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Original Article - Clinical Science

## **The future burden of vision loss in Australia: projections from the National Eye Health Survey**

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## ABSTRACT

**Importance:** Projections of Australia's future burden of vision loss will inform eye health service delivery.

**Background:** This study aimed to forecast bilateral vision loss in Australia from 2020-2050.

**Design:** Population-based survey

**Participants:** Indigenous and non-Indigenous Australians (n=4,253) aged  $\geq 50$  years from the National Eye Health Survey (NEHS, 2015-2016).

**Methods:** Using the age-and-sex-stratified prevalence of vision loss (better eye visual acuity  $< 6/12$ ) from the NEHS, the prevalence of and number of people aged  $\geq 50$  years with vision loss were forecast to 2050 using Australian census projections.

**Main outcome measure:** Prevalence of, and number of Australians with, vision loss from 2020-2050.

**Results:** The prevalence of vision loss is predicted to increase from 6.7% to 7.5% by 2050. Owing to population dynamics, the estimated number of Australians  $\geq 50$  years old with vision loss will nearly double from 532,386 in 2016 to 1,015,021 in 2050. The greatest increase in vision loss is expected to occur in those aged  $\geq 80$  years (2.6-fold, 2016=144,240; 2050=376,296). The number of people with uncorrected refractive error is projected to increase 1.7-fold, from 331,914 in 2016 to 578,969 in 2050.

**Conclusions and Relevance:** Due to population growth and ageing, the future burden of vision loss in Australia is likely to increase, but the magnitude of this change is uncertain due to a lack of available data on some relevant input variables. Nonetheless, efforts are required to ensure early detection and treatment of major eye conditions, particularly treatable conditions such as uncorrected refractive error and cataract.

**Keywords:** Projections, vision loss, National Eye Health Survey



## 1. INTRODUCTION

Globally, the number of people with bilateral vision loss has been predicted to almost triple from 253 million in 2015 to 702 million in 2050, owing to the growth and ageing of the world's population.<sup>1</sup> Given that vision loss is already the third leading cause of disability worldwide<sup>2</sup> and that it costs the global economy over USD 2 trillion annually,<sup>3</sup> this projected rise represents a significant economic and public health concern. To optimise the planning of targeted eye healthcare programmes that will mitigate the projected rise in vision loss, policy-makers in each country require country-specific predictions of the potential future magnitude of vision loss based on reliable population data.

Australia has benefitted from significant efforts to reduce the national burden of vision loss in recent years, with a number of policies and programmes being implemented including the 'National framework for action to promote eye health and prevent avoidable blindness and vision loss'.<sup>4</sup> Despite noteworthy progress, important deficits in service delivery remain, particularly among Australians residing in non-metropolitan areas<sup>5</sup> and Australia's Indigenous population which continues to have a prevalence of vision loss that is three times higher than the non-Indigenous population.<sup>6</sup> These deficits, coupled with expected population growth and ageing, portend a dramatic rise in the future prevalence of vision loss in Australia. Indeed, the number of Australians aged 50 years or older, in whom 85% of all vision loss occurs,<sup>7</sup> is expected to increase by almost 50% in the next twenty years to 11.2 million.<sup>8</sup> Projected increases in the prevalence of both myopia<sup>9</sup> and diabetes<sup>10</sup> (and hence diabetic retinopathy) may further exacerbate the rise in vision loss in Australia.

Forecasting data are therefore required to predict Australia's future eyecare needs. Projections by Taylor and colleagues (2005) estimated the burden of vision loss in Australia from 2004- 2024 on the basis of pooled data from two state-based surveys, the Melbourne Visual Impairment Project (VIP) and the Blue Mountains Eye Study

(BMES).<sup>11</sup> However, changes in the epidemiology of vision loss since the completion of those studies,<sup>12,13</sup> coupled with significant changes in key population parameters,<sup>8</sup> highlight the need for projections based on current and nationally-representative data. Data on the nationwide prevalence of bilateral vision loss in Australian older adults were provided for the first time by the National Eye Health Survey (NEHS) in 2016.<sup>14</sup> Using these prevalence estimates together with up-to-date population projections from the Australian Bureau of Statistics (ABS) that incorporate future changes in relevant demographic factors, we sought to forecast the number of Australians aged 50 years and older with bilateral vision loss from 2020 to 2050.

## **2. METHODS**

### **2.1 The National Eye Health Survey**

The NEHS (March 2015-April 2016) was a nationwide population-based survey of the prevalence and causes of vision loss among non-Indigenous Australians aged 50 years and older and Indigenous Australians aged 40 years and older. The sampling, recruitment and clinical examination methodology of the NEHS has been published previously.<sup>15,16</sup> In brief, drawing on 2011 Census data,<sup>8</sup> the survey utilised multistage random-cluster sampling to select 30 population clusters of 150 participants (100 non-Indigenous and 50 Indigenous residents per sampling site) from all levels of geographic remoteness, and participants were recruited door-to-door. Participants underwent an interviewer-administered questionnaire and an eye examination which consisted of visual acuity assessment (with pinhole and auto-refraction for those with presenting visual acuity [PVA] <6/12 in one or both eyes), anterior segment examination, perimetry, fundus photography and intraocular pressure assessment.<sup>16</sup> Bilateral vision loss was defined in the NEHS as PVA <6/12 in the better seeing eye. Uncorrected or under-corrected refractive error was assigned as the main cause of vision loss when visual acuity improved to  $\geq 6/12$  in one or both eyes with pinhole or

refractive correction. For all other cases, the main cause of vision loss was determined by two independent ophthalmologists who reviewed questionnaire responses and examination results to identify the condition most likely to account for vision loss. Disagreements were adjudicated by a third ophthalmologist. When multiple disorders were identified, the most clinically significant condition was determined to be the primary cause.

Ethics approval was obtained from the Royal Victorian Eye and Ear Hospital (RVEEH) Human Research Ethics Committee (HREC-14/1199H) and additional ethical approvals were obtained at the State level to conduct research within Indigenous communities. Each participant provided written consent after being informed of the nature of the study. The study was conducted in accordance with the tenets of the Declaration of Helsinki.

## **2.2 Population projections**

Australian population projections for the years 2020 to 2050 were provided by the ABS. Projections were stratified by sex, geographic remoteness (major city, inner and outer regional, or remote and very remote) and age group (50-59, 60-69, 70-79 and  $\geq 80$  years, Table 1).<sup>17</sup> These projections were derived from the 2016 Australian Census of Population and Housing and included assumptions about expected changes in rates of fertility, mortality and migration trends in the Australian population.<sup>18</sup> All Australian states and territories (including "Other Territories") were included.

## **2.3 Statistical analysis**

The prevalence of vision loss among Australians aged 50 years and older at the time of the NEHS was estimated using post-stratification to the 2016 population structure (stratified according to sex, Indigenous status, remoteness and age) in addition to survey weights which were derived separately for Indigenous and non-Indigenous participants according to study site. The 2016 population structure was extracted from

the ABS TableBuilder, stratified by sex, Indigenous status (non-Indigenous or not stated vs Aboriginal, Torres Strait Islander or both Aboriginal and Torres Strait Islander), remoteness and age and compared to the demographic structure of the NEHS sample using Pearson's  $\chi^2$  test to identify potential sources of unrepresentativeness.<sup>19</sup>

The number of people with vision loss was then estimated for each year from 2020 to 2050 using direct standardisation from the NEHS sample to the projected population structure according to age, sex and remoteness. Up-to-date ABS projections of population numbers stratified by Indigenous status were not available at the time of analysis. Therefore, the projected proportion of Indigenous Australians in each stratum (defined by age, sex and remoteness area) was held constant over time. The projected prevalence of vision loss was then estimated as the projected number with vision loss divided by the total Australian population aged 50 years and over projected for each timepoint in 5-year intervals between 2020 and 2050. Because projected prevalence was estimated assuming no change in the proportion of Indigenous Australians within the population, the distribution of demographic characteristics (age, sex, educational attainment, remoteness and place of birth) was compared between Indigenous and non-Indigenous NEHS participants using Pearson's  $\chi^2$  test to investigate potential sources of bias.

Numbers of Australians projected to have vision loss from the two leading causes of vision loss - uncorrected refractive error and cataract – were calculated separately for each 5-year interval. Owing to the comparatively small sample of NEHS participants with vision loss from other eye diseases such as glaucoma, age-related macular degeneration, diabetic retinopathy and loss frequently blinding diseases, the numbers of those projected to have vision loss from 'other causes' (i.e., causes other than cataract or uncorrected/undercorrected refractive error) were combined and calculated for each 5-year interval.

### 3. RESULTS

#### 3.1 Demographic characteristics of the NEHS sample

A total of 4,836 Australians participated in the NEHS, of whom 4,253 (88%) were eligible for inclusion in this analysis based on age criteria (583 Indigenous participants aged 40-49 excluded). Participants were aged 50 to 89 years (median 64, interquartile range 57-71) and 54.8% were female. The distribution of several demographics differed between the NEHS participants and the 2016 Australian population. The proportion of Indigenous males and the level of education among Indigenous participants were lower in the NEHS than in the target Australian population ( $p < 0.001$ ). Compared to the target population, non-Indigenous NEHS participants were less likely to have been born outside of Oceania or Europe and had a lower level of education and there was a smaller proportion of NEHS participants within the youngest age group (50–59 years) ( $p < 0.001$  for each).

#### 3.2 Prevalence of vision loss in the NEHS

The estimated baseline (2016) nationwide prevalence of bilateral vision loss among non-Indigenous Australians and Indigenous Australians aged 50 years or older was 6.6% (95% confidence interval [CI]: 5.5%-8.0%) and 13.3% (95% CI: 10.9%-16.2%), respectively (Table 2). The overall prevalence of bilateral vision loss in Australians aged 50 years and older, including both Indigenous and non-Indigenous Australians, was 6.7% (95% CI 5.6%-9.4%). There prevalence of vision loss was 5.2% in those aged <60 years, and although the prevalence decreased slightly amongst those aged 60-69 years to 4.1%, it increased to 8.4% in 70-79-year-olds and 15.2% in those aged  $\geq 80$  years.

### **3.3 The projected number of Australians aged 50 years and over with bilateral vision loss from 2020-2050**

ABS projections suggest there will be a 1.7-fold increase in the number of Australians aged 50 years and over between 2016 and 2050. This is compared to a 1.4-fold increase in the Australian population overall.<sup>20</sup> Accounting for expected changes in Australia's age, sex and remoteness structure, we estimate that by the year 2050 the prevalence of vision loss amongst the Australian population aged 50 years and older will increase to 7.5% (Figure 1). Accordingly it is estimated that the number of Australians aged 50 years and over with bilateral vision loss will nearly double from 532,386 in 2016 to 1,015,021 in 2050 (Table 3). The greatest increase in the number of people with vision loss is expected to occur in those aged 80 years and older (2.6-fold, 2016=144,240 people; 2050=376,296 people), followed by 70-79 years (1.9-fold), 60-69 years (1.5-fold) and 50-59 years (1.5-fold). Females with vision loss are expected to outnumber males by approximately 3.8% in 2050.

The number of people with uncorrected refractive error is projected to increase 1.7-fold, from 331,914 in 2016 to 578,969 in 2050, while, during the same period, the number of people with vision loss due to cataract is anticipated to increase as much as 2.1-fold (Table 4). The number of cases of vision loss from all other causes, including age-related macular degeneration, glaucoma, diabetic retinopathy and other less common causes of vision is expected to increase 2.2-fold to almost 300,000 by the year 2050.

## **4. DISCUSSION**

A paucity of estimates of the future burden of bilateral vision loss in Australia has hindered efforts to plan for Australia's future eye care needs. Using the first national estimates of vision loss combined with population projection data, this paper provides 30-year projections of vision loss amongst Australians aged 50 years and older. These

data suggest that the number of Australian adults in this age group with vision loss will almost double by the year 2050, which will likely have major health and economic implications.

Future planning will need to consider increased costs driven by greater demand on national health care expenditure, including Medicare subsidies for eyecare consultations, cataract surgery and therapeutics for common retinal diseases, disability support pensions and low vision rehabilitation services. Australia is predicted to have a surplus of optometric service providers, at least until the year 2036, and simply increasing the optometric workforce will therefore be unlikely to be sufficient to address the fact that half of the 1 million cases of vision loss will be due to under- or uncorrected refractive error.<sup>21</sup> Rather, new service delivery models that more appropriately distribute the eye health workforce will be required to tackle the geographic heterogeneity of vision loss, particularly in remote and Indigenous communities.<sup>22</sup> Furthermore, vision loss has a strong impact on the utilisation of community support services and nursing home placement, which will necessitate re-evaluation of the capacity for current services to keep up with demand. Estimates from this study may serve as a starting point for policy-makers to plan for the future eye health care needs of Australians.

The ageing of Australia's population is related to two key factors. Following a peak in family sizes during the baby boomer generation (1946-1964) families are, on average, having fewer children and the proportion of younger Australians is therefore declining. The number of Australians aged 65 and over is expected to increase from around 15% of the total population in 2017 to 25% in 2050.<sup>23</sup> Secondly, Australia's life expectancy is increasing - on average Australians lived 10 years longer in 2018 than they did 30 years ago.<sup>24</sup> Due to these ageing effects, we estimate that the number of Australian adults with vision loss will almost double by 2050. While a 1% increase in prevalence may seem modest, when considered in light of projected changes in population dynamics, we predict that over 1 million Australian adults could have vision loss by

the year 2050. The greatest increase in the absolute number of Australians with vision loss is expected between 2020 and 2030, increasing by 39%, which is substantially higher than the 14-20% increase expected in subsequent decades. This rapid escalation over the coming decade is a direct result of further cohorts of baby boomers turning 65 years or older and thus being at a significantly greater risk of vision loss. When compared to current population-based data from the NEHS collected between 2015 and 2016, previous predictions for the same period based on the BMES and VIP data over-estimated the expected number of people with vision loss by approximately 20% (2020 estimates: 589,890 [NEHS] vs. 716,400 [combined BMES and VIP]).<sup>11</sup> While this may partly reflect improvements in eye care utilisation and treatment coverage of ocular disease in Australia over the past 30 years,<sup>25-28</sup> we suspect that these differences may also be explained by the utilisation of more representative model inputs for vision loss in the present study combined with our use of contemporary population data that closely resembles the current Australian population structure.

Our projections for vision loss in Australia are well aligned with those from a recent study in the United States<sup>29</sup> in terms of the rate of increase over the coming 30 years (1.9-fold in Australia vs. 2.1-fold in the United States) and the projected gender disparity (i.e. females with vision loss will outnumber males). This is likely to reflect strong parallels between the population structure of Australia and the US with regards to mean age (Australia = 37.3 years; US = 37.6 years), female life expectancy (~4 years longer than males in Australia and the US), and proportion of people aged 65 years and over (15 % for both countries).<sup>30</sup>

The strengths of this study include the use of contemporary national estimates of vision loss, stratified by remoteness and Indigenous status, to account for differences in the prevalence of vision loss amongst population sub-groups in Australia. In addition, unlike previous projections that assumed the overall prevalence of vision loss would remain static over time,<sup>11</sup> we adjusted the prevalence based on changes

forecast by the Australian Government in the regional, sex and age structure of the population.

Despite this, the findings of this study should be considered in the context of several key limitations. Because the proportion of Indigenous Australians in each stratum was held constant over time (due the lack of stratification by the ABS according to Indigenous status), the number of people with vision loss may have been under-represented in this study. Australia's Indigenous population is growing proportionately faster than the non-Indigenous population and is experiencing an increase in life expectancy.<sup>31</sup> Given that vision loss is more prevalent in Indigenous Australians, particularly amongst those who are older, the prevalence and total case numbers of vision loss in the Indigenous community may increase more rapidly than among non-Indigenous Australians, contributing to a higher overall number of cases. However, because Indigenous Australians comprise a small percentage of the population, this effect is not likely to be pronounced.

An additional limitation is that, while some data inputs were nationally-applicable and highly appropriate for this analysis, including the baseline prevalence of vision loss and the projected population growth and ageing, our model did not account for the potential modulating effect of other model inputs on the prevalence of vision loss. For example, because 75-80% of vision loss in Australia is readily reversible or preventable with spectacles, cataract surgery and early treatment of diabetic retinopathy,<sup>6</sup> treatment coverage rates for avoidable causes of vision loss may be expected to improve with better targeting of eye healthcare service delivery programs. Indeed, interventions that have recently been implemented may soon have downstream attenuating effects on the prevalence of vision loss, such as the national rollout of the KeepSight diabetic retinopathy screening programme,<sup>32</sup> the allocation of \$33.8 million in Medicare rebates to general practitioners for non-mydriatic fundus photography in diabetic patients<sup>33</sup> and several Government initiatives to improve access to spectacles.<sup>34</sup> The magnitude of the influence of these variables on the overall future

prevalence of vision loss is unknown partly because the future burden of diabetes in Australia and modulating effects of other variables that are unaccounted for are presently difficult to predict.

Furthermore, there are likely to be unforeseen technological breakthroughs within the next 30 years that will result in earlier detection and improved treatment for common eye diseases such as age-related macular degeneration and glaucoma. Thus, the present study may over-estimate the prevalence of vision loss in the coming decades. On the other hand, other factors may increase Australia's prevalence of vision loss, including the current myopia crisis (which may affect up to 55% of the population of Australasia by 2050)<sup>9</sup> and the expected increase in the prevalence of diabetes<sup>10</sup> – however recent Australian Government data indicate a plateau in diabetes prevalence in the past 5 years,<sup>35</sup> and further data are required to permit accurate projections to resolve this discrepancy. Nevertheless, the often contradictory or entirely absent literature regarding projections for and complex interactions between these variables has rendered their modulating effect on projections of vision loss unquantifiable and they were therefore excluded from analysis.

These data provide an estimate of the future burden of vision loss amongst Australian adults. This increased burden is likely to have a profound economic impact on health care systems, particularly in the coming decade when the Australian baby boomers reach an age where vision loss is most prevalent. While the projections presented here were derived from nationally-representative data on the prevalence of vision loss as well as reliable Government population projection data, the exclusion of certain input variables which might have modulated these projections necessitates cautious inference about their accuracy. Nonetheless, if Australia is to address the the burden of vision loss that is expected based on these projections, innovative approaches for early detection and timely treatment of common causes of vision loss are required, and the effectiveness of these eye care interventions should be monitored and evaluated through regular follow-up and surveillance.

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**Table 1:** Summary of the projected Australian population 50 years and older (Source Australian Bureau of Statistics).

	Population n (%)	Projected population structure %						
	2016 (N = 7,937,132)	2020 (N = 8,669,433)	2025 (N = 9,519,502)	2030 (N = 10,221,691)	2035 (N = 11,045,845)	2040 (N = 11,898,021)	2045 (N = 12,764,968)	2050 (N = 13,601,180)
Sex								
Female	4,151,943 (52.3)	52.1	52.2	52.4	52.5	52.6	52.6	52.5
Male	3,785,189 (47.7)	47.9	47.8	47.6	47.5	47.4	47.4	47.5
Age (years)								
50-59	2,970,930 (37.4)	35.8	33.7	32.2	31.9	33.3	33.5	33.1
60-69	2,481,423 (31.3)	30.7	30.5	29.3	28.0	26.7	26.6	28.0
70-79	1,537,901 (19.4)	21.5	22.8	23.3	23.5	22.6	21.8	21.0
80-89	946,878 (11.9)	12.0	13.0	15.2	16.6	17.5	18.0	17.8
Remoteness area								

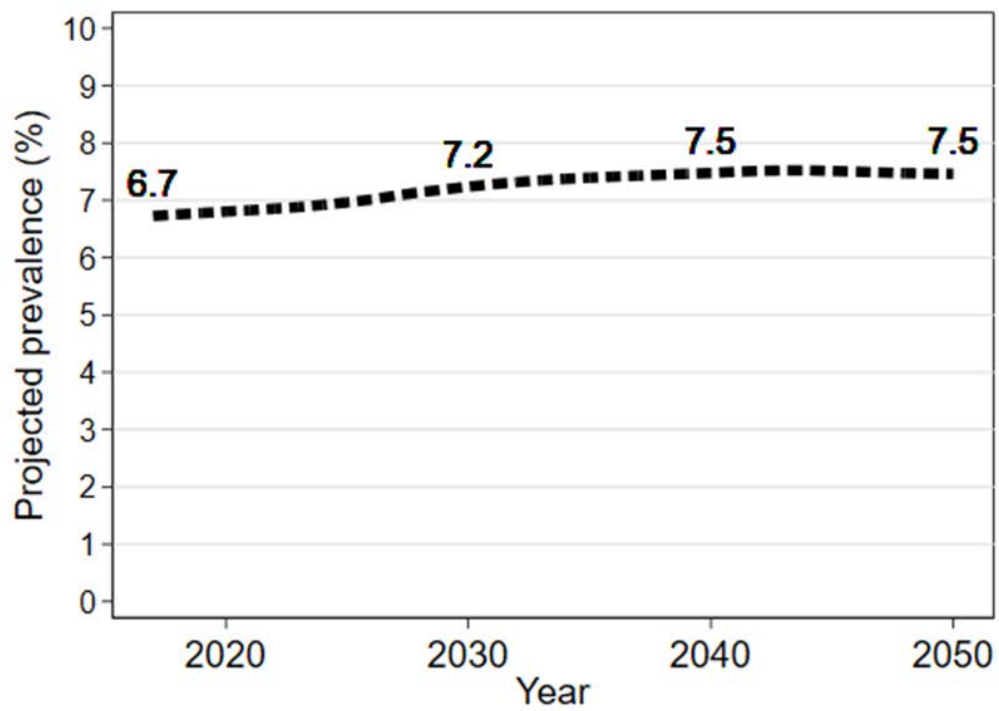
Major City	5,283,071 (66.6)	67.3	67.7	68.3	69.2	70.1	71.0	71.8
Regional	2,510,665 (31.6)	30.9	30.5	30.0	29.2	28.4	27.5	26.7
Remote	143,396 (1.8)	1.8	1.7	1.7	1.6	1.6	1.5	1.5

**Table 2:** Characteristics of non-Indigenous and Indigenous National Eye Health Survey participants aged 50 years and over

	<b>Non-Indigenous</b> (n = 3098)	<b>Indigenous</b> (n = 1155)	<b>p-value*</b>
Sex			
Female	1661 (53.6%)	668 (57.8%)	0.014
Male	1437 (46.4%)	487 (42.2%)	
Age-group			
50-59	814 (26.3%)	632 (54.7%)	<0.001
60-69	1167 (37.7%)	362 (31.3%)	
70-79	762 (24.6%)	135 (11.7%)	
≥80	355 (11.5%)	26 (2.3%)	
Educational attainment			
Did not complete secondary	1342 (43.3%)	732 (63.4%)	<0.001
Completed secondary	481 (15.5%)	78 (6.8%)	
Completed trade/university	1275 (41.2%)	344 (29.8)	
Remoteness area			
Major City	1253 (40.4%)	499 (43.2%)	0.080
Regional	1261 (40.7%)	470 (40.7%)	
Remote	584 (18.9%)	186 (16.1%)	
Place of birth			
Oceania	2216 (71.5%)		
Europe	655 (21.1%)		
Others	227 (7.3%)		
Bilateral vision loss			
No	2890 (93.3%)	1001 (86.7%)	<0.001
Yes	208 (6.7%)	154 (13.3%)	
<i>Cause</i>			
Refractive error	124 (4.0%)	87 (7.5%)	<0.001

Cataract	28 (0.9%)	38 (3.3%)
Other	56 (1.8%)	29 (2.5%)

\* Characteristics compared between Indigenous and Non-Indigenous participants using Pearson's  $\chi^2$  test



**Figure 1:** Projected prevalence of bilateral vision loss among Australians aged  $\geq 50$  years from 2020 to 2050.

**Table 3:** Projected number of Australian people with bilateral visual impairment by age and sex based on presenting visual acuity.

	2016 estimates of bilateral visual impairment			Projected number with bilateral visual impairment**						
	Population size†	Prevalence (%)*	Number*	2020	2025	2030	2035	2040	2045	2050
<b>Male</b>										
50-59 years	1,516,841	4.1	62,107	64,574	66,718	67,748	72,127	81,235	87,482	91,206
60-69 years	1,271,712	4.9	62,688	67,587	73,751	76,431	79,231	80,738	86,397	97,481
70-79 years	800,631	9.2	73,331	88,097	5	8	9	6	9	140,304
≥ 80 years	562,759	12.2	68,709	73,725	85,233	5	8	1	5	168,698
Total ≥ 50 years	4,151,943	6.4	266,835	293,982	329,817	365,522	402,764	436,960	469,903	497,689
<b>Female</b>										
50-59 years	1,454,089	6.4	93,492	98,042	101,704	105,126	113,077	126,700	137,668	146,296
60-69 years	1,209,711	3.3	40,150	42,932	46,492	47,616	49,148	50,463	53,955	60,179
70-79 years	737,270	7.6	56,379	68,990	79,482	86,270	93,856	96,492	8	103,259
≥ 80 years	384,119	19.7	75,530	85,943	105,478	135,294	157,961	179,021	197,243	207,598
Total ≥ 50 years	3,785,189	7.0	265,551	295,907	333,156	374,306	414,041	452,676	489,074	517,332
<b>Male and female</b>										
50-59 years	2,970,930	5.2	155,599	162,616	168,422	172,874	185,203	207,935	225,150	237,502

60-69 years	2,481,423	4.1	102,838	110,519	120,243	124,047	128,379	131,201	140,352	157,660
70-79 years	1,537,901	8.4	129,709	157,087	183,597	201,858	220,225	227,988	237,337	243,563
≥ 80 years	946,878	15.2	144,240	159,668	190,711	241,049	282,998	322,512	356,138	376,296
<b>Total ≥ 50 years</b>	<b>7,937,132</b>	<b>6.7</b>	<b>532,386</b>	<b>589,890</b>	<b>662,973</b>	<b>739,828</b>	<b>816,806</b>	<b>889,636</b>	<b>958,977</b>	<b>1,015,021</b>

† Source: Australian Bureau of Statistics.

\* Weighted prevalence estimated via post-stratification according to the age, sex, remoteness area and Indigenous status 2016 population in addition to sample weighting according to study site.

\*\* Estimated number of cases rounded to the nearest person which may result in the combined total being different to the sum of the listed estimates.

**Table 4:** Projected number of Australian people 50 years and older with bilateral visual impairment (based on presenting visual acuity), stratified by cause.

Cause	2016 estimates		Projected number with bilateral visual impairment						
	Prevalence (%) <sup>*</sup>	Number	2020	2025	2030	2035	2040	2045	2050
Uncorrected refractive error	4.2	331,914	363,715	400,139	432,108	468,844	507,788	545,521	578,969
Cataract	0.9	69,327	78,149	90,363	104,293	116,967	127,121	136,808	144,014
Other <sup>^</sup>	1.7	131,145	148,026	172,471	203,427	230,995	254,727	276,648	292,037

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\* Weighted prevalence estimated via post-stratification according to the age, sex, remoteness area and Indigenous status of the 2016 population in addition to sample weighting according to study site. Based on presenting visual acuity.

^Other: all conditions causing vision loss other than uncorrected refractive error and cataract

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