermore, a recent New Zealand study revealed that expedited cataract surgery (reducing surgical wait time by 12 months) was cost-effective. In addition to QALYs gained, the study also estimated the cost savings associated with preventing falls. To perform expedited initial cataract surgery for one year of incident cases (n=3867), it would incur a net health system cost of $NZ 2.43M.

Motor vehicle crashes

Motor vehicle crashes incur considerable costs to individuals and society in addition to the health system costs borne by Governments. The total economic cost of police-reported

crashes encompassing costs associated with loss of life and health, vehicle damage, disability and medical care, insurance administration, emergency and legal services, are estimated at $11,000 per property damage crash, $15,000 per non-hospitalised injury crash, $287,000 per hospitalised injury crash and $4.7M per fatal crash. Additionally, these figures do not account for vehicle and property damage costs incurred by individuals in non-police reported crashes. Under-reporting of crashes to police is a known issue, with self-reported crash rates in patients awaiting cataract surgery estimated at 9%.[6]

Driving cessation and Loss of driver's licence

It is estimated that about 25% of patients with cataract discontinue driving whilst waiting for cataract surgery.[6] Of those who continue to drive, 31% do not meet the visual acuity requirements for a unconditional driver's licence.[6] This could amount to over 13,000 drivers on the road who do not meet driving standards and lose confidence in their driving ability. According to a 'willingness to pay' study, a driver licence was highly-valued by Australians, with an average value respondents were willing to pay to avoid losing their licence for 12 months of $2290. Loss of one's driver licence could lead to further negative consequences including social isolation, depressive symptoms and poorer health.[40, 41]

Cataract and Mental Health

About 29% of patients experience depressive symptoms while waiting for cataract surgery; older adults with worse visual acuity, self-reported visual disability or reduced quality of life are more likely to be affected.[5, 42] A recent meta-analysis of 14 studies showed improvement in depressive symptoms following cataract surgery.[43]

RECOMMENDATIONS

To address current and projected increases in visually significant cataract in Australia, government investment in public cataract services should be a health policy priority to reduce avoidable vision impairment and associated negative health consequences. This report recommends investment in:

- Streamlined pathways to access cataract surgery including standardised referral and triage processes to ensure referrals are appropriately targeted
- Higher volume cataract surgery services for public patients in public (or private) hospitals to meet demand and reduce waiting time for surgery
- Financial incentives to promote high quality outcomes and efficiency in public hospital services while maintaining eye surgery training programs for ophthalmology trainees

- Increased provision of surgical services linked to outreach and regional cataract assessment services to address current inequity in access and longer wait time for public cataract services for Aboriginal and Torres Strait Islander peoples
- Greater uniformity and transparency in reporting wait times for patients seeking care in public hospitals. Ideally, with data collection following a national standard to allow better insight of true waiting times for patients.

REFERENCES

1. Foreman J, Keel S, Xie J, van Wijngaarden P, Crowston J, Taylor HR, Dirani M. The National Eye Health Survey: Centre for Eye Research Australia and Vision 2020 Australia; 2016 [cited 2020 Mar 23]. Available from: www.vision2020australia.org.au/resources/national-eye-health-survey-report.
2. Rochtchina E, Mukesh BN, Wang JJ, McCarty CA, Taylor HR, Mitchell P. Projected prevalence of age-related cataract and cataract surgery in Australia for the years 2001 and 2021: pooled data from two population-based surveys. *Clinical & experimental ophthalmology*. 2003;31:233-6.
3. Australian Bureau of Statistics (ABS). Population Projections, Australia, 2017 (base) - 2066 Canberra: ABS; 2018, Nov 22 [cited 2020 Apr 1]. Available from: www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3222.0.
4. Palagyi A, McCluskey P, White A, Rogers K, Meuleners L, Ng JQ, Morlet N, Keay L. While We Waited: Incidence and Predictors of Falls in Older Adults With Cataract. *Invest Ophthalmol Vis Sci*. 2016;57:6003-10.
5. Palagyi A, Rogers K, Meuleners L, McCluskey P, White A, Ng JQ, Morlet N, Keay L. Depressive symptoms in older adults awaiting cataract surgery. *Clinical & experimental ophthalmology*. 2016;44:789-96.
6. Keay L, Palagyi A, Do V, White A, Lamoureux E, Ivers RQ, Pesudovs K, Stapleton F, Boufous S, McCluskey P. Vision and driving status of older Australians with cataract: an investigation of public hospital waiting lists. *Clin Exp Optom*. 2016;99:449-55.
7. Meuleners LB, Hendrie D, Lee AH, Ng JQ, Morlet N. The effectiveness of cataract surgery in reducing motor vehicle crashes: a whole population study using linked data. *Ophthalmic Epidemiol*. 2012;19:23-8.
8. Australian Institute of Health and Welfare (AIHW). Elective surgery waiting times 2018-19 data tables Canberra: AIHW; 2020 [cited 2020 Mar 31]. Available from: www.aihw.gov.au/reports-data/myhospitals/sectors/elective-surgery.
9. Queensland Health. Clinical Prioritisation Criteria: Ophthalmology, Cataracts [Available from: https://cpc.health.qld.gov.au/Condition/132/cataracts.
10. South Australia Health. Specialist Outpatient Clinics Waiting Time Report: Government of South Australia; 2019 [cited 2020 May 14]. Available from: www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/about+us/our+performance/specialist+outpatient+waiting+time+report.
11. Queensland Health. Quarterly information for Specialist Outpatient at 01 January 2020 (ophthalmology): Queensland Government; 2019 [cited 2020 May 15]. Available from: www.performance.health.qld.gov.au/Hospital/SpecialistOutpatient/99999.
12. Do VQ, McCluskey P, Palagyi A, Stapleton FJ, White A, Carnt N, Keay L. Are cataract surgery referrals to public hospitals in Australia poorly targeted? *Clinical & experimental ophthalmology*. 2018;46:364-70.
13. Australian Institute of Health and Welfare and the Royal Australasian College of Surgeons. National definitions for elective surgery urgency categories: Proposal for the Standing Council on Health. 2013.
14. Keel S, McGuiness MB, Foreman J, Taylor HR, Dirani M. The prevalence of visually significant cataract in the Australian National Eye Health Survey. *Eye (Lond)*. 2019;33:957-64.
15. Randall DA, Reinten T, Maher L, Lujic S, Stewart J, Keay L, Leyland AH, Jorm LR. Disparities in cataract surgery between Aboriginal and non-Aboriginal people in New South Wales, Australia. *Clinical & experimental ophthalmology*. 2014;42:629-36.
16. Australian Institute of Health and Welfare. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples. Canberra: AIHW; 2015. Contract No.: Cat. no. IHW 147.

17. Australian Prudential Regulation Authority. Private health insurance membership trends. 2020 March 2020.
18. Harwood RH, Foss AJ, Osborn F, Gregson RM, Zaman A, Masud T. Falls and health status in elderly women following first eye cataract surgery: a randomised controlled trial. *Br J Ophthalmol*. 2005;89:53-9.
19. Foss AJ, Harwood RH, Osborn F, Gregson RM, Zaman A, Masud T. Falls and health status in elderly women following second eye cataract surgery: a randomised controlled trial. *Age Ageing*. 2006;35:66-71.
20. Sach TH, Foss AJ, Gregson RM, Zaman A, Osborn F, Masud T, Harwood RH. Falls and health status in elderly women following first eye cataract surgery: an economic evaluation conducted alongside a randomised controlled trial. *Br J Ophthalmol*. 2007;91:1675-9.
21. Palagyi A, Morlet N, McCluskey P, White A, Meuleners L, Ng JQ, Lamoureux E, Pesudovs K, Stapleton F, Ivers RQ, Rogers K, Keay L. Visual and refractive associations with falls after first-eye cataract surgery. *J Cataract Refract Surg*. 2017;43:1313-21.
22. Meuleners LB, Fraser ML, Ng J, Morlet N. The impact of first- and second-eye cataract surgery on injurious falls that require hospitalisation: a whole-population study. *Age Ageing*. 2014;43:341-6.
23. Keay L, Ho KC, Rogers K, McCluskey PJ, White AJ, Morlet N, Ng J, Lamoureux EL, Pesudovs K, Stapleton F, Ivers RQ, Palagyi A. Reductions in the incidence of falls after first and second eye cataract surgery. *Investigative Ophthalmology & Visual Science*. 2019;60:1389-.
24. Feng YR, Meuleners LB, Fraser ML, Brameld KJ, Agramunt S. The impact of first and second eye cataract surgeries on falls: a prospective cohort study. *Clin Interv Aging*. 2018;13:1457-64.
25. Owsley C, McGwin G, Jr., Sloane M, Wells J, Stalvey BT, Gauthreaux S. Impact of cataract surgery on motor vehicle crash involvement by older adults. *JAMA*. 2002;288:841-9.
26. Meuleners LB, Brameld K, Fraser ML, Chow K. The impact of first- and second-eye cataract surgery on motor vehicle crashes and associated costs. *Age and Ageing*. 2018;48:128-33.
27. Boyd M, Kvizhinadze G, Kho A, Wilson G, Wilson N. Cataract surgery for falls prevention and improving vision: modelling the health gain, health system costs and cost-effectiveness in a high-income country. *Inj Prev*. 2019.
28. Church J, Goodall S, Norman R, Haas M. The cost-effectiveness of falls prevention interventions for older community-dwelling Australians. *Aust N Z J Public Health*. 2012;36:241-8.
29. Busbee BG, Brown MM, Brown GC, Sharma S. Incremental cost-effectiveness of initial cataract surgery. *Ophthalmology*. 2002;109:606-12; discussion 12-3.
30. Busbee BG, Brown MM, Brown GC, Sharma S. Cost-utility analysis of cataract surgery in the second eye. *Ophthalmology*. 2003;110:2310-7.
31. Cooper K, Shepherd J, Frampton G, Harris P, Lotery A. The cost-effectiveness of second-eye cataract surgery in the UK. *Age Ageing*. 2015;44:1026-31.
32. Hewitt J, Saing S, Goodall S, Henwood T, Clemson L, Refshauge K. An economic evaluation of the SUNBEAM programme: a falls-prevention randomized controlled trial in residential aged care. *Clin Rehabil*. 2019;33:524-34.
33. Kwok MQT, Kareem MA, Cash MJ, Lafferty F, Tobin K, O'Mahony JF. Adherence to Discounting Guidelines: Evidence from Over 2000 Published Cost-Effectiveness Analyses. *Pharmacoeconomics*. 2020.
34. Independent Hospital Pricing Authority (IHPA). National Hospital Cost Data Collection Report: Public Sector, Round 22 (Financial Year 2017-18) Sydney: IHPA; 2018 [cited 2020 Jun 14]. Available from: www.ihpa.gov.au/publications/national-hospital-cost-data-collection-data-request-specifications-round-22.
35. Potterton P, Ockwell A, Cross J. Cost of Road Trauma in Australia: Economic Connections for the Australian Automobile Association; 2017 [cited 2020 May 20]. Available from: www.aaa.asn.au/wp-content/uploads/2018/03/AAA-ECON_Cost-of-road-trauma-full-report_Sep-2017.pdf.

36. Reserve Bank of Australia. Inflation Calculator [Available from: https://www.rba.gov.au/calculator/annualDecimal.html.
37. Nevitt MC, Cummings SR, Hudes ES. Risk factors for injurious falls: a prospective study. *J Gerontol*. 1991;46:M164-70.
38. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *N Engl J Med*. 1988;319:1701-7.
39. Brown GC, Brown MM, Menezes A, Busbee BG, Lieske HB, Lieske PA. Cataract surgery cost utility revisited in 2012: a new economic paradigm. *Ophthalmology*. 2013;120:2367-76.
40. Marottoli RA, Mendes de Leon CF, Glass TA, Williams CS, Cooney LM, Jr., Berkman LF, Tinetti ME. Driving cessation and increased depressive symptoms: prospective evidence from the New Haven EPESE. Established Populations for Epidemiologic Studies of the Elderly. *J Am Geriatr Soc*. 1997;45:202-6.
41. Edwards JD, Lunsman M, Perkins M, Rebok GW, Roth DL. Driving cessation and health trajectories in older adults. *J Gerontol A Biol Sci Med Sci*. 2009;64:1290-5.
42. Freeman EE, Gresset J, Djafari F, Aubin MJ, Couture S, Bruen R, Laporte A, Boisjoly H. Cataract-related vision loss and depression in a cohort of patients awaiting cataract surgery. *Can J Ophthalmol*. 2009;44:171-6.
43. Pellegrini M, Bernabei F, Schiavi C, Giannaccare G. Impact of cataract surgery on depression and cognitive function: Systematic review and meta-analysis. *Clinical & experimental ophthalmology*. 2020;48:593-601.

APPENDICES

Appendix I: Wait time statistics for Specialist Appointment in Victoria

Number and waiting time for new routine referrals (category 2 & 3) for ophthalmology outpatient services in public hospitals in Victoria, by Local Hospital Network, 2019. Source: Victorian Agency for Health Information: https://vahi.vic.gov.au/reports/victorian-health-services-performance

		Calendar Quarter 2019			
Local Hospital Network		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Austin Health	Number of new routine appointments	186	165	111	161
	Days waited at the 50th percentile	162	147	333	379
	Days waited at the 90th percentile	768	825.6	1309	841
Ballarat Health Service	Number of new routine appointments	38	32	26	22
	Days waited at the 50th percentile	156	79	84	94.5
	Days waited at the 90th percentile	838.6	513.8	360	396.1
Barwon Health	Number of new routine appointments	157	114	178	-
	Days waited at the 50th percentile	359	356	402.5	-
	Days waited at the 90th percentile	646	550	585	-
Bendigo Health Care Group	Number of new routine appointments	5	27	18	16
	Days waited at the 50th percentile	117	300	288.5	236
	Days waited at the 90th percentile	173.8	347	343.4	244
Eastern Health	Number of new routine appointments	219	192	198	208
	Days waited at the 50th percentile	118	127	128	149
	Days waited at the 90th percentile	151.7	173.2	184.3	221.3
Melbourne Health	Number of new routine appointments	130	117	88	41
	Days waited at the 50th percentile	116	92	93.5	111.5
	Days waited at the 90th percentile	170.7	161.9	206.1	182.2
Monash Health	Number of new routine appointments	134	289	376	181
	Days waited at the 50th percentile	105.5	77	54	72
	Days waited at the 90th percentile	156.5	147.3	143.8	135
Northern Health	Number of new routine appointments	263	308	259	203
	Days waited at the 50th percentile	225	172	111	101
	Days waited at the 90th percentile	303	217.4	160.3	114.2
Royal Victorian Eye and Ear	Number of new routine appointments	1448	1704	1590	1219
	Days waited at the 50th percentile	57	62	63	53
	Days waited at the 90th percentile	189.4	173	144	143.4

Appendix II: Wait time statistics for Specialist Appointment in Queensland

Days waited (90th percentile) and proportion (%) of referred patients seen within the recommended time frame (Category 2: 90 days and Category 3: 365 days) in ophthalmology outpatient clinics in Queensland hospitals, October to December 2019. Source: Queensland Reporting Hospitals: http://www.performance.health.qld.gov.au/Hospital/SpecialistOutpatient/99999

	Category 2		Category 3	
Hospital	90th percentile wait (days)	% seen within recommended time	90th percentile wait (days)	% seen within recommended time
Cairns Hospital	349	27%	558	70%
Caloundra Hospital	85	100%	267	100%
Gold Coast University Hospital	509	23%	664	69%
Ipswich Hospital	578	27%	672	92%
Mater Adult Hospital	69	100%	317	100%
Mount Isa Base Hospital	79	100%	363	100%
Princess Alexandra Hospital	358	28%	750	77%
Queensland Children's Hospital	276	34%	517	90%
Rockhampton Hospital	194	38%	462	77%
Royal Brisbane & Women's Hospital	356	32%	632	71%
The Townsville Hospital	149	72%	423	92%
Toowoomba Hospital	81	98%	355	100%

Appendix III: Admissions and Wait times for Cataract Surgery according to Jurisdiction

Admissions, waiting times (50th and 90th percentile) and proportion (%) who waited over 365 days for cataract surgery, Australian states and territories, from 2014–15 to 2018–19. Source: Australian Institute of Health and Welfare, Elective surgery waiting times 2018-19. https://www.aihw.gov.au/reports-data/myhospitals/sectors/elective-surgery

Jurisdiction		2014-15	2015-16	2016-17	2017-18	2018-19
New South Wales	Admissions	23,304	23,587	24,502	24,545	25,120
	Days waited at the 50th percentile	221	240	224	223	245
	Days waited at the 90th percentile	351	349	349	349	349
	% waited over 365 days	1.8%	2.5%	1.2%	0.8%	0.5%
Victoria	Admissions	14,290	15,843	17,433	20,864	19,757
	Days waited at the 50th percentile	35	56	41	40	36
	Days waited at the 90th percentile	126	153	133	127	115
	% waited over 365 days	0.2%	1.0%	0.6%	0.3%	0.2%
Western Australia	Admissions	10,397	11,059	10,626	7,447	9,314
	Days waited at the 50th percentile	41	37	51	63	61
	Days waited at the 90th percentile	202	184	220	260	335
	% waited over 365 days	0.1%	0.1%	0.7%	2.5%	5.1%
Queensland	Admissions	6,892	7,971	8,189	7,802	8,747
	Days waited at the 50th percentile	57	64	70	87	72
	Days waited at the 90th percentile	265	330	334	357	343
	% waited over 365 days	0.6%	0.7%	0.7%	4.5%	2.7%
South Australia	Admissions	6,801	6,446	6,152	5,950	6,241
	Days waited at the 50th percentile	99	119	93	97	106
	Days waited at the 90th percentile	299	310	318	324	336
	% waited over 365 days	0.6%	0.5%	1.1%	3.7%	2.7%
Tasmania	Admissions	1,490	2,119	2,353	1,782	2,010
	Days waited at the 50th percentile	273	301	185	146	173
	Days waited at the 90th percentile	589	562	372	338	456
	% waited over 365 days	36.4%	36.4%	11.3%	6.8%	22.5%
Northern Territory	Admissions	729	730	895	786	813
	Days waited at the 50th percentile	143	158	117	71	82
	Days waited at the 90th percentile	281	342	310	283	349
	% waited over 365 days	4.5%	8.4%	6.8%	1.4%	4.7%
Australian Capital Territory	Admissions	1,279	-	1,227	1,026	268
	Days waited at the 50th percentile	107	-	123	134	51
	Days waited at the 90th percentile	252	-	330	391	325
	Proportion waited over 365 days	3.4%	-	4.7%	18.6%	6.7%

Appendix IV: Admissions and Wait times for Cataract Surgery according to Local Hospital Network

Admissions for cataract extraction from hospital waiting lists, associated waiting times (50th percentile) and proportion of patients who waited over 365 days, by local hospital networks, 2018-19. Source: Australian Institute of Health and Welfare, Elective surgery waiting times 2018-19. https://www.aihw.gov.au/reports-data/myhospitals/sectors/elective-surgery

Local Hospital Network	Admissions	Days waited at the 50th percentile	Proportion waited over 365 days
New South Wales			
Central Coast	1,722	204	0.0%
Far West	187	272	0.0%
Hunter New England	4,562	272	0.0%
Illawarra Shoalhaven	2,185	249	0.0%
Mid North Coast	1,601	202	0.1%
Murrumbidgee	877	224	2.2%
Nepean Blue Mountains	600	250	0.3%
Northern NSW	2,293	294	1.5%
Northern Sydney	654	249	2.8%
South Eastern Sydney	2,880	266	0.0%
South Western Sydney	1,884	301	0.1%
Southern NSW	964	113	1.0%
St Vincent's Health Network	111	292	0.0%
Sydney	1,248	57	0.0%
Sydney Children's Hospitals Network	25	-	-
Western NSW	1,410	246	0.0%
Western Sydney	1,917	270	1.7%
Victoria			
Albury Wodonga Health	871	76	0.0%
Alfred Health	1,530	NP	NP
Austin Health	792	41	0.0%
Ballarat Health Services	141	62	5.0%
Barwon Health	1,003	33	0.2%
Bendigo Health Care Group	272	41	1.5%
Eastern Health	1,126	52	0.0%
Latrobe Regional Hospital	966	6	0.0%
Melbourne Health	411	71	0.0%
Monash Health	3,386	53	0.1%
Northern Health	821	34	0.4%
Royal Children's Hospital	21	21	-
Royal Victorian Eye and Ear Hospital	7,120	28	0.3%
South West Healthcare	380	79	0.0%
West Gippsland Healthcare Group	183	7	0.0%
Western Health	734	11	0.0%
Queensland			
Cairns and Hinterland	795	13	0.0%
Central Queensland	455	203	0.0%
Central West	113	126	4.4%
Children's Health Queensland	<5	-	-

Darling Downs	75	320	1.3%
Gold Coast	1,794	65	0.0%
Metro North	900	73	3.0%
Metro South	1,759	56	2.6%
North West	166	58	0.0%
South West	357	56	0.0%
Sunshine Coast	518	85	1.0%
Torres and Cape	46	-	-
Townsville	656	84	2.4%
West Moreton	88	83	0.0%
Western Australia			
Child Adolescent Health Service	33	38	-
East Metropolitan Health Service	4,581	49	3.4%
North Metropolitan Health Service	1,738	27	4.1%
South Metropolitan Health Service	1,798	112	13.4%
WA Country Health Service	1,164	113	0.3%
South Australia			
Central Adelaide	1,127	195	4.3%
Country Health SA	3,376	70	0.1%
Northern Adelaide	513	305	12.9%
Southern Adelaide	1,213	180	4.3%
Women's and Children's Health Network	12	37	-
Tasmania			
Tasmanian Health Service	2,010	173	22.5%
Australian Capital Territory			
Australian Capital Territory	268	51	6.7%
Northern Territory			
Central Australia	282	42	5.0%
Top End	531	100	4.5%

Note: Where the number of admissions was less than 100, 'days waited at the 50th percentile' and 'proportion waited over 365 days' were not shown in the NESWTDC data.

Appendix V: Prevalence of visually significant cataract in Australia

Projections of visually significant cataract prevalence in non-Indigenous and Aboriginal and Torres Strait Islander people according to the National Eye Health Survey and ABS projected population statistics, in years 2020, 2022, 2025 and 2030.

Non-Indigenous		**Cases according to year, *n***			
Age	% (weighted)	**2020**	**2022**	**2025**	**2030**
50–59	0.9	27,239	27,751	28,159	28,865
60–69	2.5	65,459	68,086	71,010	73,027
70–79	4.8	88,401	94,747	102,895	112,627
80–99	5	51,424	54,633	60,878	76,536
Total	-	232,523	245,216	262,943	291,055

Aboriginal and Torres Strait Islander		**Cases according to year, *n***			
Age	% (weighted)	**2020**	**2022**	**2025**	**2030**
40–49	0.6	522	517	537	635
50–59	3.2	2428	2568	2675	2665
60–69	7	3311	3665	4151	4869
70–79	12.8	2497	2927	3658	4990
80–99	34.1	1858	2147	2669	4302
Total	-	10,616	11,822	13,691	17,461

Appendix VI: Economic analysis of costs associated with different wait times for cataract surgery

Comparison of health system costs across five different waiting time scenarios (A-D). The cost to the health system to provide cataract surgery and treat fall- and motor vehicle crash-related injuries (immediately following the incident) were considered over a three-year period.

		Scenario A	Scenario B	Scenario C	Scenario D
Wait times and observation period	(3 years in total)				
Wait time for 1st eye surgery	Months	1	3	6	12
Wait time for 2nd eye surgery	Months	1	3	6	12
Observation period after surgeries	Months	34	30	24	12
Cost of cataract surgery					
Year 1	$3713 per eye	563,735,700	563,735,700	563,735,700	281,867,850
Year 2	$3536† per eye	0	0	0	268,445,571
Year 3	$33679† per eye	0	0	0	0
Cost of cataract surgery		**$563,735,700**	**$563,735,700**	**$563,735,700**	**$550,313,421**
Cost of falls					
Year 1	$409 per fall	20,307,326	24,912,044	31,819,122	36,320,364
Year 2	$389† per fall	17,147,587	17,147,587	17,147,587	26,017,029
Year 3	$371† per fall	16,331,035	16,331,035	16,331,035	16,331,035
Cost of falls		**$53,785,949**	**$58,390,667**	**$65,297,745**	**$78,668,428**
Costs of motor vehicle crashes					
Year 1	$2,076 per crash	1,963,857	1,899,043	1,801,823	2,592,551
Year 2	$1,977† per crash	1,901,204	1,901,204	1,901,204	1,501,126
Year 3	$1,883† per crash	1,810,670	1,810,670	1,810,670	1,810,670
Cost of crashes	$2,076 per crash	**$5,675,731**	**$5,610,917**	**$5,513,697**	**$5,366,168**
Total Health System Costs		**$622,859,872**	**$627,737,284**	**$634,547,141**	**$634,348,018**

† 5% discount rate applied to costs

Appendix VII: Sensitivity Analysis

One-way deterministic sensitivity analysis using the upper and lower estimates of the average cost of falls (using 95% confidence intervals) and motor vehicle crashes (±25%).

		Scenario A	**Scenario B**	**Scenario C**	**Scenario D**
Cost of falls *-using higher estimate*	$642 per fall	$84,389,229	$91,613,953	$102,451,039	$123,429,411
Adjusted Health System Costs		**$653,800,660**	**$660,960,570**	**$671,700,436**	**$679,109,001**
Cost of falls *-using lower estimate*	$173 per fall	$22,803,811	$24,756,089	$27,684,506	$33,353,320
Adjusted Health System Costs		**$592,215,242**	**$594,102,706**	**$596,933,903**	**$589,032,910**
Cost of crashes *-using higher estimate*	$2,595 per crash	$7,094,664	$7,013,647	$6,892,121	$6,707,710
Adjusted Health System Costs		**$624,616,313**	**$629,140,014**	**$635,925,566**	**$635,689,560**
Cost of crashes *-using lower estimate*	$1,557 per crash	$4,256,798	$4,208,188	$4,135,273	$4,024,626
Adjusted Health System Costs		**$621,778,447**	**$626,334,555**	**$633,168,717**	**$633,006,476**