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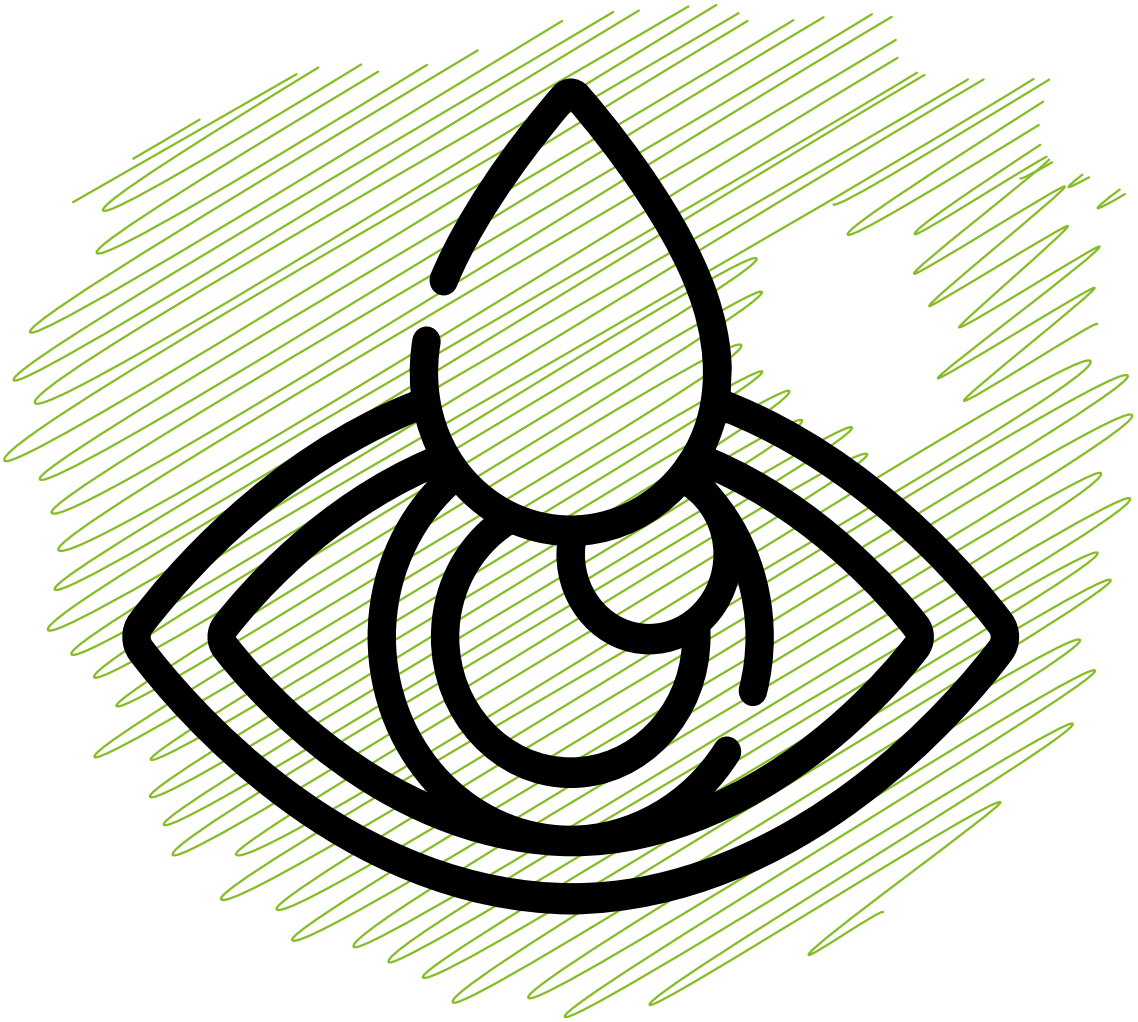

Insight into Optometry: Exploring Workforce Trends and Care Models in Aotearoa New Zealand

Specsavers

Final Report

Deloitte Access Economics

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Glossary.

Acronym	Full name
AHPRA	Australian Health Practitioner Regulation Agency
AMD	Age-related macular degeneration
COE	Competency in Optometry Examination
COVID-19	SARS-CoV-2
DHB	District Health Board
DR	Diabetic retinopathy
FTE	Full time equivalent
Nd:YAG	Neodymium:yttrium-aluminum-garnet
ODOB	Optometrists and Dispensing Opticians Board
OECD	Organisation for Economic Co-operation and Development
SSI	Semi-structured interviews
TTMRA	Trans-Tasman Mutual Recognition Act
VEGF	Vascular Endothelial Growth Factor

Executive summary.

Optometrists are the frontline of the eye healthcare system, and often serve as the first point of contact for a patient seeking expert care, guidance, and solutions for their vision and eye health needs. Optometrists deliver advice, education and healthcare to their patients and, where appropriate, refer patients to other eye health and medical professionals, including ophthalmologists, to provide collaborative and comprehensive eye health care, management and support for patients.

It is difficult to estimate the prevalence of eye conditions in Aotearoa New Zealand with the lack of a national eye survey, and therefore understand the areas of greatest need of eye care services. However, what is known is that there is a need to ensure there is equitable access to high-quality eye care to meet the needs of the population, across the North and South Islands. This is particularly pertinent as the demand for optometry care is increasing and expected to rise significantly in the next several decades. By 2025, it is expected that the number of optometric consultations is expected to surpass 1.2 million.[1]

The increasing prevalence of vision impairment is driven by several factors including an ageing population, increased life expectancy, rise in prevalence of chronic conditions such as diabetes and obesity which has negative adverse outcomes for eye health, and technology advancements resulting in the detection and diagnosis of eye conditions at their earliest stages. The optometry workforce landscape has evolved in the last decade and with the long wait list for public ophthalmology services in Aotearoa New Zealand, the eye care profession is recognising the need to do things differently. In addition, the disruption and challenges to access faced by patients and health care professionals during the COVID-19 pandemic has also highlighted opportunities to consider the future delivery of optometry care.

Specsavers commissioned Deloitte Access Economics to undertake optometry workforce modelling from 2022 to 2042 and consider alternative models of care to enhance the delivery of eye care and improve patient outcomes in Aotearoa New Zealand.

Scope and methodology

The work assessed two key questions: (1) 'What is the supply for and demand of optometrists over 2022-42?' and (2) 'What are the opportunities to enhance delivery of eye care in Aotearoa New Zealand?'.

The methodology to address the first question estimates the supply of optometrists as a function of the estimated opening headcount of optometrists in each year, plus relevant inflows, and net outflows of optometrists. Demand for optometrists is estimated through a consideration of population size and indicators of need such as population demographic (e.g., age group, gender, geographic distribution).

The modelling approach assumes that the market for optometrists starts from an initial position of equilibrium and then tracks the gap between demand and supply over the projected period (until 2042), assuming that there is no workforce or policy reform from the current day. That is, if supply and demand continue to track in accordance with their current trends. While a model of this nature is a best representation, there are a number of factors which may, over time, differ from the assumptions made in the model. For one, the model assumes that supply and demand for the market of optometry services are in equilibrium in 2022, when in fact that may not be true. The model does not consider the inequality of optometrist access between geographic areas (i.e., North and South Island) such as wait times as that is not available from the input dataset. This report does not make a judgment on the adequacy of the current supply of optometry services; rather it looks at the direction of future demand and supply pressures for the optometry workforce relative to the current position.

The methodology used to address the second question involved undertaking a scan of the peer-reviewed and grey literature and stakeholder consultations to identify opportunities to enhance the delivery of eye care in Aotearoa New Zealand. The stakeholder engagement strategy included four stakeholder semi-structure interviews (SSIs) representing three stakeholder groups: peak bodies, service providers and patient support groups.

[1] Ramke J et al., Defining eye health for everyone (2022) 42(1) *Ophthalmic and Physiological Optics* 1-3.

Key findings

Workforce modelling

The modelling finds that the supply of optometrists is projected to increase from 778 full time equivalent (FTE) optometrists in 2022 to **890 FTEs** by 2042 (representing a 14% increase). The optometry workforce is estimated to supply more than 1.5 million hours of clinical services by 2042.

Demand for optometrists is estimated to grow by 49% between 2022 and 2042. FTE optometrist demand is projected to grow by 46% in the North Island by 2042, while demand in the South Island is projected to increase by 55% in the same period.

Demand for optometry services is forecast to outpace supply – resulting in a widening shortfall of optometrists from 2023 onwards. This shortfall is expected to reach **270 FTE optometrists** by 2042.

In per capita terms, the average New Zealander in 2022 demanded in real terms of 0.25 hours of optometry care per annum. This is forecast to grow to 0.33 hours per annum by 2042. Meanwhile, supply of optometry clinical hours per person is estimated to remain constant at 0.25 hours per annum from 2022 to 2042. This indicates an average annual shortfall for New Zealanders of 4.6 minutes of optometry care per year by 2042.

The model forecasts a deficit in both the North and South Islands from a starting point of equilibrium.[2] The supply and demand projections presented in this report start from a position of initial equilibrium in 2022. This is an important assumption that is employed for modelling purposes. Future movements in supply and demand are relative to the initial position (in 2022) and the analysis is undertaken holding all other factors constant. The deficit in the South Island is more pronounced over the projection period than in the North Island, with a deficit of 38% in the South Island compared to 27% undersupply in the North Island.

Opportunities to enhance the delivery of eye care

The COVID-19 pandemic has disrupted the delivery of and access to healthcare across Aotearoa New Zealand. This change presents an unprecedented opportunity to review current models of eye care in Aotearoa New Zealand, with a view to embracing and enhancing the ones that provide the most value to the health system. Research identified a clear opportunity to optimise optometrist scopes of practice, by helping to manage and treat lower-risk patients in primary care settings, reducing burden on the hospital system.

The key opportunities identified to meet the current and future challenges for eye care are summarised below:

Key theme	Opportunities for Aotearoa New Zealand
Investing in enablers to optimise access to care	• Continue investment in building the qualifications of the eye care workforce, particularly primary care optometrists. This will ensure that there are more qualified primary care professionals who are able to diagnose, treat and manage lower-risk patients in the primary care setting. National funding may be required to support the expansion of this workforce. • Consider the use of telehealth as a strategic tool to enhance collaborative care models between optometrists and ophthalmologist and explore funding models to support the widespread adoption of remote eye care delivery models to alleviate accessibility issues. This would include ensuring industry standards and appropriate regulations are in-place to facilitate the use of telehealth. • Invest in technologies that better enable information sharing across all health professionals involved in the care pathway, and more effective central recording of data and images. • Provide opportunities to engage with patient support groups to ensure that people with eye conditions have access to appropriate emotional and informational support throughout their care journey. • Establish a dedicated government representative unit to prioritise and drive the eye health agenda. This collaborative effort would unite various stakeholder groups, pooling their expertise and resources, thereby creating a cohesive voice. Additionally, initiatives like conducting a nationwide eye health survey would be undertaken to further drive progress in this area.
Enhanced role for optometrists	• Employ risk-stratified care pathways to unlock opportunities to fully utilise the skillset of optometrists in the primary care setting, to manage and treat lower-risk and stable patients with eye conditions. • Establish and implement collaborative care pathways which better utilise the existing eye health workforce, to address community needs for eye health services and alleviate pressure on hospitals.

[2] The supply and demand projections presented in this table starts from a position of initial equilibrium in 2022. This is an important assumption that is employed for modelling purposes. Thus, future movements in supply and demand are relative to the initial position (in 2022) and the analysis is undertaken holding all other factors constant.

Conclusion

Demand for optometry services is forecast to outpace supply, resulting in a growing shortfall of FTEs from 2022 onwards. By 2042, a shortfall of 270 FTE optometrists across Aotearoa New Zealand is projected. The North Island is forecast to experience a shortfall of 167 FTE optometrists and 27% undersupply. This is in comparison to the South Island, where demand for optometry services is met with a shortfall of 104 FTE optometrists and 38% undersupply by 2042.

Ensuring an adequate supply of optometrists that is well-distributed throughout Aotearoa New Zealand will better enable optometrists to address gaps in accessible and timely primary eye care services to all New Zealanders and contribute to improved overall eye health and quality of life for all.

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Will demand for optometrists outstrip supply over the next decade?

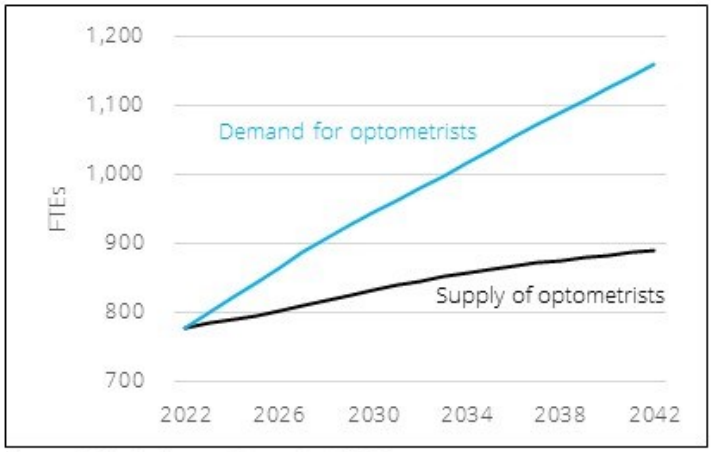
A CRITICAL WORKFORCE

Optometrists are at the forefront of the eye healthcare system, and often serve as the first point of contact for a patient seeking expert care, guidance, and solutions for their vision and eye health needs, in the primary care setting. It is critical that adequate supply and appropriate distribution of optometrists – to keep pace with growing and evolving demand for their services – underpins the sustainability of the healthcare system as a whole.

New Zealand faces its own unique challenges. With no national eye survey, it is difficult to estimate the prevalence of eye conditions in New Zealand and importantly, the areas of greatest need of eyecare services. Nevertheless, it is imperative to ensure equitable access to high-quality eye care across both the North and South Islands, catering to the eye health needs of the population.

Specsavers commissioned Deloitte Access Economics to undertake optometry workforce modelling from 2022 to 2042.

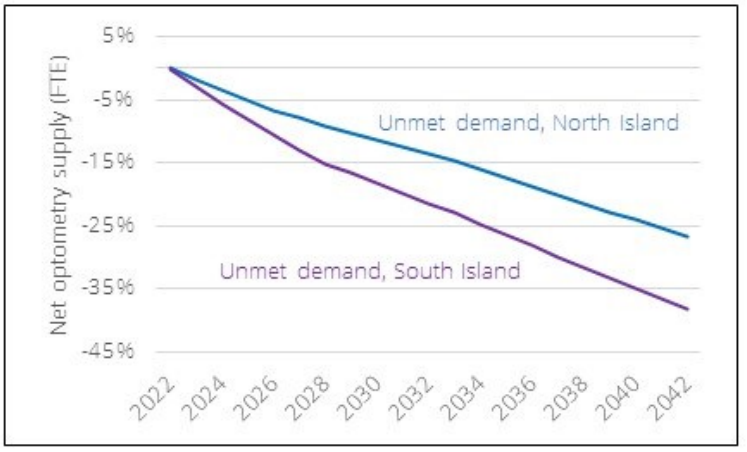
THE GAP WIDENS ACROSS NEW ZEALAND



Source. Deloitte Access Economics (2023).

The 2023 Deloitte Access Economics modelling estimates that the shortfall in optometrists will persist and grow to 2042. The model estimates that by 2042, the shortfall will reach 270 FTEs optometrists.

UNMET NEED CONCENTRATED IN THE SOUTH ISLAND



Source. Deloitte Access Economics (2023).

The 2023 Deloitte Access Economics modelling estimates a shortfall of FTE optometrists in both the North and South Island. There is shortfall of 167 FTE optometrists in the North Island by 2042, and a shortfall of 104 FTE optometrists in the South Island in the same period.

1 Introduction.

Optometrists are the forefront of the eye healthcare system, and often serve as the first point of contact for a patient seeking expert care, guidance, and solutions for their vision and eye health needs. Optometrists deliver advice, education and healthcare to their patients and, where appropriate, refer patients to other eye health and medical professionals, including ophthalmologists, to provide collaborative and comprehensive eye health care, management and support for patients.

Definition of an optometrist

In Aotearoa New Zealand, an optometrist is a registered healthcare professional who is trained and licensed to provide primary eye care services. They are qualified to perform comprehensive eye examinations, diagnose and manage various eye conditions, dispense corrective lenses, and provide advice on eye health and visual hygiene.

There is no standardised system of capturing and reporting on optometric services performed by optometry practices in Aotearoa New Zealand. However, it is estimated that over 780,000 comprehensive eye examinations were performed by optometrists in Aotearoa New Zealand in FY18, representing approximately 17% of the population.[3] By 2025, it is expected that the number of optometric consultations is expected to surpass 1.2 million, primarily driven by factors such as the ageing demographic of the population.[3] Ensuring an adequate supply of optometrists in Aotearoa New Zealand is an essential goal in health workforce planning, which is crucial to meet the population's needs to eye care services.

1.1 Vision impairment: an escalating challenge

Eye health is the state in which vision, ocular health and functioning ability is maximised.[4] Eye health can be affected by a range of eye conditions, some of which can lead to irreversible vision impairment and blindness. It is estimated that there are approximately 175,000 people living with vision impairment or blindness in Aotearoa New Zealand.[3] The risk of vision impairment increases with age, as does the prevalence of major eye disease causing vision impairment including age-related macular degeneration (AMD), cataracts, glaucoma and diabetic retinopathy (DR).[5]

Access to eye care is not equitable across the country. Māori and Pasifika people face barriers in accessing primary and secondary health services, including eye healthcare and are genetically more at risk of conditions such as diabetes which can have sight-threatening complications.[6] As a result, there is a higher rate of vision impairment and blindness in these groups and therefore they experience poorer outcomes compared to the total population.[7]

The demand for optometry care is increasing and expected to rise significantly in the next several decades. The increasing prevalence of vision impairment is driven by several factors, which includes:

- **An ageing population.** Historical peaks in family sizes in the baby boomer generation and increasing life expectancies has meant that as Aotearoa New Zealand's population ages, a larger share of the population will be 65 years or older. This population group is expected to rise from one in six people to one in four people by 2050.[8] The rapidly growing ageing population will increase the incidence of age-related eye conditions.
- **Increased life expectancy.** In the last two decades, the life expectancy for males and females has increased by 3.7 years and 2.4 years respectively in Aotearoa New Zealand.[9] An increase in life expectancy will mean people are living a longer proportion of their lives in older age. With this comes with the increased risk of developing age-related eye conditions.
- **Rising prevalence of chronic conditions.** For example, diabetes prevalence has increased since 2010 and accounts for an increasing disease burden in Aotearoa New Zealand.[10] Chronic conditions such as diabetes are associated with age and

[3] Specsavers Australia and Aotearoa New Zealand (2018) Australia and Aotearoa New Zealand Eye Report, <https://www.profile-anz.com/wp-content/uploads/2018/11/2018-SOTN-Eye-Health-Report_web_SP.pdf>, accessed May 1 2023.
[4] Ramke J et al., Defining eye health for everyone (2022) 42(1) *Ophthalmic and Physiological Optics* 1-3.
[5] Australian Institute of Health and Welfare (2005) Vision problems among older Australians, <https://www.aihw.gov.au/reports/eye-health/vision-problems-in-older-australians/summary>, accessed on 1 May 2023.
[6] Cumming J et al., The determinants of GP visits in Aotearoa New Zealand (2010) 34(5) *Australian and Aotearoa New Zealand Journal of Public Health* 451-457.
[7] Rogers J et al., Vision impairment and differential access to eye health services in Aotearoa Aotearoa New Zealand: protocol for a scoping review (2021) 11(9) *BMJ Open* e048215.
[8] Stats NZ (2022) One Million people aged 65+ by 2028, <https://www.stats.govt.nz/news/one-million-people-aged-65-by-2028/>, accessed May 2 2023.
[9] Stats NZ (2022) Life Expectancy <https://www.stats.govt.nz/topics/life-expectancy>, accessed May 2 2023.
[10] Ministry of Health (2019) Health and Independence Report 2019, <https://www.health.govt.nz/system/files/documents/publications/health-and-independence-report-2019-25feb2021.pdf>, accessed on 5 June 2023.

can also impact vision health.[11] As diabetes and other chronic conditions become more prevalent, and if poorly managed, will increase the prevalence of certain eye conditions.

- **Technological advancements.** The advent of advanced diagnostic tools and imaging technologies means that optometrists can now, and will continue to, detect and diagnose eye conditions at their earliest stages. This early detection leads to a higher reported prevalence of vision impairment, as individuals who may have been previously unaware of their condition are now being diagnosed earlier.

1.1.1 Impact of COVID-19

The impact of the COVID-19 pandemic, including the effects of social distancing measures and lockdowns, has been substantial on both patients and the healthcare system. This has been especially pronounced among older individuals, who have the highest prevalence of eye conditions like glaucoma and age-related macular degeneration, and were considered high risk to illness from the COVID-19 virus.[12] Further, it was noted that whilst public health messages emphasised the vulnerability of older people and urged them to self-isolate at home, this had an unintended effect of discouraging some from obtaining healthcare when they needed it.[13] The effects of COVID-19 on service disruption extend beyond age groups and also impacted different ethnic groups. For example, Māori experienced the greatest disruption in the delivery of planned care interventions in April 2020 compared with April 2019, relative to non- Māori groups.[14]

1.2 Objective of this report

Specsavers has commissioned Deloitte Access Economics to undertake optometry workforce modelling from 2022 to 2042 and consider alternative models of care for the delivery of optometry services and improve patient health outcomes in Aotearoa New Zealand.

The remainder of the report is structured as followed:

- Chapter 2 summarises the drivers of supply of and demand for optometrists in Aotearoa New Zealand over the next two decades
- Chapter 3 provides a high-level summary of the supply and demand model methodology
- Chapter 4 discusses the key drivers and findings from the optometrist supply modelling
- Chapter 5 discusses the key drivers and findings from the optometrist demand modelling
- Chapter 6 builds on the analysis in Chapter 4 and Chapter 5 to forecast the supply and demand of optometrists in Aotearoa New Zealand over 2022-42
- Chapter 7 summaries the opportunities to embed efficient and effective practice into the future delivery of optometry care
- Chapter 8 summarises the key findings from the updated model and discusses the implications for the Aotearoa New Zealand optometrist landscape.

A technical appendix is included to provide a detailed account of the modelling assumptions and model structure.

[11] Diabetes Australia (2022) Reducing the Impact of the Diabetes Epidemic, <https://www.diabetesaustralia.com.au/wp-content/uploads/Diabetes-Australia-Report-2022_Change-the-Future_1.0.pdf>, accessed May 15 2023.
[12] Aotearoa New Zealand Government (2023) People at higher risk of severe illness from COVID-19, <https://covid19.gov t.nz/prepare-and-stay-safe/people-at-higher-risk-of-severe-illness-from-covid-19/>, accessed May 2 2023.
[13] Wilson G et al., Navigating the health system during COVID-19: primary care perspectives on delayed patient care (2021) 134(1546) *NZ Med J*, 17-27.
[14] Ministry of Health (2020) COVID-19 disruptions to hospital and general practice activity, <https://www.health.govt.nz/system/files/documents/publications/covid-19-disruptions-hospital-general-practice-activity-7dec2020.pdf>, accessed May 20 2023.

2 The current state: The optometry landscape.

Understanding the current optometry workforce landscape, and the drivers of supply and demand for optometrists in Aotearoa New Zealand over the next two decades will assist in efforts in workforce planning into the future.

Optometrists play a key role in the delivery of essential eye care in the primary care setting. They are among the most common health professionals seen by the Aotearoa New Zealand population for routine eye care services. As of March 2022, there were 1,032 optometrists registered with the Optometrists and Dispensing Opticians Board (ODOB), the statutory body responsible for the regulation and oversight of the optometry and dispensing optician professions in Aotearoa New Zealand.[15] Of this, 82% (n=858) were practising optometrists.

Over the last two decades, scope of practice for optometrists has increased to not only support in the diagnosis of eye conditions, but also to provide a wider range of treatment and interventions in the management of eye conditions. This was in response to addressing the unmet public needs in eye care services and a shortage of ophthalmologists across the country. Box 1 provides an overview of the three scopes of practice for optometrists in Aotearoa New Zealand.

Box 1. Scope of practices for optometrists in Aotearoa New Zealand

1. Optometrist. Practitioners registered under this scope of practice must provide evidence-based comprehensive eye health and vision care, including the following services:

Prescribing any ophthalmic appliance, optical appliance, or ophthalmic medical device
Assessing, diagnosing, treating and managing conditions affecting the eye and its appendages
Prescribing medicines
Reporting or giving advice in an ophthalmic capacity
Signing any certificate required for statutory purposes, such as driver licensing eyesight certificates
Non-clinical practice such as teaching, research, optometric or eye health management, in hospitals, clinics, general optometric practices and community and institutional contexts, whether paid or voluntary.

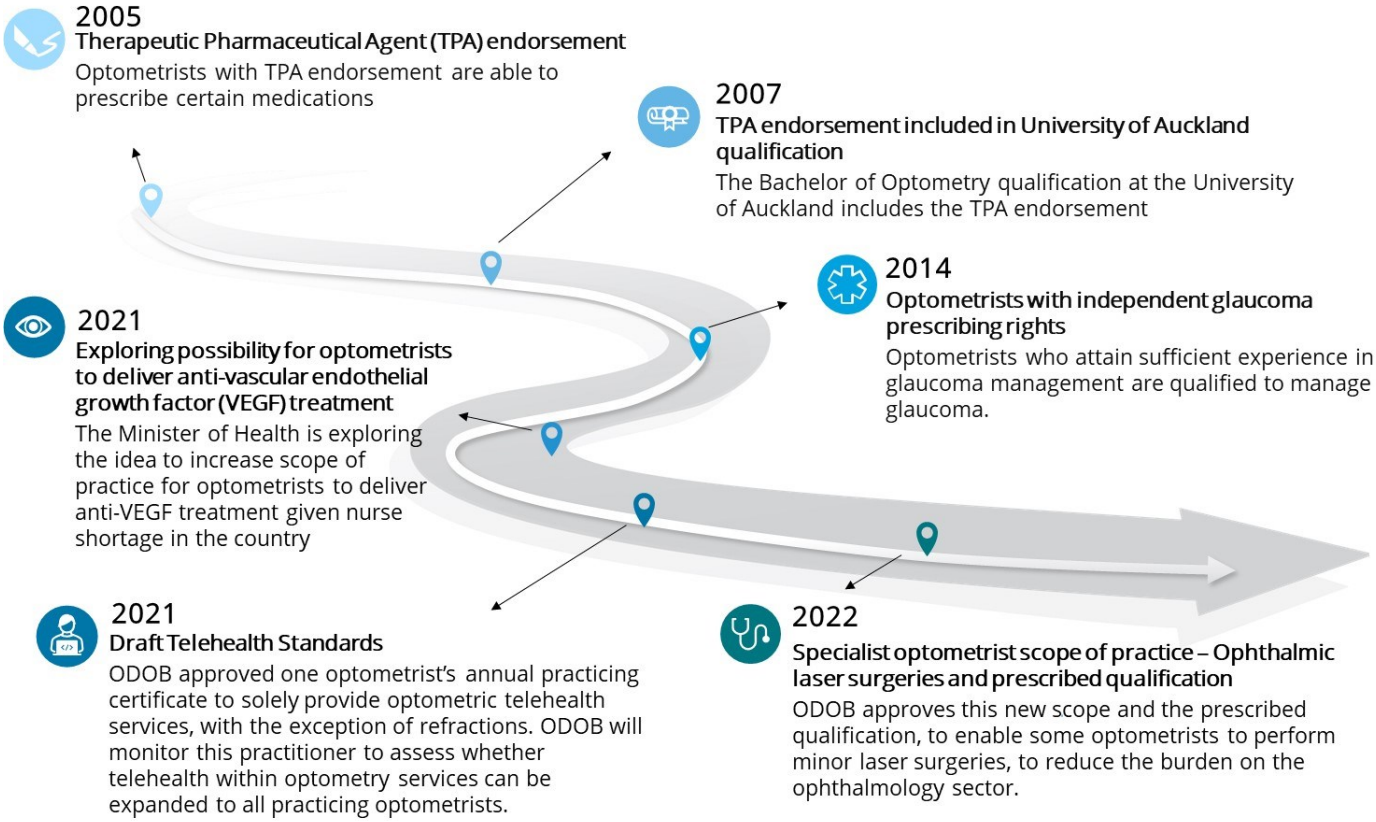
2. Provisional optometrist. Practitioners registered under this scope of practice work under a supervisor and have their scope of practice usually limited to three years. Provisional optometrists can perform tasks that fall under the scope of practice for optometrists, under the appropriate supervision and oversight, however, are not able to prescribe medicines.

3. Specialist Optometrist – Ophthalmic Laser Surgeries. Practitioners registered under this scope of practice are authorised to perform specialised procedures below the mucous membrane or surface of the skin. This includes performing neodymium:yttrium-aluminum-garnet (Nd:YAG) laser capsulotomy and/or Nd:YAG laser peripheral iridotomy in an approved hospital setting.

Figure 2.1 illustrates the changing scope of practice and policy landscape for optometrists in Aotearoa New Zealand.

[15] Optometrists and Dispensing Opticians Board (OBOB) (2022) Annual Report, <https://myodob.odob.health.nz/docs/O&OD%20AnnualReport2022b.pdf>, accessed May 1 2023.

Figure 2.1: Evolving scope of practice for optometrists



Source: Deloitte Access Economics (2023) using ODOB (2022)[16], Ministry of Health (2014)[17] and Black et al (2019).[18]

2.2 The supply of optometrists in Aotearoa New Zealand

2.2.1 Size of the optometrist workforce

Over the last decade, the size of the optometrist workforce has increased from 815 in 2014 to 1,032 in 2022, representing approximately a 3% annual growth rate.[19] The proportion of practising optometrists across this period has consistently ranged between 81-86% of total registered optometrists (see Chart 2.1).

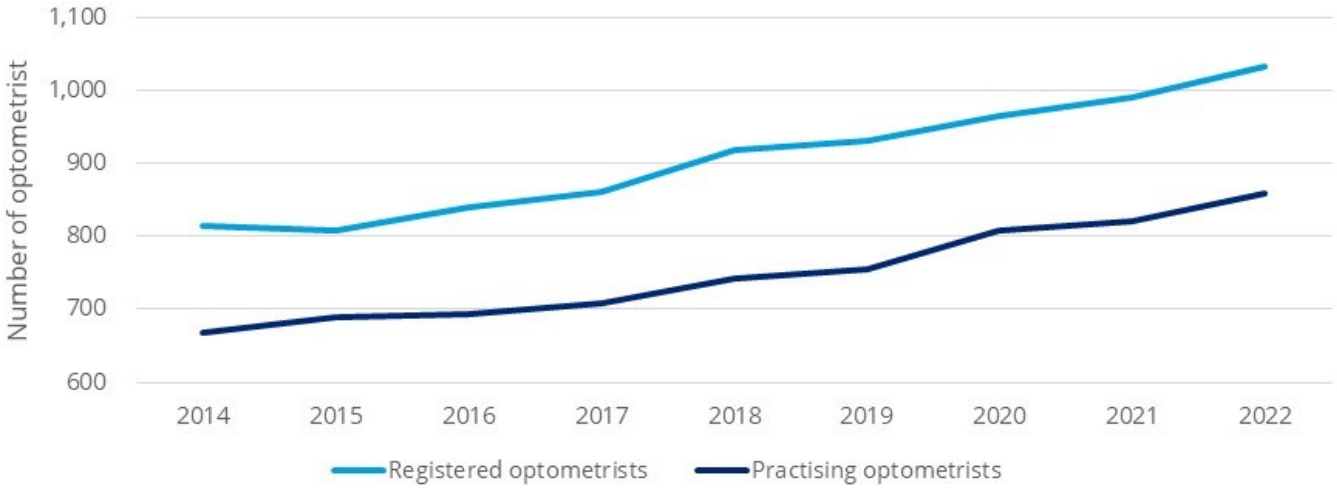
[16] Optometrists and Dispensing Opticians Board (OBOB) (2022) Scopes of Practice Report < https://odob.health.nz/site/registration/scope-of-practice#:~:text=Optometrist%20Scope%20of%20Practice,An%20optometrist%20registered&text=assessing%2C%20diagnosing%2C%20treating%20and%20managing,as%20driver%20licensing%20eyesight%20certificates>, accessed May 1 2023.

[17] Ministry of Health – Manatu Hauora (2014) Changes to Prescribing, Medicines Amendment Act 2013 and Misuse of Drugs Amendment Regulations 2014, Wellington, https://www.health.govt.nz/our-work/regulation-health-and-disability-system/1-july-2014-changes-prescribing, accessed May 1 2023.

[18] Black JM et al., The changing scope of optometry in Aotearoa New Zealand: historical perspectives, current practice and research advances, (2019) 49(2) *Journal of the Royal Society of Aotearoa New Zealand* 188-204.

[19] Optometrists and Dispensing Opticians Board (OBOB) (2023) Annual reports 2014-2022, <https://www.odob.health.nz/site/about-us/annual-report>, accessed May 1 2023.

Chart 2.1: Number of optometrists in Aotearoa New Zealand, 2014-22



Source: Deloitte Access Economics calculation (2023) using ODOB (2014-22).[19]

Optometrists undergo significant training in eye care. A typical pathway in Aotearoa New Zealand includes the completion of a five-year Bachelor of Optometry course, which is only offered at the University of Auckland, located on the North Island.[20] All optometrists must be registered with ODOB to practise in Aotearoa New Zealand. An optometrist that is registered with the Australian Health Practitioner Regulation Agency (AHPRA) is eligible to register as a practising optometrist in Aotearoa New Zealand under the Trans-Tasman Mutual Recognition Act 1997 (TTMRA).[21] An optometrist who holds a qualification in optometry from an institution outside of Aotearoa New Zealand or Australia is required to pass the Competency in Optometry Examination (COE) before applying for registration to practise in Aotearoa New Zealand.

Previous workforce forecasting modelling for optometrists indicates that there is expected to be a gradual increase in the number of optometrists from 16 to 18 optometrists per 100,000 population over 2022 to 2032.[22] As such, it was reported that the supply of optometrists over the next decade will be adequately sized to meet the eye health needs of the Aotearoa New Zealand population. The forecast modelling is not publicly available to validate the methodology.[23]

2.2.2 Geographic distribution of the optometry workforce

The distribution of the optometry workforce is concentrated in the previous central Auckland District Health Board (DHB) regions, and most of the highly populated DHB regions.[24] Auckland DHB has 15.4 times more optometrists per capita than the lowest DHB density aera, Wairarapa.[25] At the time of the study's publication, the findings indicated that Auckland and other major metropolitan regions are adequately supplied with optometrists, whilst other less-densely populated regions such as West Coast region experience an undersupply of optometrists.[26]

Understanding the geographic distribution of the optometry workforce in Aotearoa New Zealand is challenged by the complex classification of urban and rural areas. The Aotearoa New Zealand Government categorises these areas based on resident population size, however, there is inconsistency in how data is recorded and reported. Moreover, the majority of the country, excluding the three major cities (Auckland, Wellington, and Canterbury) where most people live, is classified as regional. This geographic composition makes it exceedingly difficult to accurately assess the spatial distribution of optometrists throughout the country.

2.2.3 Impact of COVID-19

The COVID-19 pandemic impacted the supply of optometrists in several ways:

[20] University of Auckland (2023) Bachelor of Optometry, <https://www.auckland.ac.nz/en/study/study-options/find-a-study-option/bachelor-of-optometry-boptom.html>, accessed May 1 2023.
[21] Optometrists and Dispensing Opticians Board (ODOB), Registering as an optometrists, <https://odob.health.nz/site/registration/optometrist>, accessed 1 May 2023.
[22] Optometrists and Dispensing Opticians Board (OBOB) (2022) Annual Report, <https://myodob.odob.health.nz/docs/O&OD%20AnnualReport2022b.pdf>, accessed May 1 2023.
[23] An attempt was made to contact the authors to validate the findings but received no response.
[24] Chapman N.A. et al., Geographic distribution of eye-care practitioners in Aotearoa/Aotearoa New Zealand: implications for future eye health workforce (2020) 103 *Clin Exp Optom* 531-541.
[25] Optometrists and Dispensing Opticians Board (OBOB) (2022) Annual Report, <https://myodob.odob.health.nz/docs/O&OD%20AnnualReport2022b.pdf>, accessed May 1 2023
[26] Chapman N.A. et al., Geographic distribution of eye-care practitioners in Aotearoa/Aotearoa New Zealand: implications for future eye health workforce (2020) 103 *Clin Exp Optom* 531-541.

- **Fewer overseas optometrists entering the country.** The slowing of migration and border closures may have resulted in fewer registration applications from overseas applicants, though this is likely to be a small number of optometrists.
- **Disruption of optometry education and training.** Adverse impacts on workforce development, by disrupting provision of education and training. In addition, fewer employment opportunities may have affected trainees' career progression.
- **Underdeveloped technical skills.** By November 2021, the closure of community optometry practices and the University of Auckland's optometry clinic resulted in the cancellation of over 2,000 practical sessions for final-year optometry students.[27]

2.2.4 Changes to recent visa requirements

From July 2023, Aotearoa New Zealand citizens who hold a special category visa will gain the right to apply for Australian citizenship without the need to become a permanent resident first.[28] While only a small number of Aotearoa New Zealand optometrists practice in Australia, this new policy change may result in an increase in the number of optometrists who relocate to Australia or decide to permanently stay in Australia.

2.3 The demand of optometrists in Aotearoa New Zealand

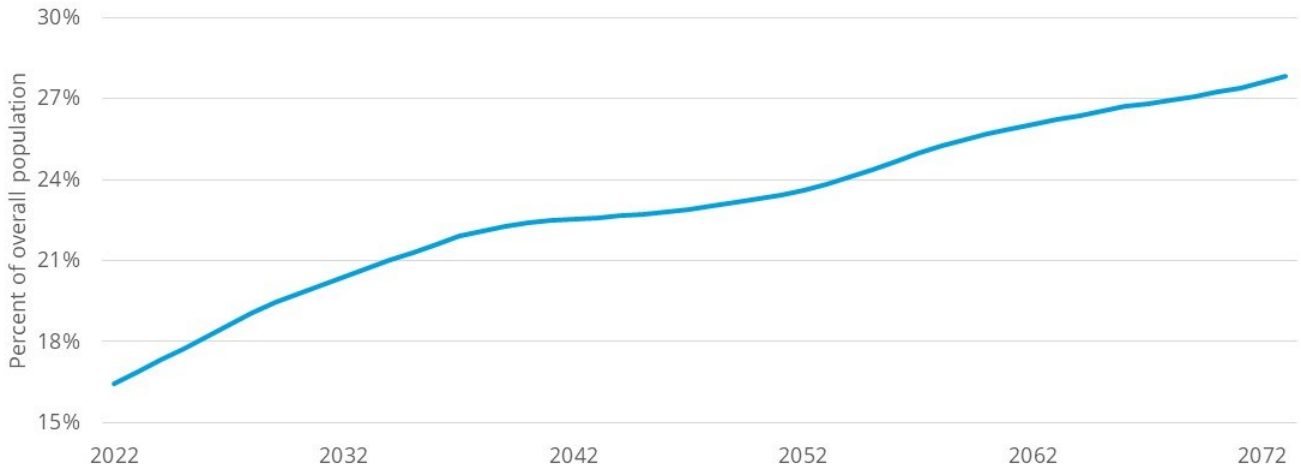
2.3.1 Population growth

Aotearoa New Zealand has had a steady population growth rate compared to many other Organisation for Economic Co-operation and Development (OECD) countries over the last decade, with the annual growth rate for 2022 at 0.69%.[29] Historically, the key factors impacting population size has been fertility, net migration and mortality rates. In September 2022, Aotearoa New Zealand experienced negative net migration of 8,400 people as a result of COVID-19 and the associated border closures.[30] Although the future of immigration remains uncertain, Aotearoa New Zealand's population is projected to increase by 12% from 2022 to 2032.[31] In the long-term, Aotearoa New Zealand's population growth is expected to slow, with an estimated one in four chance that there will be no population growth by 2050s.[32]

2.3.2 The ageing population

Aotearoa New Zealand, like most high-income countries, has a large and growing older population with one in every six (16.4%) people aged 65 years and over in 2022. This proportion is expected to grow to approximately 28% by 2073 (see Chart 2.2).[33] Life expectancy in Aotearoa New Zealand is among the highest in the world, with the latest available data indicating a raise by 0.5 years and 0.3 years for males and females respectively in 2018-19 compared to 2012-14.[34]

Chart 2.2: Projection of population aged 65+ as a percent of overall population, Aotearoa New Zealand, 2022-73



[27] Eye on Optics (2022) Two Years: the impacts of COVID-19 on eye care, <https://eyeonoptics.com/articles/archive/two-years-the-impacts-of-covid-19-on-eyecare/#>, accessed May 1 2023.
[28] Department of Home Affairs (2023) Pathway to permanent residence and citizenship, <https://immi.homeaffairs.gov.au/entering-and-leaving-australia/new-zealand-citizens/pathway-to-permanent-resident-and-citizenship>, accessed June 1st 2023.
[29] Stats NZ (2022) Population, <https://www.stats.govt.nz/topics/population> , accessed April 27 2023.
[30] Stats NZ (2022) Annual net migration loss of 8,400, <https://www.stats.govt.nz/news/annual-net-migration-loss-of-8400/>, accessed April 27 2023.
[31] StatsNZ (2023) Statistical area 2 population projections, characteristics, 2018(base)-2048(update), <https://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE8621&_ga=2.162468156.1214492373.1682295928-805917779.1678853845>, accessed May 1 2023.
[32] StatsNZ (2023) National population projections to 2073 (2022 base), <https://www.stats.govt.nz/information-releases/national-population-projections-2022base2073/#text-alt-3>, Accessed May 1 2023.
[33] StatsNZ (2022) One million people aged 65+ by 2028, <https://www.stats.govt.nz/news/one-million-people-aged-65-by-2028/>, accessed May 1 2023.
[34] StatsNZ (2022) Life expectancy, <https://www.stats.govt.nz/topics/life-expectancy>, accessed May 1 2023.

Source: Deloitte Access Economics (2023) using StatsNZ (2022).[35]

A growing share of the population that are aged 65+, coupled with longer life expectancy, will contribute to growing prevalence of eye diseases such as cataracts, glaucoma, and age-related macular degeneration. These conditions can significantly impact vision and quality of life for older people, posing challenges to their daily activities and independence.[36]

2.3.3 Chronic conditions

Among other factors, the ageing population is a key driver of the increasing prevalence of chronic conditions and multimorbidity.[37] The prevalence of chronic conditions is particularly a concern for Māori and Pasifika people who are more likely to experience conditions earlier in life, therefore making them more at risk of encountering complications.[38] The rising prevalence of conditions such as diabetes, hypertension, and cardiovascular disease is a growing concern, as these health issues can lead to complications which can cause preventable vision loss. People with these conditions are at an increased risk of developing eye conditions like diabetic retinopathy and age-related macular degeneration.

2.3.4 Impact of COVID-19

The optometry workforce and practice patterns have been substantially impacted by the COVID-19 pandemic. This includes:

- **Increased use of telehealth services.** To limit face-to-face consultations and the spread of the COVID-19 virus, optometry practices in Aotearoa New Zealand embraced the use of tele-optometry, which allowed optometrists to continue to provide assistance to patients with eye health concern and dispensing needs through a triage model.[39] Alongside this, the Aotearoa New Zealand Ministry of Health had loosened its standards to permit the exchange of electronic prescriptions via email between optometry clinics and pharmacies, whereas previous to COVID-19 hardcopy prescriptions was required for therapeutics dispensing in most cases.[40]
- **Delayed and avoided access to eye care.** Due to delayed and postponed medical care, it is expected that there will be an increase in the diagnosis of more progressed and advanced eye conditions, which will add significant strain to the healthcare system.
- **Potential increased prevalence in eye conditions.** The shift to online learning and increased screen time, coupled with restrictions on outdoor time due to the pandemic, has raised concerns about the effect on myopia rates, particularly in children. Findings from a large Chinese study with over 120,000 children found that myopia prevalence rose by 400% in six-year-olds during the COVID-19 pandemic.[41] Although a similar study has not been undertaken in the Aotearoa New Zealand context, it is likely that the burden of myopia has increased in children due to the decreased levels of outdoor activity and prolonged use of portable devices and screens during the high of the pandemic, risk factors that contribute to the development of myopia.[42] Myopia is known to be a risk factor for other potentially blinding eye conditions such as retinal detachment, macular disease, cataract and glaucoma.[43] Any increases in prevalence in myopia in children may lead to increases in prevalence of other eye conditions, which will increase the demand for eye care.

[35] Stats NZ (2022) One million people aged 65+ by 2028, <https://www.stats.govt.nz/news/one-million-people-aged-65-by-2028/>, accessed May 1 2023.
[36] National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division, Health, Making Eye Health a Population Health Imperative: Vision for Tomorrow: The Impact of Vision Loss, <https://www.ncbi.nlm.nih.gov/books/NBK402367/>, accessed on 7 June 2023.
[37] Divo MJ et al., Ageing and the epidemiology of multimorbidity. (2014) 44(4) *European Respiratory Journal* 1055-1068.
[38] Aotearoa New Zealand institute of economic research (2022)The cost of long term conditions in Aotearoa New Zealand, <https://www.health.govt.nz/system/files/documents/publications/cost_of_illness_ltcs_2_jun_-_jr.pdf> , accessed April 27 2023.
[39] NZ optics (2020) The rise of Teleoptometry, <https://nzoptics.co.nz/articles/archive/the-rise-of-teleoptometry/#>, accessed April 27 2023.
[40] Imlach F et al., E-prescribing and access to prescription medicines during lockdown: experience of patients in Aotearoa/Aotearoa New Zealand (2021) 22 *BMC Fam Pract* 140.
[41] Wang J et al., Progression of Myopia in School-Aged Children After COVID-19 Home Confinement, (2021) 139(3) *JAMA Ophthalmol* 293–300.
[42] Australia and Aotearoa New Zealand Child Myopia Working Group (2023) The Australia and Aotearoa New Zealand Child Myopia Report (2022/23) – Reducing the risk to vision <https://www.optometry.org.au/wp-content/uploads/National_news_images/2022/November/Reducing-the-Risk-to-Vision_Myopia-Report-202223.pdf>, accessed May 12 2023.
[43] Williams K et al., High myopia and its risks. (2019) 32(105) *Community Eye Health* 5-6.

3 Methodology.

This chapter provides an overview of the modelling approach used in estimating the supply of and demand for optometrists in Aotearoa New Zealand. It also describes the approach for analysing the changes in models of optometry care.

3.1 Workforce modelling

3.1.1 Supply model methodology

The supply of optometrists between 2022-2042 is based on the initial headcount of optometrists in 2022 and accounting for changes to inflows and outflows from the optometry workforce overtime. A detailed description of supply modelling is provided in Appendix A.

The initial headcount of optometrists is based on data available from ODOB. This data is disaggregated by age, gender, location and remoteness. The total number of optometrists were adjusted to only account for clinical optometrists based on data from ODOB.

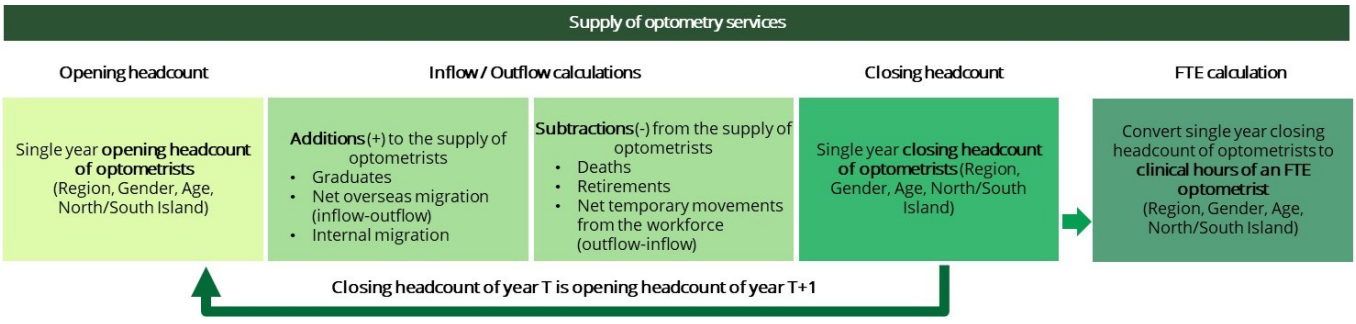
Inflows into the supply model include graduates and net overseas migration into Aotearoa New Zealand. Graduate data was based on publicly available data from the University of Auckland. Net overseas migration was based on the average annual passes of the competence in optometry examination as provided by the Optometry Council of Australia and Aotearoa New Zealand annual reports.

Outflow from the supply model include deaths, retirements and net temporary movements. Death rates were obtained based on data from the StatsNZ and disaggregated by age, gender, region (including differences between regions and North/South Island). Data on retirements and other exits from the workforce were based on data from ODOB. Net temporary movements accounted for overseas study and travel as well as for pregnancy, childbirth and childcare.

The average number of hours worked by optometrists in 2022 was not available at sufficient disaggregation in Aotearoa New Zealand. It was assumed that the average hours worked by Aotearoa New Zealand optometrists aligns with the average hours worked by Australian optometrists (adjusting for differences in age and gender), with this data sourced from the National Health Workforce Dataset.[44] This was used to adjust the headcount of clinical optometrists to an estimate of the total FTE optometrists available.

A high-level schematic of the supply model is shown in Figure 3.1. Further information on the supply model methodology is available in Appendix A.

Figure 3.1: Supply of optometrists in Aotearoa New Zealand



Source: Deloitte Access Economics (2023).

[44] Australian Institute of Health and Welfare (2023) National Health Workforce Data Set (NHWDS), <https://www.aihw.gov.au/about-our-data/our-data-collections/national-health-workforce-dataset>, accessed May 1 2023.

3.1.2 Demand model methodology

The demand for optometrists was inferred from observing indicators of factors driving demand, including changes in population growth, age structure and utilisation of optometry services. A detailed description of demand modelling is provided in Appendix B.

In the absence of a national dataset, utilisation rates of optometry services was calculated using Specsavers Aotearoa New Zealand billing information to infer demand for optometrists in Aotearoa New Zealand.[45] Data obtained was disaggregated by optometry service type, region, geographic location (North/South Island), gender and age across 2019-23. As discussed in Section 2.2.2, given the challenges of the geographic location classification in Aotearoa New Zealand, this report provides the North/South Island split for the demand for optometry services. This is likely to best represent the population's access and utilisation of optometry services, as the movement of the population is usually contained within local areas. That is, a patient who lives on the North Island is unlikely to travel to the South Island for eye care services, instead, they are more likely to travel to the closest major city nearest to their place of residence.

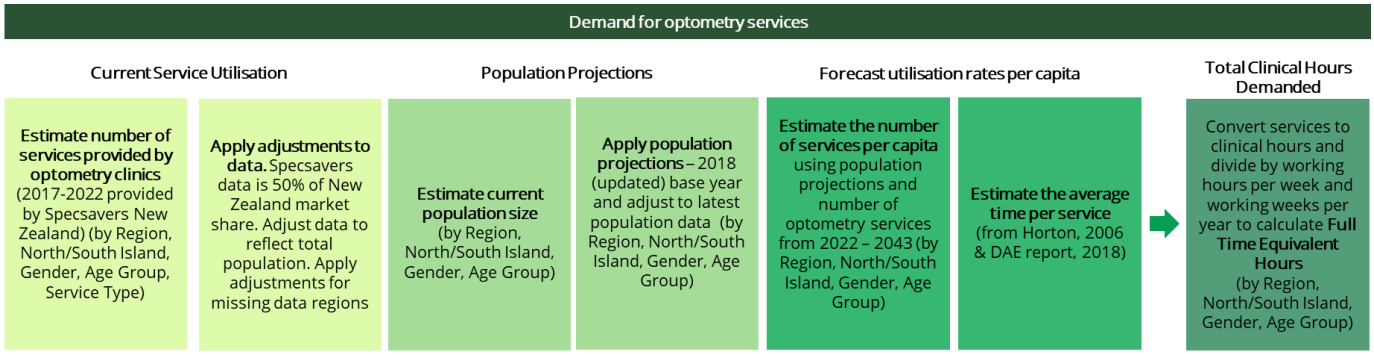
To obtain total optometry services, a 50% market share of Specsavers clinics was assumed[46] and used to extrapolate to total optometry services in Aotearoa New Zealand. Optometry service type was classified by the following categories: standard eye exam, recheck, contact lens consult, drivers screening, visual field, long subsequent exam and short subsequent exam.

To estimate population growth, population estimates supplied by StatsNZ were applied to population projection growth trajectories.[47] Each region of Aotearoa New Zealand was then either classified as located in the North or South Island.

Historical service data was converted to a measure of service utilisation, stratified by, regions, North/South Island split, gender, age and service grouping. To perform this conversion, services were divided by their matched population. Service utilisation rates per 1,000 people was then forecast from 2023 onwards to 2042 using a variety of methods, and then multiplied out by matched population forecasts and average minutes by service grouping to obtain an estimate of the total number of clinical optometry hours demanded in Aotearoa New Zealand.[48]

A high-level schematic of population demand is shown in Figure 3.2.

Figure 3.2: Demand for optometry in Aotearoa New Zealand



Source: Deloitte Access Economics (2023).

3.1.3 Caveats and limitations of the modelling

While a model of this nature is a best representation, there are a number of factors which may, over time, differ from the assumptions made in the model. For one, the model assumes that supply and demand of services are in equilibrium in 2022, when in fact that may not be true. Rather, the model has been designed to consider future directions of demand and supply of the optometry workforce relative to its current position if no policy or workforce changes occur. The main considerations for interpretation are discussed below.

3.1.3.1 Supply-side modelling

- No data was available to inform the age/gender and location of optometry graduates. It was assumed that graduate demographics aligned with Australian graduate data (with most graduates aged 20-29 and approximately 70% female). Graduates were distributed by location based on the relative population splits of each region.

[45] Specsavers provided billing data of optometry services, 2019-22.
[46] Sourced from Kantar Market Research (18 July 2023).
[47] Stats NZ (2023) National population projections to 2073 (2022 base), <https://www.stats.govt.nz/information-releases/national-population-projections-2022base2073/#text-alt-3>, accessed May 1 2023.
[48] Horton P et al., The Australian optometric workforce 2005 (2006) 89(4) *Clinical and Experimental Optometry*, 229-240.

- No data was available detailing the average hours worked by optometrists by age and gender. It was assumed that the average hours worked by Aotearoa New Zealand optometrists are equivalent to Australian optometrists (after accounting for differences in the age/gender profile of both cohorts).
- Exits from the workforce were informed by ODOB. While ODOB also publish data for re-entries into the workforce, the data was not sufficient to be included in the modelling. Consequently, exits from the workforce (for reasons other than those classified as net temporary movements) were assumed to be permanent. This may result in an underestimate of the total supply of optometrists.
- The modelling does not account for geographic serviceability. That is, the modelling only defines supply by 'North' and 'South' Islands. This assumes that all supply of optometrists can flow within each Island to appropriately meet demand. In practice there will be serviceability boundaries which result in some geographic areas receiving far less supply of optometrists than others.

3.1.3.2 Demand-side modelling

- The projection methods used in this model are based off historical data of services per capita. This method does not consider any external factors that may influence the time series per capita, such as technology advancements, the economy, macroeconomic policy shocks or consumer behaviour.
- Total clinical hours may be under-recorded. It is likely that the clinical hours used in the analysis may be an underestimate of the actual clinical hours worked by optometrists, with administration time and other non-billable services being not fully captured.
- Two regions were not included in billing data provided by Specsavers as Specsavers have no operating practices in these two regions. Certain assumptions were used to infer number of services based off similar regions by population and geography. It is possible that services in these two regions may have true number of services different to those estimated.
- Given the limitation of the existing data for sub-groups of the population, this model does not disaggregate estimates of service utilisation by sub-groups.

3.2 Exploring opportunities to enhance care delivery

To assess the opportunities to enhance eye care delivery in Aotearoa New Zealand, a mixed method approach was adopted. This included:

- **Literature scan.** A scan of the peer-reviewed and grey literature online (e.g., reports obtained through search engines)
- **Stakeholder consultations**. The stakeholder engagement strategy included four stakeholder semi-structure interviews (SSIs) representing three stakeholder groups: peak bodies, service providers and patient support groups. The SSIs provide an in-depth understanding of the current and future trends of the optometry workforce and identified opportunities to improve the future delivery of optometry services in Aotearoa New Zealand.

4 Results: Supply of optometrists.

This chapter presents the modelling results for the supply of optometrists in Aotearoa New Zealand from 2022 to 2042.

4.1 Findings

Table 4.1 presents the total FTEs supplied by optometrists in each year, modelled between 2022 and 2042. The total optometry supply is projected to increase from 778 FTEs in 2022 to 890 FTEs in 2042 (a 14% increase). The optometry workforce is projected to supply almost 1.5 million hours of clinical services in 2042.

Comparatively the headcount of optometrists (the total number of optometrists in the workforce) is projected to grow from 900 optometrists in 2022 to 1,059 optometrists in 2042 (a 18% increase). The optometry headcount is expected to grow faster than optometry FTEs. This is driven by changes to the composition of the optometry workforce. In particular, it is assumed that delivery of clinical optometry hours is highest amongst optometrists aged 20-34. As the average age of the optometry workforce increases, the average number of clinical hours provided decreases. The modelling estimates that the average optometrist delivered 31.3 hours of clinical optometry services per week in 2022, reducing to 30.4 hours per week in 2042.

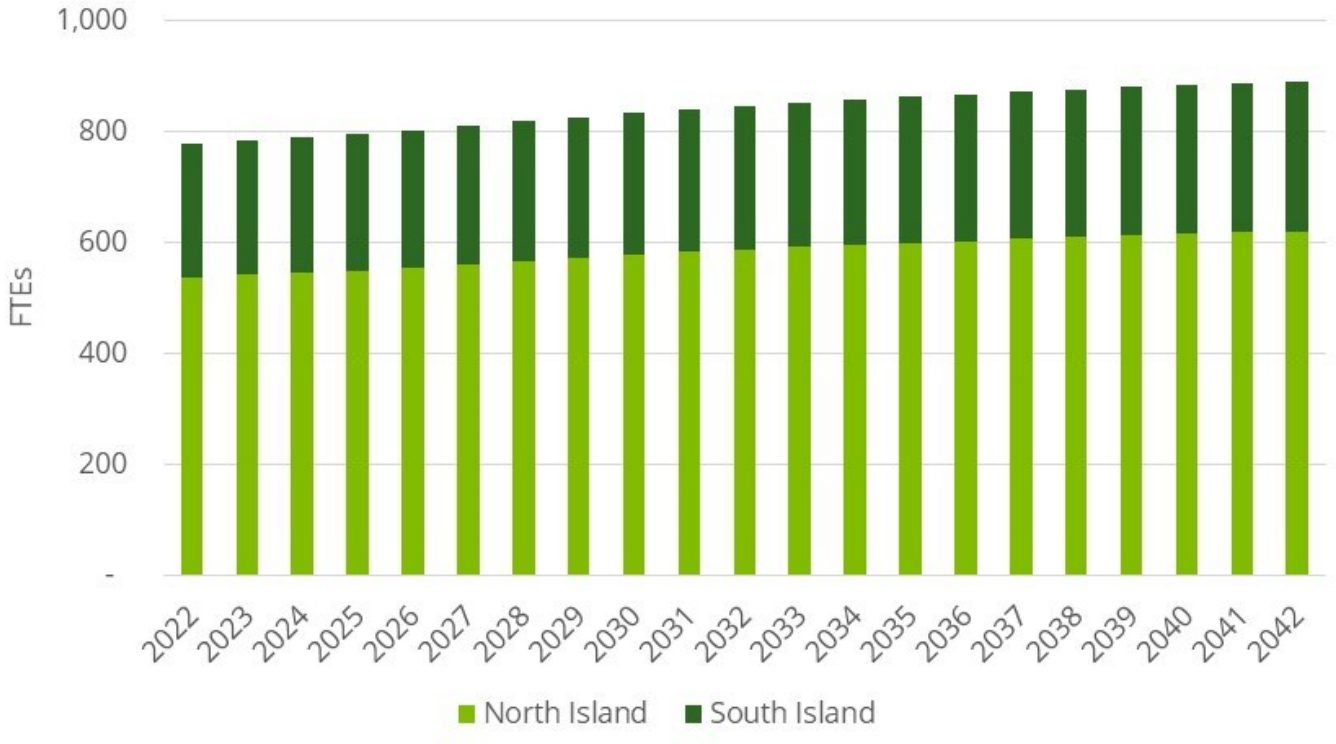
Table 4.1: Total optometrist FTEs supplied, 2022-42

	2022	2027	2032	2037	2042
FTEs optometrists supplied					
Region					
North Island	537	561	587	606	620
South Island	241	249	258	265	270
Age					
0-24	41	74	84	86	87
25-44	443	443	459	470	477
45-64	250	244	249	258	268
65+	44	48	54	57	58
Gender					
Male	351	345	340	337	336
Female	427	465	505	535	554
Aotearoa New Zealand (total)	**778**	**810**	**846**	**871**	**890**

Source: Deloitte Access Economics calculation (2023). Note: components may not sum to totals due to rounding. A FTE optometrist assumes to practice full-time in one region.

The optometry workforce is projected to grow at a similar rate across both Islands. Growth from 2022 to 2042 is expected to be largest in the North Island at 15% while the South Island is forecast to grow by 12% over the same period. Chart 4.1 shows the growth in optometry FTEs supplied across both Islands.

Chart 4.1: Optometry FTEs supplied, by North/South Island, 2022-42



Source: Deloitte Access Economics calculations (2023).

Table 4.2 presents a breakdown of the inflows and outflows of the clinical optometry headcount over time. The largest inflows into the workforce come from the graduating optometry cohort in each year. Net migration is a small positive addition to the headcount which remains constant over time. Outflows of the model such as net temporary movements and retirements increase over time as the size of the overall cohort increases. It is noted that migration from New Zealand to Australia could not be accounted for in this model. It is possible that net migration would be negative if this were accounted for due to the relative ease for New Zealand optometrists to migrate to Australia and the comparative wages between the two countries.

Table 4.2: Supply of clinical optometry headcount by component

	2023	2028	2033	2038	2042
Graduates (+)	54	60	60	60	60
Net migration (+)	2	2	2	2	2
Net temporary movements (-)	10	10	10	10	10
Retirements (-)	37	40	43	44	45
Deaths (-)	1	1	1	1	1
Closing headcount	**908**	**963**	**1,008**	**1,040**	**1,059**

Source: Deloitte Access Economics calculation (2023).

4.2 Interpretation of findings

Overall, the modelling projects significant growth in supply of optometry through to 2042. The primary driver of growth in the optometry supply is the growing volume of graduates entering the workforce. In 2023 there were an estimated 54 graduates, growing to 60 graduates in 2042. Notably it was assumed that the number of graduates would not exceed 60 people due to capacity constraints at the University of Auckland.

The forecasts for Aotearoa New Zealand project a slower rate of growth in optometry supply relative to supply side modelling of the Australian optometry workforce. The most significant driver of this is the estimated rate of permanent exits from the optometry workforce. While at older age groups this is expected to be driven largely by retirements, there are also a significant proportion of people aged 20-34 years exiting the workforce. Permanent exits from the optometry workforce for reasons other than retirement drive a loss of FTEs supplied each year and limits the overall growth of the optometry workforce.

5 Results: Demand for optometrists.

This chapter presents the modelling results for the demand for optometrists in Aotearoa New Zealand from 2022 to 2042.

5.1 Findings

Table 5.1 presents the FTE optometrists demanded and the total optometry services demanded in each year, modelled between 2022 and 2042. Overall, the total number of optometry services is projected to increase by 51% from 1.31 million services in 2022 to 1.98 million in 2042. The demand of FTE optometrists is estimated to grow from 778 optometrists in 2022 to 1,160 optometrists in 2042 (representing a 49% increase). The demand in the South Island is expected to increase by 55%, whilst demand in the North Island will increase by 46% by 2042.

The model also projected a 93% increase in FTE demanded amongst those aged 65+ years old and lesser growth (15%) in those aged 0-24 years. This finding is explained by the increasing incidence of age-related eye conditions consistent with an ageing population. Table 5.1Chart 5.1 summarises FTE optometrists demanded.

Table 5.1: Summary of demand optometry FTEs and services, 2022, 2027, 2032, 2037 and 2042

	2022	2027	2032	2037	2042
FTE optometrists demanded					
Region					
North Island	537	605	667	728	787
South Island	241	281	314	345	374
Age					
0-24	154	164	171	180	177
25-44	181	203	219	240	245
45-64	253	277	301	325	372
65+	190	243	289	341	367
Gender					
Male	309	354	394	438	472
Female	468	531	585	645	686
Unknown gender	1	1	2	2	2
Aotearoa New Zealand (total)	778	887	980	1,073	1,160
Total number of services					
Region					
North Island	969,316	1,100,174	1,216,853	1,333,011	1,445,257
South Island	341,086	400,255	448,141	493,778	536,650
Age					
0-24	248,818	265,563	276,813	281,135	287,041
25-44	295,449	331,790	359,322	380,438	402,399
45-64	429,036	469,335	509,857	564,315	628,953

	2022	2027	2032	2037	2042
65+	342,943	440,531	526,443	608,878	671,917
Gender					
Male	530,378	611,207	682,109	752,514	820,536
Female	784,059	893,702	987,634	1,079,199	1,166,373
Unknown gender	1,810	2,309	2,691	3,052	3,401
Aotearoa New Zealand (total)	1,310,402	1,500,428	1,664,995	1,826,789	1,981,907

Source: Deloitte Access Economics calculation (2023). Note: components may not sum to totals due to rounding. A FTE optometrist assumes to practice full-time in one region.

5.2 Interpretation of findings

Overall, the demand for optometrist FTEs is estimated to increase by 49% and the number of optometry services is estimated to increase by 51% over the period from 2022 to 2042. FTEs demanded is projected to increase by 55% on the South Island and 47% on the North Island. Chart 5.1 shows the FTEs demanded by North and South Island.

Chart 5.1: Optometry FTEs demanded, 2022-42, by North and South Island

Source: Deloitte Access Economics calculations (2023).

One key driver of increased demand for optometry services is the rate of population growth in the respective islands, increasing by 15% between 2022 to 2042.

- The North Island is projected to experience higher population growth (15.7%) compared to South Island (12.4%)
- Population growth is forecast to be highest in Waikato region (20%) and Auckland region (19%) and lowest in West Coast region (3% decline)
- The 65+ years age group is projected to grow by 58% to 2042, contributing to FTE demand increase of 70% to 2042.

Demand is also influenced by increased utilisation of optometry services. When adjusting for population in per capita estimates, service utilisation is projected to grow greater on the South Island (40%) compared to the North Island (29%) to

2042. Otago has the largest growth in predicted utilisation of services per capita, increasing by 56%. Service utilisation per capita for those aged 65+ is also expected to increase by 70%, thought to be related to increased prevalence of age-related vision problems.

It is likely that the FTE demanded still represents an underestimate of the future demand on optometry services. For example, the model uses Specsavers data to estimate the total optometry services provided in Aotearoa New Zealand, which may not be representative of the services provided in smaller independent optometry clinics. Similarly, any expansions to the scope of practice for optometrists are not captured in the current modelling.

6 Comparison of supply and demand.

This chapter combines the supply and demand modelling and compares projections of the optometry workforce for the future.

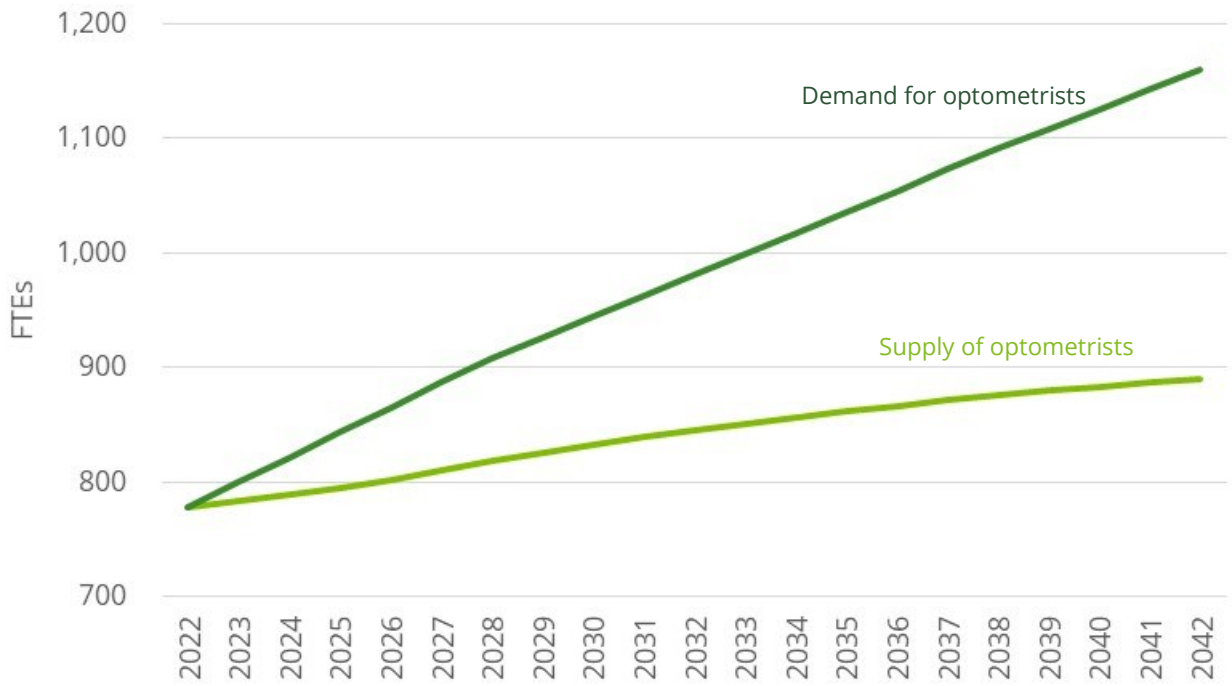
In considering the results from the chapter, the reader should take note that a market economy as such as Aotearoa New Zealand tends to adjust dynamically to changes in supply and demand to reallocate resources using price signals. For example, where the model shows demand exceeding supply over the period of analysis, the market would adjust through increasing wages or other financial incentives (increasing supply through encouraging new entrants into the workforce) and/or through increasing customer prices (reducing demand). However, there can be significant time lags to increasing the supply of optometry workforce, while prices are regulated by government and so may not respond quickly (or at all) to workforce imbalances.

The supply and demand projections presented in this report starts from a position of initial equilibrium. This is an important assumption that is employed for modelling purposes. Thus, future movements in supply and demand are relative to the initial position and the analysis is undertaken holding all other factors constant.

6.1 Aggregate analysis

Starting from an equilibrium in 2022, demand for optometry services is forecast to outpace supply – resulting in a widening shortfall of FTE optometrists from 2023 onwards. Chart 6.1 shows the number of FTE demanded relative to FTEs supplied. By 2042, the excess demand is forecast to be equivalent to 270 FTEs, or 23% of total FTEs demanded. The gap between supply and demand is forecast to grow at an increasing rate – largely a function of continued population growth, but limited ability for the optometry workforce to expand.

Chart 6.1: Supply and demand for FTE optometrists in Aotearoa New Zealand, 2022-42

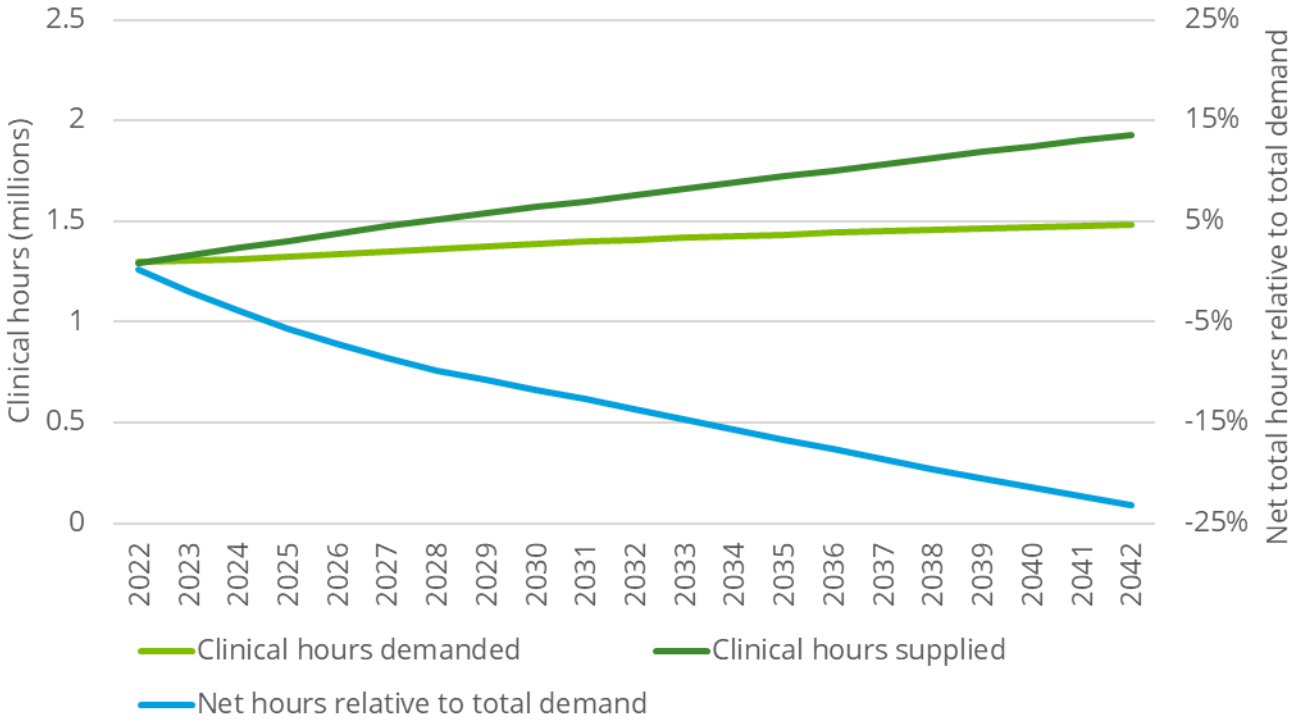


Source: Deloitte Access Economics calculation (2023).

The delivery of clinical optometry hours in Aotearoa New Zealand is similar to the results for FTE optometrists. The modelling forecasts an undersupply of 450,000 clinical optometry hours by 2042, or an approximate 23% undersupply of the total hours demanded. The deficit in clinical optometry hours delivered is most significant in 2037 to 2042, as demonstrated by Chart 6.2.

In per capita terms, the average New Zealander in 2022 demanded 0.25 hours of optometry care per annum. This is forecast to grow to 0.33 hours per annum by 2042. Meanwhile, supply of optometry clinical hours per person is estimated to be constant at 0.25 hours per annum from 2022 to 2042. This indicates an average annual shortfall for Aotearoa New Zealand residents of 4.6 minutes of optometry care per person per annum by 2042.

Chart 6.2: Supply and demand for clinical hours in Aotearoa New Zealand, 2022-42



Source: Deloitte Access Economics calculation (2023).

6.2 North and South Island analysis

As shown in Table 6.1, following an assumed starting point of equilibrium in 2022, the model forecasts an undersupply of FTE optometrists across both the North (167 FTE deficit) and South Islands (104 FTE deficit). The deficit in the South Island is more pronounced over the projection period than in the North Island, with a deficit of 38% in the South Island compared to 27% undersupply in the North Island.

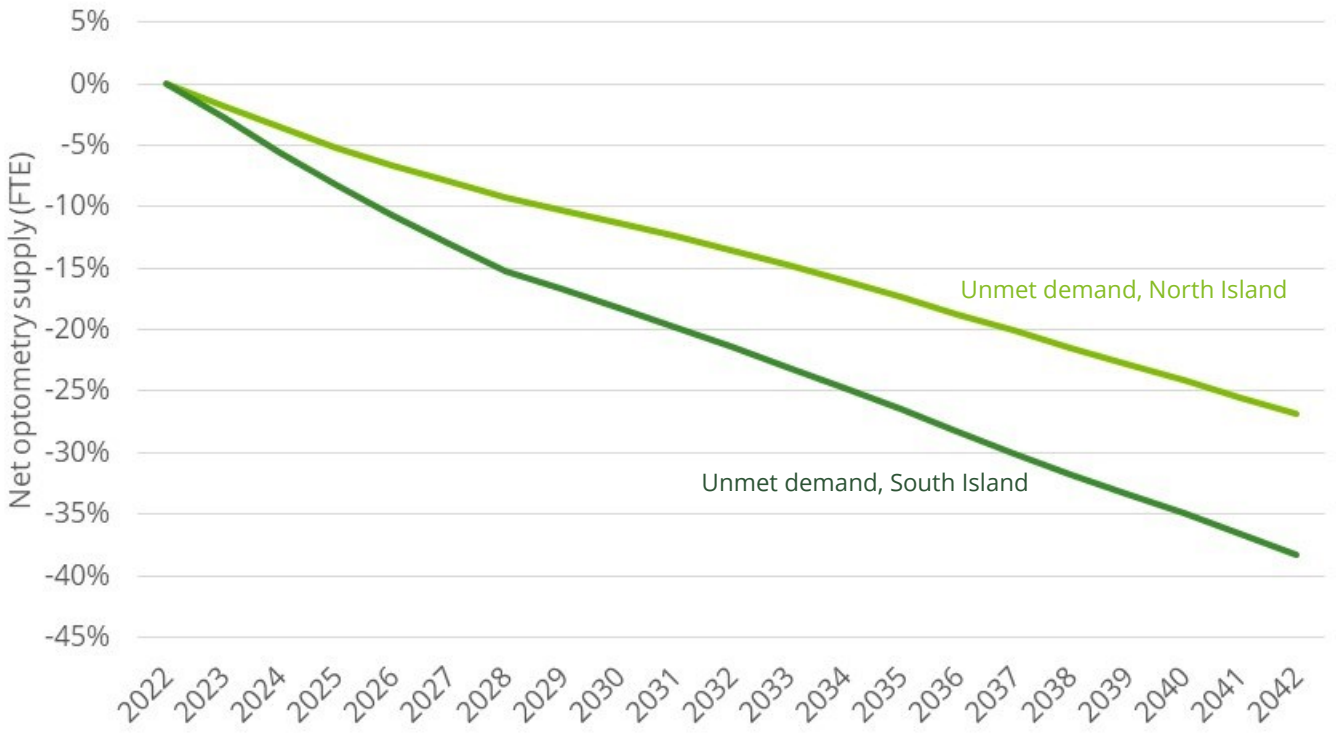
Table 6.1: Supply and demand for FTE optometrists in Aotearoa New Zealand, by North and South Island, 2022, 2027, 2032, 2037 and 2042

	2022	2027	2032	2037	2042
North Island					
Supply	537	561	587	606	620
Demand	537	605	667	728	787
Difference	**0**	**-44**	**-80**	**-122**	**-167**
South Island					
Supply	241	249	258	265	270
Demand	241	281	314	345	374
Difference	**0**	**-32**	**-56**	**-80**	**-104**

Source: Deloitte Access Economics calculation (2023). Note: components may not sum to totals due to rounding. Note: The supply and demand projections presented in this table starts from a position of initial equilibrium in 2022. This is an important assumption that is employed for modelling purposes. Thus, future movements in supply and demand are relative to the initial position (in 2022) and the analysis is undertaken holding all other factors constant.

Chart 6.3 shows the net FTE optometrists by North or South Island across the forecast period. The undersupply of FTEs in the North Island and South Island areas are forecast to increase in magnitude over time. In 2042, the unmet demand is approximately 23% of total demand. The undersupply in South Island increases at a higher rate relative to the North Island, particularly in the first six years of the forecast.

Chart 6.3: Comparison of FTEs supplied to FTEs demanded by North and South Island, 2022-42



Source: Deloitte Access Economics calculation (2023).

There are several contributing factors to this forecast maldistribution of optometry workforce trend. On the supply side, there are less than proportional share of South Island optometrists entering the workforce (when measured against distribution of demand) compared to North Island. Overall, there is also a greater unmet demand experienced in the South

Island, with a demand growing at a larger than proportional share than North Island to 2042. The South Island is also less densely populated with 1.3 million people forecast by 2042 compared to 4.5 million in North Island.

6.3 Sensitivity analysis

Sensitivity analysis is a technique used to assess the impact of changes in variables or assumptions on the results of modelling. In sensitivity analysis, different scenarios are tested for specific variables or assumptions to observe the corresponding changes to the overall results. For example, the future prevalence of eye conditions, the number of hours worked by optometrists and any expansion to scope of practice (measured through increasing clinical time) for optometrists is unknown. However, such variables are likely to impact the demand for and supply of optometrists. As such, modifying these variables in the modelling allows us to understand the impact on overall FTE optometrists. Table 6.2 and Table 6.3 present the outputs from sensitivity analysis conducted on key parameters for supply and demand side parameters.

On the supply side it is noted that estimates of the average hours worked by the optometry workforce are drawn from Australian data sources due to limited availability of Aotearoa New Zealand data. A general trend observed from the National Health Workforce dataset was that hours worked by optometrists in 2021 (the latest year of available data) were lower than the average hours worked over the 2013-21 period. This may be a result of the COVID-19 pandemic, and it remains unclear whether hours worked will remain suppressed in the future. The sensitivity in Table 6.2 shows the additional FTEs that could be gained if average hours worked returns to pre-COVID levels.

Table 6.2: Sensitivity analysis of key supply side parameters

Parameter	Description	FTEs				
		2022	2027	2032	2037	2042
Baseline	Core modelling results with no sensitivity analysis	778	810	846	871	890
Elevated hours worked	Adjusting the hours worked by optometrists to the average value 2013-2021 rather than the 2021 value	805	837	873	899	919

Source: Deloitte Access Economics calculation (2023).

There are two input parameters on the demand side – service utilisation rate and time per services – which could affect overall FTE demanded. It is noted that the average time per service calculations to estimate FTE demand are based off an Australian source from 2006 in the absence of any specific Aotearoa New Zealand sources.[49] Given there is no current specific source for average time per service in Aotearoa New Zealand, there may be different estimates that represent the time per service in that are specific to the Aotearoa New Zealand context. For example, anecdotal evidence indicates that consultations time in Aotearoa New Zealand are generally longer compared to their Australian counterpart due to the requirements mandated by ODOB.[50]

Table 6.3 describes varies potential scenarios which may impact the demand for FTE optometrists. The service utilisation rates and average time per service used are for illustrative purposes only.

- **Service utilisation rate – lower.** This scenario represents no additional growth in the prevalence of eye conditions aside from any organic growth in the demand for eye services and the general population.
- **Service utilisation rate – upper.** This scenario represents a high growth environment where eye conditions become increasingly more prevalent in the population due to high population growth and large ageing population.
- **Time per service – lower.** This scenario represents an environment where technological advances could achieve increased efficiencies in the provision of optometry services which may result in shorter consultation times.
- **Time per service – upper.** This scenario represents an environment where optometrist's scope of practice increases and any potential increases in consultation times due to high demand for optometry services.

[49] Horton, P., Kiely, P. M., & Chakman, J. (2006). The Australian optometric workforce 2005. Clinical and Experimental Optometry, 89(4), 229-240.
[50] Optometrists and Dispensing Board (2018), Standards and Guidelines, <https://www.odob.health.nz/site/standards-guidelines>, Accessed June 1st 2023

Table 6.3: Sensitivity analysis of key demand side parameters

Parameter		Description	FTEs				
			2022	2027	2032	2037	2042
	Base case	Core modelling results with no sensitivity analysis	778	887	980	1,073	1,160
Service utilisation rate	Lower	Service utilisation rate set to 0% (no growth in prevalence of eye conditions)	778	877	964	1,048	1,128
Service utilisation rate	Upper	Service utilisation rate set to 20% over 20-year period	778	892	990	1,087	1,179
Time per service	Lower	Average time per service set to 10% reduction from base case	700	798	882	965	1,044
Time per service	Upper	Average time per service set to 10% increase from base case	856	975	1,079	1,180	1,276

Source: Deloitte Access Economics calculation (2023) using Horton et al (2006)[51] and Holden et al (2016).[52] The percentages used in the sensitivity analysis are for illustrative purposes only.

[51] Horton P et al., The Australian optometric workforce 2005 (2006) 89(4) *Clinical and Experimental Optometry* 229-240.

[52] Holden BA et al., Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050 (2016) 123(5) *Ophthalmology*. 1036-42.

7 Future state: embedding innovation into standard practice.

The literature and stakeholder consultations highlight opportunities to embed efficient and effective practice into future optometry care pathways.

7.1 A case for change

The COVID-19 pandemic has disrupted the way healthcare is accessed and delivered in Aotearoa New Zealand. This provides an unprecedented opportunity to review current models of eye care delivery in Aotearoa New Zealand, with a view to embracing and enhancing those that provide the most value to the health system. In addition, the acute care sector is facing growing capacity pressures, which requires consideration of how care could be delivered more effectively and efficiently in primary and community settings. Optometrists have a key role to play in these value-based models of care.

A discussion of opportunities to enhance the role and value of optometrists for patients and the broader health system is explored in detail throughout this section.

7.2 Enhanced role of optometrists

The working relationship between optometrists and ophthalmologists is integral to the diagnosis, treatment, and monitoring of eye care. Currently there is a shortage of ophthalmologists across the country, which is particularly pertinent in rural and small towns.[53] When compared to other OECD countries, Aotearoa New Zealand is at the bottom end of the range in terms of ophthalmologist-to-population ratio, at 3.4 ophthalmologists for every 100,000 people.[53] Further, given that close to 90% of ophthalmologists work in the private health sector, this means there is a disparity in access to eye care services for those who cannot afford or do not have private health insurance coverage.

As discussed in Section 2, the Ministry of Health has increased the scope of practice for optometrists in order to address unmet public needs in eye care. This includes prescribing any medicine appropriate to their scope of practice and performing minor laser surgeries given they have undertaken the appropriate qualification. Both service provider and patient support group stakeholders consulted indicated that there is an opportunity for more optometrists to increase their scope of practice, which could help reduce the burden on the private and public ophthalmology sector and lower geographic barriers to accessing care, particularly outside of major cities. The key changes required to achieve optimised scope of practice includes:

- **Consider establishing risk-stratified referral pathways.** Stakeholders indicated that there is an opportunity to better utilise optometrists' existing skillset in the management of lower-risk patients with stable eye conditions, within the primary care setting. In recent years, there has been some discussion from stakeholders on further increasing the scope of practice for optometrists to deliver anti-vascular endothelial growth factor (VEGF) injections for conditions such as age-related macular degeneration and diabetic retinopathy, given the shortage of nurses across the country. Establishing risk-stratified referral pathways would not only see optometrists operate at the top of their scope of practice but could reap benefits to patients in that care is managed closer to home and to the ophthalmology sector, by alleviating pressure on hospital services. This would allow for the triaging of lower-risk patients to be managed and treated in the primary care setting by optometrists, opening capacity for ophthalmologists to treat complex conditions and reduce wait times.
- **Establishing roles and responsibilities between optometrists and ophthalmologists.** Establishing clear roles and responsibilities between optometrists and ophthalmologists is crucial for efficient and effective eye care delivery. By defining the scope of practice and delineating the specific tasks and responsibilities of each profession, healthcare systems can optimise resource allocation, streamline patient care pathways, and enhance collaboration between optometrists and ophthalmologists in risk-stratified referral pathways.

[53] The Royal Australian and Aotearoa New Zealand College of Ophthalmologists (2023) RANZCO's Vision for Aotearoa Aotearoa New Zealand's Eye Healthcare to 2030 and beyond, <https://ranzco.edu/wp-content/uploads/2023/05/NZ-Vision-2030_FINAL.pdf>, accessed 18 May 2023.

- **Educate and train to support any changes in roles and responsibilities.** Whilst stakeholders consulted encouraged the future possibility to increase scope of practice for optometrists, service providers of optometric and ophthalmic services highlighted that any increase to scope of practice needs to place patient safety and care as the topmost priority. Stakeholders emphasised the importance of maintaining high standards of training, qualifications, and ongoing professional development for optometrists to ensure their competence in expanding roles. While acknowledging the potential benefits of an increased scope of practice for optometrists, stakeholders also highlighted the necessity to clearly define the responsibilities and roles for both optometrists and ophthalmologists, to reduce any duplication of tasks and achieve efficiencies in care delivery. In the short-term, leveraging the full scope of optometrists' skillset brings immediate benefits in terms of timely eye care access and improved patient outcomes.

Box 2. The increasingly significant role of optometrists in the delivery of routine eye care

To address significant workload on ophthalmology clinics, allied healthcare professionals-led intravitreal injections clinics have been established throughout the United Kingdom. These models of care use ophthalmic nurse practitioners, optometrists, technicians, and orthoptists to play a greater role in the delivery of routine eye care and supports to expand service provision capacity. The models of care which are led by allied healthcare professionals have produced positive patient satisfaction and shown little variation inpatient experience when compared to doctor-led service.[54, 55]

7.2.1 Collaborative care models

The eye care workforce in Aotearoa New Zealand is made up of a multidisciplinary team of health professionals including specialist nurses, optical technicians, optometrists and ophthalmologists. Collaboration between professionals across the primary and secondary care setting means a diverse range of capabilities and skills can be leveraged to enhance health outcomes, improve patient satisfaction, and optimise the utilisation of resources.

Collaborative care models in Aotearoa New Zealand have showcased the potential for optometrists to assume a more active role in diagnosing, treating, and managing eye conditions. The Stable Glaucoma Clinic in Palmerston North is one example of this where glaucoma patients are initially assessed by a consulting ophthalmologist and thereafter reviewed by a clinical optometrist. Patients who demonstrated glaucoma progressed are referred back to the consulting ophthalmologist to ensure appropriate care and intervention. Over a five-year period, this model significantly reduced delays in appointment times, which allowed for earlier detection of uncontrolled intraocular pressure and disease progression.[56] An integrated collaborative care model which utilises specialised optometrists working within a supervised setting is able to provide a safe and effective solution to enable departments to accommodate the increasing demand on hospital eye services.

Numerous collaborative care models for glaucoma, diabetic retinopathy, macular degeneration and intravitreal injections are currently implemented and are being considered for implementation by ophthalmology departments across Aotearoa New Zealand.[57] This includes optometrist reviewing low-risk or stable age-related macular degeneration, diabetic retinopathy and glaucoma patients in their practice at specific intervals in the patient's care journey, with hospital review only if concerned. This would reduce unnecessary referrals to ophthalmology departments, alleviate pressure on the hospital system, and open capacity for ophthalmologists to treat more complex conditions. Stakeholders consulted indicated the consistent implementation of collaborative care models throughout Aotearoa New Zealand would need dedicated funding available for services to perform and deliver such care.

Box 3. Reaching the areas hardest to reach – Vision Bus Aotearoa

In 2022, the University of Auckland launched Vision Bus Aotearoa, an optometry clinic on wheels, to improve access to eye healthcare in greater Auckland.[58] The service delivers free comprehensive eye examinations and glasses fitting to staff and students at schools and other locations.

The Vision Bus Aotearoa aims to provide eye care services to geographically isolated communities and individuals from low-socio-economic backgrounds. It particularly focuses on regions with high Māori and Pasifika populations, as these groups are disproportionately affected by vision impairment and blindness and the onset of eye conditions usually starts earlier in these populations. Additionally, the Vision Bus

[54] Raguro A et al., Implementation and evaluation of a nurse-delivered intravitreal injection service (2015) 56(7) *Investigate ophthalmology and visual science* 4175.
[55] Khan Y et al., Incidence of endophthalmitis following intravitreal injection-real world outcomes from Moorfields Eye Hospital (2016) 57(12) *Investigate ophthalmology and visual science* 6371.
[56] Botha V et al., Approach to collaborative glaucoma care in Aotearoa New Zealand: An update (2019) 47(6) *Clin Exp Ophthalmol* 798-799.
[57] Royal Australian and Aotearoa New Zealand College of Ophthalmologists (2022) RANZCO Vision for Aotearoa New Zealand's Eye Healthcare 2030 and Beyond <https://ranzco.edu/wp-content/uploads/2023/05/NZ-Vision-2030_FINAL.pdf>, accessed May 12 2023.
[58] University of Auckland (2022) Country's first mobile optometry clinic launched, <https://www.auckland.ac.nz/en/news/2022/06/10/country-s-first-mobile-optometry-clinic-launched.html#:~:text=The%20Vision%20Bus%20Aotearoa%20is,at%20schools%20and%20other%20locations., accessed May 27 2023.

aims to promote participation and engagement with Māori and Pasifika communities, with the goal of encouraging individuals from these backgrounds to pursue optometry as a career in the future.

The impact of the Vision Bus Aotearoa on eye care accessibility and affordability cannot be overlooked. However, scaling and implementing this mobile service across Aotearoa New Zealand pose some logistical and operational challenges. To address these challenges and ensure widespread eye care delivery, integrating tele-optometry and incorporating remote models of care into the patient care pathway can complement the Vision Bus Aotearoa program effectively. This integration enables the provision of eye care services at a larger scale while maintaining quality and accessibility.

7.3 Enablers to optimised access to care

7.3.1 Invest in training opportunities for optometrists

A critical enabler of the extent to which optometrists can play a larger role in care delivery is ensuring they have the adequate qualifications to perform their roles and responsibilities. The majority of practising optometrists (83%, n=713) are trained to prescribe medicines, of which approximately 10% (n=88) hold independent glaucoma prescribing rights.[59] Optometrists who have this specialised qualification have the capacity to use clinical judgement in respect of treatment and require a formalised arrangement with an ophthalmologist with an agreed management plan.[60] Increasing the number of optometrists with specialised qualifications including independent glaucoma prescribing rights or specialist laser surgery will help alleviate a significant lack of ophthalmology cover in many areas across Aotearoa New Zealand, reducing the burden on the private and public ophthalmology sector, and lower geographic barriers to accessing care.

Stakeholder consultations revealed that the main obstacle to increasing the number of highly qualified optometrists is the absence of funding for upskilling. Currently, there is no government support available for optometrists to enhance their capabilities in specific areas. This differs from countries like Scotland, where optometrists seeking to upskill in managing glaucoma patients in primary care can receive fully funded training from the Scottish Government.[61]

Further, there is currently only one university (University of Auckland) with an optometry course in the country, located on the North Island. Whilst there is no publicly available data which describes where optometrists practice, stakeholders consulted indicated that the majority of graduates are likely to remain on the North Island and practice from urban areas. Stakeholders also highlighted the difficulty of attracting and retaining graduate optometrists in rural areas, contributing to the maldistribution of optometrists and optometry care between the two islands. Despite less than one quarter of the Aotearoa New Zealand population residing on the South Island, the challenges faced by their North Island counterpart are the same – a growing and ageing population. This will lead to an increase in age-related eye conditions. For this reason, it is important to consider a well-distributed optometry workforce that can provide optometry services closer to home, reducing the burden on people to travel for eye care services. While achieving a well-distributed workforce may not be entirely realistic, it is important to explore and consider alternative solutions such as the use of remote models of care (such as telehealth) to improve eye care accessibility and ensure that individuals across Aotearoa New Zealand receive the vital eye care they need.

7.3.2 Technology

All stakeholders consulted emphasised the need for improved information sharing and centralised data recording among all providers in the care pathway. Currently there is insufficient guidance and communication in referral pathways across the healthcare system. This means there is a significant challenge in sharing and accessing patient information seamlessly across different healthcare providers and settings. Furthermore, the majority of public health settings rely solely on fax technology to receive their optometry referrals, which poses problems and increases the likelihood of patients being lost to follow-up. The absence of a unified electronic medical record and medical image viewing systems creates fragmentation and inefficiencies in care coordination, leading to potential delays, duplicated tests, and suboptimal patient outcomes.

There is a longstanding commitment to roll out electronic patient record systems across Aotearoa New Zealand. Initially this involved building a single Electronic Health Record but has recently moved toward developing Hira, a National Health Information Platform. Although not specifically designed for optometric purposes, Hira aims to serve as a comprehensive

[59] Optometrists and Dispensing Opticians Board (OBOB) (2022) Annual Report, <https://myodob.odob.health.nz/docs/O&OD%20AnnualReport2022b.pdf>, accessed May 1 2023.
[60] Optometrists and Dispensing Opticians Board (OBOB) (2021) Glaucoma Guidelines, <https://odob.health.nz/document/6774/Glaucoma%20Guidelines%20August%202021.pdf>, accessed May 30 2023.
[61] NHS Education for Scotland (2021) How the NES glaucoma award training (NESGAT) supports prescribing optometrists and their patients, <https://www.nes.scot.nhs.uk/news/how-the-nes-glaucoma-award-training-nesgat-supports-prescribing-optometrists-and-their-patients/>, accessed May 23 2023.

platform to enable healthcare providers to access and update patient data held in different databases.[62] Hira is to be delivered across three overlapping stages with completion expected around the end of 2026.

A centralised electronic medical record system for eye care would provide standardised patient information, ensuring comprehensive care details, treatment options, and management plans are readily available to patients. This would facilitate efficient and shared care pathways across healthcare settings, fostering stronger collaboration between optometrists, ophthalmologists, and other healthcare professionals within collaborative care models.

7.3.3 Other considerations

7.3.3.1 Telehealth

Telehealth has been present in the healthcare settings over the last decade, however its uptake only gained momentum during the COVID-19 pandemic, as a means to continue to deliver care to patients whilst reducing face-to-face interactions to minimise the spread of the COVID-19 virus. The use of telehealth has been particularly impactful in reducing barriers to healthcare, especially in remote areas, where there is often a lack of health professionals.

In response to the COVID-19 pandemic, ODOB released the Telehealth Standards, which sets out the guidelines expected of optometrists and dispensing opticians when providing telehealth services to members of the public.[63] Optometry service providers rolled out telemedicine across Aotearoa New Zealand to assist patients with an eye health concern or critical dispensing need during COVID-19 and lockdowns.[64] The guidelines also outline activities which cannot be performed as a telehealth activity. For example, it states that an optometrist must not *"prescribe an ophthalmic appliance, optical appliance or ophthalmic medical device intended for remedial or cosmetic purposes or for the correction of a defect of sight without an in-person physical examination."* This limitation restricts the use of telehealth in optometry, its widespread uptake and the potential benefits of tele-optometry in preserving vision in individuals. A number of other considerations are required for the wide adoption of telehealth in optometry including:

- **Understanding the applicability and limitations of telehealth**. Innovative solutions continue to ensure all people have access to eye services and receive the care they need to prevent vision loss and blindness. Australian researchers at the eHealth Research Centre have developed a low-cost remote telehealth system called Remote-I which enables the screening of individuals at risk of eye disease by capturing full high-resolution images of the patient's retina using a special low-cost camera. These images are sent to a city-based ophthalmologist for examination. The trial successfully screened over 1,000 patients, accurately identifying 82 cases of DR and 60 cases of diabetic macular oedema. It demonstrates the feasibility of conducting routine eye examinations for early detection of certain eye diseases in remote and rural patients. The ongoing efforts to enhance accessibility and provide effective eye care solutions to the population are highlighted by the development of innovative technology like Remote-I and may provide opportunities to embed remote eye care delivery models in the provision of eye care across New Zealand. However, some stakeholders expressed concerns regarding the limited use of telehealth in optometry, as technological limitations may hinder the provision of certain services to the same standard as in-person care. For instance, replicating a detailed examination of the eye's physical structures through remote medicine can be challenging. It is crucial to acknowledge the limitations that may exist in telehealth delivery and strike a balance by considering new clinically appropriate and safe ways of delivering eye care services that go beyond traditional in-person eye care.
- **Using telehealth as a strategic tool to enhance collaborative care.** Service providers emphasised the opportunity to use telehealth as a strategic tool to enhance collaborative care models between optometrists and ophthalmologists more widely in the delivery of eye care. An example of this is store-and-forward telemedicine which would involve in-person testing by an optometrist, with the patient's electronic medical records, laboratory results and retinal images forwarded to an ophthalmologist to review at a convenient time.[65] Such examples of this delivery model enhanced by the use of telemedicine has already been used in countries such as the United Kingdom, where images and patient data are uploaded in an electronic system which is accessible by the treating optometrist and ophthalmologist.[66]
- **Ensure industry standards and appropriate regulations support the widespread use of remote models of care.** To fully leverage the potential of remote models of care including telehealth in eye care, it is essential to establish industry standards and regulatory frameworks that promote their effective and safe implementation. These standards should address various aspects, including data privacy and security, technological requirements, professional guidelines, and reimbursement policies. Developing comprehensive guidelines for telehealth in optometry will help ensure consistent

[62] Health Aotearoa New Zealand Te Whatu Ora (2023) Hira – connecting health information, <https://www.tewhatuora.govt.nz/our-health-system/digital-health/hira-connecting-health-information/#what-is-hira>, accessed May 3 2023.

[63] Optometrists and Dispensing Opticians Board (OBOB) (2022) Telehealth Standards, <https://www.odob.health.nz/document/7313/ODOB%20Telehealth%20Standards%20(2022).pdf> accessed May 23 2023.

[64] NZ optics (2020) The rise of teleoptometry, <https://nzoptics.co.nz/articles/archive/the-rise-of-teleoptometry/#>, accessed April 27 2023.

[65] Bonnardot L et al., Store-and-forward telemedicine for doctors working in remote areas (2009) 15(1) *J Telemed Telecare* 1-6.

[66] Hwb Gwyddorau Bywyd Cymru Life Sciences Hub Wales (2022) Working collaboratively to improve eye care for patients across Wales, <https://lshubwales.com/success-stories/improve-patient-eye-care>, accessed 5 August 2022.

quality of care, protect patient information, and maintain ethical practices. Additionally, regulatory bodies should actively engage with stakeholders to assess and adapt existing regulations to accommodate the unique challenges and opportunities presented by remote models of telehealth and consider how remote models of care can complement existing eye health service delivery models.

Combined with enhanced training of optometrists with higher qualifications, this pathway provides opportunity for lower-risk and stable patients to be treated within primary care and reduces accessibility barriers to care. This care model also addresses the maldistribution of optometrists, ensuring that eye health professionals are available to patients in rural and remote areas and between the North and South Islands, without requiring them to be physically present in those regions. This may also serve as an incentive for non-practicing optometrists to re-enter the profession, as it offers the flexibility to work remotely from home, accommodating their preferred lifestyle.

7.3.3.2 Embed patient support services in patient care pathway

Patient support services offer valuable advice and support to people living with vision impairment so that they can continue to live independent lives. Organisations such as Glaucoma Aotearoa New Zealand and Eye Health Aotearoa/Blind Low Vision can provide emotional and informational needs to patients who are newly diagnosed with an eye condition, which has been shown in other health disciplines to reduce feelings of anxiety and uncertainty.[67] Integrating patient support services within a patient's care trajectory or educating eye health practitioners about the availability of such services can significantly enhance the quality of their overall care experience.

7.3.3.3 The need for a dedicated government representative unit

In Aotearoa New Zealand, the absence of a national vision plan and a dedicated government representative unit presents a significant gap in governance and implementation of a comprehensive strategy for eye health. Despite the presence of multiple stakeholders in the eye health ecosystem, a unified platform to foster collaboration and drive a collective agenda within government is currently lacking. Consensus among consulted stakeholders underscores the critical importance of conducting a national eye health survey. This survey would yield precise data regarding the prevalence of vision impairment, blindness, and various eye conditions, enabling the identification of areas of greatest need of eye care services.

The establishment of a government representative unit has the potential to drive this initiative, guaranteeing the consistent and comprehensive collection of ongoing data pertaining to eye health. This data would then be utilised to facilitate continuous health service planning across Aotearoa New Zealand. By incorporating key stakeholders such as optometrists, nurses, orthoptists, ophthalmologists, and other healthcare professionals involved in delivering eye care, along with strong leadership from Māori and Pasifika communities, this could drive the adoption of collaborative care arrangements and models, and ultimately foster eye health outcomes and enhanced access to quality eye care services.

[67] Tindall T et al., Developing a patient care pathway for emotional support around the point of multiple sclerosis diagnosis: A stakeholder engagement study (2023) 26(2)*Health Expectations* 858-868.

8 Conclusion.

This section summarises the findings from the optometry workforce modelling. Further, it describes the challenges facing optometry care and proposes some opportunities to embed efficient and effective practice of into future optometry care pathways.

Starting from an assumed initial equilibrium in 2022, demand for optometry services is forecast to outpace supply, resulting in a widening shortfall of FTEs from 2023 onwards. By 2042, it is projected that there is a shortfall of 270 FTE optometrists across Aotearoa New Zealand, with an expected shortfall of 104 FTE optometrists in the South Island and 167 FTE optometrists in the North Island. The South Island is forecast to have a relative shortage of FTE supplied compared to FTE demanded with 38% unmet demand, compared to 27% unmet demand in the North Island by 2042.

Table 8.1 shows the distribution of demand and supply disaggregated by North and South Island in 2022 and 2042. Over the next two decades, the volume of optometry services is expected to increase in the North and South islands alike. This is predominantly driven by an ageing population. A greater increase in services is expected to be seen in South Island compared to the North Island. However, trends in number of optometrists in the workforce will not rise at the same rate as need for services. It is expected this will contribute to the projected undersupply in services in both regions, especially in the South Island.

Table 8.1: Distribution of services and workforce in 2022 and 2042, by North and South Island

Regionality	Optometry services (%)		Optometrists (%)	
	2022	2042	2022	2042
North Island	74%	73%	69%	70%
South Island	26%	27%	31%	30%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Deloitte Access Economics calculation (2023).

While our model – as with all models – is underpinned by assumptions, the findings are aligned with a logical interpretation of current scope of practice and the optometry workforce landscape highlighted through stakeholder consultations.

This current misalignment will be further exacerbated to 2042, with demand for optometrists in the South Island growing faster than in the North Island (55% in South Island vs 46% in North Island). At a national level, this shortfall will be driven by changing workforce demographics, workforce exists and demand for services that grow faster than underlying population growth.

Even prior to the onset of COVID-19, the eye care profession recognised the need to do things differently. The wait list for public ophthalmology services in Aotearoa New Zealand was high and an ageing population meant there was an urgency to make changes in the way eye services were being delivered. The pandemic serves as a catalyst to reset the way eye care services are delivered and consider the adoption of efficient and effective shared care approaches between optometrists, ophthalmologists and other eye health professionals in the eye care pathway.

The need to address the existing challenges in the delivery of eye care necessitates the role of optometrists to be further expanded and enhanced and maximise the skillset of optometrists. Optometrists are well-positioned to provide comprehensive care to lower risk patients within primary care setting, including screening for and managing early signs of eye conditions, enabling them to play a crucial part in shared care for individuals with vision impairment. This in turn will open capacity in ophthalmology services, reduce wait times, improve access to eye care services, create opportunities for ophthalmologists to treat more complex cases and ultimately lead to improved outcomes for all New Zealanders.

The key findings based on evidence from the literature review and stakeholder consultations undertaken as part of this analysis are summarised in Table 8.2.

Table 8.2: Opportunities to optimise the delivery of optometry care in Aotearoa New Zealand

Key theme	Opportunities for Aotearoa New Zealand
Investing in enablers to optimise access to care	• Continue investment in building the qualifications of the eye care workforce, particularly primary care optometrists. This will ensure that there are more qualified primary care professionals who are able to diagnose, treat and manage lower-risk patients in the primary care setting. National funding may be required to support the expansion of this workforce. • Consider the use of telehealth as a strategic tool to enhance collaborative care models between optometrists and ophthalmologist and explore funding models to support the widespread adoption of remote eye care delivery models to alleviate accessibility issues. This would include ensuring industry standards and appropriate regulations are in-place to facilitate the use of telehealth. • Invest in technologies that better enable information sharing across all health professionals involved in the care pathway, and more effective central recording of data and images. • Provide opportunities to engage with patient support groups to ensure that people with eye conditions have access to appropriate emotional and informational support throughout their care journey. • Establish a dedicated government representative unit to prioritise and drive the eye health agenda. This collaborative effort would unite various stakeholder groups, pooling their expertise and resources, thereby creating a cohesive voice. Additionally, initiatives like conducting a nationwide eye health survey would be undertaken to further drive progress in this area.
Enhanced role for optometrists	• Employ risk-stratified care pathways to unlock opportunities to fully utilise the skillset of optometrists in the primary care setting, to manage and treat lower-risk and stable patients with eye conditions. • Establish and implement collaborative care pathways which better utilise the existing eye health workforce, to address community needs for eye health services and alleviate pressure on hospitals.

Source: Deloitte Access Economics (2023).

Appendix A Detailed supply-side inputs.

A.1. Key Modelling parameters

This section details the estimation of each of the key parameters used to determine the supply of optometrists in Aotearoa New Zealand. The supply of optometrists is estimated using the total initial headcount of optometrists and then accounting for the relevant inflows and outflows from the workforce. Optometrist supply is estimated by age, gender, region and remoteness.

The supply model can be written as the following function:

$$N_{t+1} = N_t + Grads_t + NOM_t + IM_t - Deaths_t - RET_t - Temp_t$$

Where:

- N_{t+1} represents the closing headcount of optometrists in each period
- N_t represents the opening headcount of optometrists in each period (t)
- Grads represents the total completions of accredited courses in each period (t)
- NOM represents the net inflow of overseas migrants in each period (t)
- IM represents the net inflow of regional migrants in each period (t)
- Deaths represents the total deaths from the optometry workforce in each period (t)
- RET represents the total retirements from the optometry workforce in each period (t)
- Temp represents net temporary departures from the optometry workforce in each period (t).

The supply of optometrists is stratified by five-year age and gender, location and remoteness – North and South islands. It is assumed that the supply of optometrists follows a uniform age distribution within five-year age groups, and that the opening headcount of optometrists in time period 't+1' is equal to the closing headcount of optometrists in time period 't' aged by one year.

A.1.1. Optometrist headcount

Data on the total number of registered optometrists in Aotearoa New Zealand was obtained from ODOB.[68] There were 1,082 registered optometrists as of May 2023. The approximate age and gender distribution of registered optometrists was estimated using data from ODOB.[69] The distribution of optometrists across Aotearoa New Zealand's regions was estimated based on the distribution of optometry and optical dispensing employee data.[70]

A.1.2. Clinical optometrist headcount

The headcount reported by ODOB was adjusted to account for optometrists working in roles other than a clinician. For example, some optometrists may be working in administrative, teaching, researching or other non-clinical roles. ODOB estimates that approximately 83% of the optometrist headcount in Aotearoa New Zealand are clinical optometrists.[71] This proportion was applied by age, gender and region. It was assumed that only clinical optometrists provide clinical hours, whilst the optometrists working in other roles do not.

A.1.3. Hours provided and FTEs

There was no data available to estimate the hours worked by optometrists in Aotearoa New Zealand disaggregated by age/gender and region. For this reason, the number of clinical hours provided by optometrists each year was estimated to be equivalent to the Australian optometry workforce (matched by age and gender). No differences at a location or remoteness level were applied to hours worked.

[68] Optometrist and Dispensing Opticians Board (ODOD) (2023) Search the Register, <https://odob.in1touch.org/client/roster/clientRosterView.html?clientRosterId=658>, accessed on 1 June 2023.
[69] Optometrist and Dispensing Opticians Board (ODOB) (2022) The Optometrists and Dispensing Opticians Workforce in Aotearoa New Zealand 2022, <https://mcusercontent.com/275ef0418fe018fce17d16fec/files/f05ee951-89af-9e55-6dd2-bf912cab9fd7/2022_ODOB_Workforce_Survey_Small_.pdf>, accessed on 1 June 2023.
[70] NZstats (2023) Geographic units by region and industry 2000-2022, <https://nzdotstat.stats.govt.nz/WBOS/Index.aspx?DataSetCode=TABLECODE7604#>, accessed 1 June 2023.
[71] Optometrist and Dispensing Opticians Board, *Annual Report* (2022), available at < https://myodob.odob.health.nz/docs/O&OD%20AnnualReport2022b.pdf>.

The total number of clinical hours provided by optometrists each year was then estimated by multiplying out the average hours worked by the corresponding headcount in each region (and assuming a 46-week working year). Total hours worked increased from 1.3 million hours in 2022 to 1.6 million hours in 2042.

Not all clinical optometrists work full time. For this reason, a FTE approach has been used as a better measure of services supplied instead of the headcount data. Assuming the average FTE optometrist works 46 weeks a year (accounting for holidays and leave) and an estimated 36.16 clinical hours provided by the average clinical FTE optometrist, an FTE optometrist delivers 1,663 clinical hours per year.

A.2. Supply inflows

The following sections outline the modelling approach adopted for estimation of supply inflows. These include the number of graduates from accredited optometry courses in each period, net overseas migration and net internal migration.

A.2.1. Number of graduates

The only optometry course available in Aotearoa New Zealand is at the University of Auckland. Data on the number of optometry graduates from the University of Auckland were obtained from the university website.[72] Data from 2015 to 2022 were used to estimate the average cohort size (approximately 54 students). It was assumed that there would be limited growth in the number of graduate optometrists due to capacity constraints within the University – the assumed maximum cohort size was set to 60 students through to 2032. Accounting for potential investment into the optometry school overtime, the cap on the maximum cohort size was lifted from 2033-42. Growth in the number of graduate optometrists was assumed to be equal to a maximum of 3%, noting the capacity constraints imposed. Graduate optometrists increased from 54 graduates in 2023 to 81 graduates by 2042.

A.2.2. Net overseas migration

The number of net overseas migrants entering the Aotearoa New Zealand optometry workforce was estimated using data from OCANZ.[73] Net overseas migration into the optometry workforce was estimated based on the number of people successfully passing the OCANZ clinical optometry exam in a given year. This data was averaged since 2015. Data from 2020 and 2021 were excluded from the average due to disruptions from the COVID-19 pandemic. It was estimated that there would be approximately two optometrists entering the Aotearoa New Zealand workforce in each year. This inflow was held constant through to 2042 (i.e., no growth rate was applied to the number of overseas migrants entering Aotearoa New Zealand). The distribution of net overseas migrants was assumed to match the current distribution of the Aotearoa New Zealand optometry workforce.

Although there is some anecdotal evidence, there is no publicly available data specific to optometrists in Aotearoa New Zealand, it was assumed that there is no overseas migration of Aotearoa New Zealand optometrists. Similarly, while the *Trans-Tasman Mutual Recognition Act 1997* permits Australian accredited optometrists entering the Aotearoa New Zealand workforce (and vice-versa), this migration was excluded from the analysis due to limited publicly available information. However, it is noted that the wages for optometrists are higher in Australia compared with New Zealand. Considering this incentive (and acknowledging that there are many other incentives which influence upon the decision to migrate) it is possible that the differences in wages would result in a greater number of New Zealand optometrists migrating to Australia. This would mean a decline in the number of optometrists working in New Zealand relative to the estimates presented in this report.

A.2.3. Net regional migration

As there is no regional migration data specific to optometrists in Aotearoa New Zealand, this modelling component was excluded from the analysis.

A.3. Supply outflows

This section outlines the approach used to determine the outflow from the optometry workforce. This includes net temporary movements from the optometric workforce, retirements and deaths.

A.3.1. Net temporary movements from the optometric workforce

Net temporary movements from the optometric workforce were assumed to be equal to temporary departures from the optometric workforce, net of subsequent re-entries to the workforce.

[72] University of Auckland (2023) Graduation search results, <https://www.auckland.ac.nz/en/for/current-students/cs-academic-information/cs-graduation-information/cs-graduation-search-and-confirmation/cs-graduation-search-results.html>, accessed on 4 May 2023.
[73] Optometry Council of Australia and New Zealand (2023) Annual Reports July 2021 – June 2022, <https://www.ocanz.org/about/annual-reports/>, accessed on 4 May 2023.

Temporary departures were assumed to be due to childbirth, childcare and overseas study and travel. Fixed parameters related to study and travel were assumed based on previous work by Deloitte Access Economics (2011) and Access Economics (2006, 2008) as shown in Table A.1. These rates were applied to the estimated optometric headcount in each year to estimate the number of temporary departures due to overseas study and travel.

Table A.1: Rate of temporary departures due to overseas study and travel (% of optometrists in age group)

Age group	Rate
20-24	2.0%
25-29	2.0%
30-34	1.0%

Source: Deloitte Access Economics calculation (2023).

In addition to temporary departures due to overseas study and travel, women were also assumed to temporarily leave the workforce due to pregnancy, childbirth and childcare. Fertility rates were estimated based on data from StatsNZ.[74] Fertility rates were multiplied by the estimated headcount of optometrists in order to estimate the number of births attributable to optometrists. Temporary departures due to childbirth were assumed to impact women aged between 20 and 44.

Temporary departures require the worker to re-enter the workforce at a later point in the future. Optometrists departing the workforce temporarily were added back into the workforce at a future point in time and at an older age (based on the length of absence). The length of time spent out of the optometry workforce was set at an average of three years.

A.3.2. Deaths

The estimated number of deaths occurring in the optometry workforce, stratified by age and gender was based on StatsNZ data.[75] Mortality rates were estimated by dividing the total number of deaths by population data at five-year age intervals. Mortality rates were then applied to the optometry workforce in each period.

A.3.3. Retirements and other exits from the workforce

Data on exits from the workforce were estimated using data from ODOB.[76] While this data accounts primarily for retirements, it also estimates the rate of other exits from the workforce in younger populations.

Retirements and other exit rates were assumed to be held constant over the forecast window and applied to total estimated optometrists in order to calculate total exits from the workforce.

Table A.2: Exits and retirements from the optometrist workforce

Age group	Proportion exiting the profession
20-24	4%
25-29	3%
30-34	6%
35-39	4%
40-44	4%
45-49	1%
50-54	4%
55-59	2%
60-64	4%

[74] StatsNZ (203) Births and deaths, <https://www.stats.govt.nz/information-releases/births-and-deaths-year-ended-december-2022-including-abridged-period-life-table/>, 20 May 2023.
[75] StatsNZ (2022) Aotearoa New Zealand cohort life tables: March 2022 update, < https://www.stats.govt.nz/information-releases/new-zealand-cohort-life-tables-march-2022-update/>, 20 May 2023.
[76] Optometrist and Dispensing Opticians Board (2022) Annual Report, <https://myodob.odob.health.nz/docs/O&OD%20AnnualReport2022b.pdf>, 20 May 2023.

Age group	Proportion exiting the profession
65-69	9%
70-74	10%
75+	20%

Source: Deloitte Access Economics calculation (2023) using ODOB (2022).

Appendix B Detailed demand-side inputs.

B.1. Key demand model parameters

Utilisation of optometry services in this analysis is calculated using Specsavers NZ billing data[77] and Stats NZ population projections.[78] The results were reported by age, gender, region and North and South Island split. Optometry service demand was inferred from the service utilisation data collected in this analysis. A detailed description of the demand side methodology is listed below.

B.1.1. Population and demographic projection

Changes in population size and structure of Aotearoa New Zealand is a main driver of optometry demand that factored into projection methodology. For instance, an ageing population structure has been identified as a key driver for increasing demand of all health services, and specifically optometry.

Population projections were sourced from 'NZ Stats Statistical Area 2 population projections, by age and sex, 2018 (base)-2048 (updated).[78] These projections have been updated to 2022 population values to accurately adjust for COVID-19 related impacts on population size. StatsNZ produce a range of scenarios that predict population size based on mortality, fertility, internal and external migration rates. Population level data was projected to 2042 and stratified by region, North/South Island split, age and gender. Given the uncertainty that exists around the disaggregation of urban and rural areas in Aotearoa New Zealand, an alternative approach of North and South Island was used to produce the geographic breakdown.

B.1.2. Service utilisation

Historical patient level data was classified according to Specsavers billing data, stratified by gender, age-group and region, and urban/rural split across calendar years from 2019 to 2022. Specsavers has an estimated market share of 50% of the Aotearoa New Zealand optometry market,[79] thus billing data was adjusted to all providers, assuming regions with a Specsavers clinic have an equal distribution of Specsavers and non-Specsavers clinics.

Service utilisation data was not available for Tasman and West Coast regions. To estimate the service utilisation in these two regions, a ratio of service utilisation to the region population was applied, using the region with the closest population size. The population size of West Coast region is closest to Marlborough region and the population size of Tasman region is closest to Nelson region.

B.1.3. Service utilisation projection methods

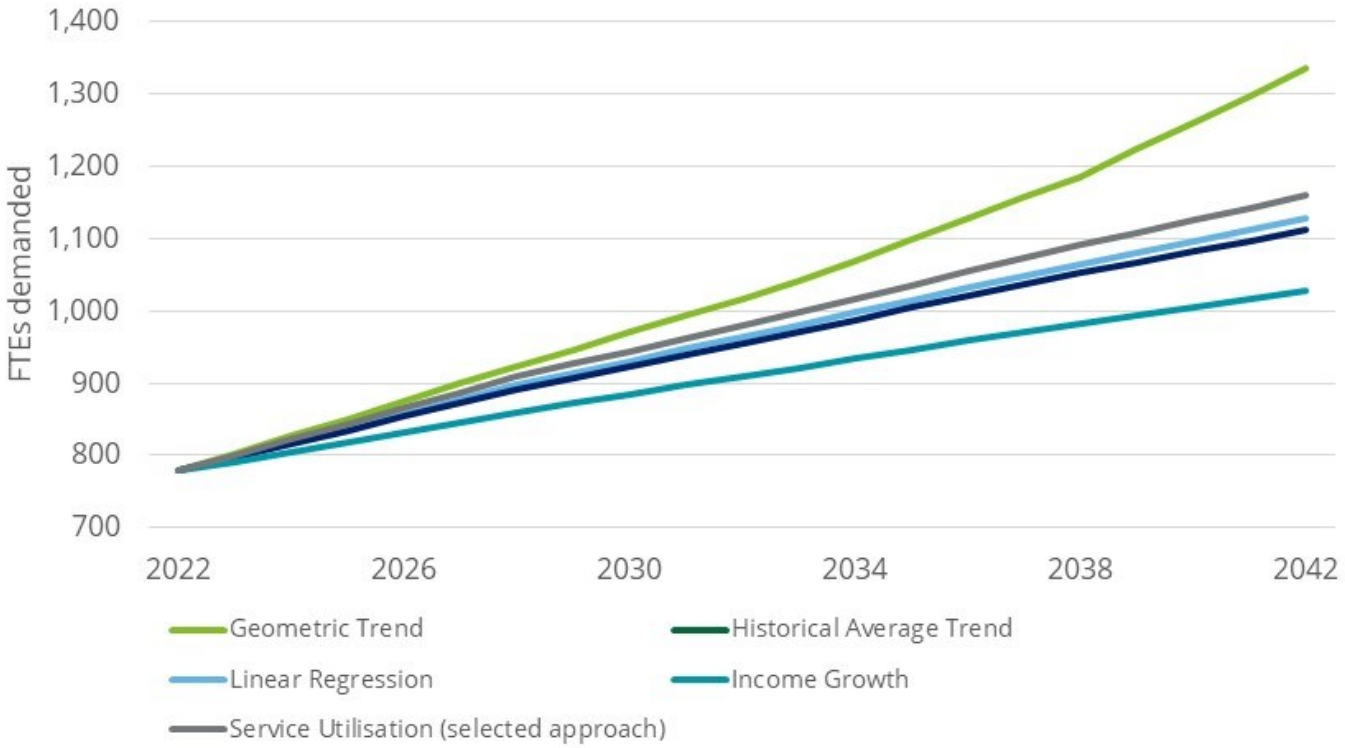
Historical population data total optometry services were used to estimate historical service utilisation per 1,000 people for each region, age and gender. Historical services per capita was forecast from 2023 onwards to 2042 through several projection methods:

- Growth in service utilisation was based on the historical average trend from 2019 to 2022
- Growth in service utilisation was based on the geometric average annual growth between 2019 and 2022
- Growth in service utilisation was based on simple linear regression between 2019 and 2022
- Growth in service utilisation was proportional to income growth over 2022 to 2042
- Growth in service utilisation was based on a combination of linear regression adjusted with a service utilisation rate (driven by increasing prevalence of eye conditions) over 2022 and 2042. This method was selected as the basis for the demand modelling.

Chart B.1 summarises the various projection methods used in this analysis and impact of FTE demanded.

[77] Specsavers Data Request (2023).
[78] Stats NZ (2023), Statistical area 2 population projections, characteristics, 2018(base)-2048 (update), <https://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE8621&_ga=2.162468156.1214492373.1682295928-805917779.1678853845>, accessed 1 May 2023.
[79] Sourced from Kantar Market Research (findings are not publicly available)

Chart B.1: Summary of projection methods for FTE demand



Source: Deloitte Access Economics calculation (2023).

Historical average trend

This method models future trends by using the least squares method for a line of best fit between two variables. It is a widely used method of regression analysis.

Average geometric annual growth

This method estimates future service utilisation rates per capita by a geometric average of historical growth. This again assumes the future will look largely like the past. However, exogenous approach accounts for compounding per annum and provides a smoother measure of underlying changes in service utilisation.

Linear regression

A linear regression model was used to estimate the slope (or average change) in optometry service utilisation for each grouping between 2017 and 2022. The model used service utilisation as the dependent variable and the independent variable as year. The simple linear regression model has an advantage in which it is simple and easy to you when applying to a variety of subgroups.

Income growth

Income growth is an important driver of health care utilisation. As previously established in Deloitte Access Economics (2011), real income per capita will likely rise over the next two decades between 2022 and 2042 in Australia.[80] It was assumed that similar income growth with occur in Aotearoa New Zealand. This report (2011) suggested that the difference between projected average Gross Domestic Product growth and population growth that income per capita will grow at approximate 1.6% per annum or 32% over the 20-year period. Additionally, an income elasticity of demand of 1.3 (demand for optometry services growth 1.3 times more proportionally with income growth) and a real income per capita of 1.6%, service utilisation is expected to grow by 2.1% per annum.

Service utilisation (base case)

Prevalence of eye conditions is another important driver of optometry service utilisation. Myopia is the most documented condition that requires optometry services. Using the most up to date estimates on prevalence by Holden et al (2016)[81], the study predicted that there would be a 19% increase in prevalence of myopia between 2020 and 2050 from 36% to 55%. This

[80] Deloitte Access Economics report (2011) Optometry Workforce Report 2009-2023. Report for Specsavers.
[81] Holden BA et al., Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050 (2016) 123(5) *Ophthalmology.* 1036-42.

equates to a projected growth rate of 12.67% over 2023-42 or 0.63% per annum. This growth rate was applied to the linear regression. Service utilisation was chosen as the base case projection method for this analysis.

B.1.4. Average minutes per service

Utilisation of services is used as a proxy estimate for demand in this report. As demand and supply are measured in clinical hours, it is also important to consider the average time per optometry services.

To calculate FTE hours demanded, number of services were multiplied by the average time per service in hours based off Horton et al.[82] Modelled equilibrium is achieved by taking the estimate of time per service, and proportionally weighting them to match current FTE demand and supply for both North and South Island. Average time per service used in this analysis is presented in Table B.1.

A FTE hours estimate was then multiplied by the average hours per week of 36.2 hours and 46 week per year to calculate total clinical hours demanded for optometry.

Table B.1: Summary of average time per service used in analysis (in minutes)

Item Type	Calculated average	Horton, 2006
Contact Lens Consult	90.5	60.0
Standard Eye Exam	67.9	45.0
Subsequent Exam Long	45.3	30.0*
Visual Field	40.4	26.8
Drivers Screening (DL12)	22.6	15.0
Recheck	22.6	15.0
Subsequent Exam Short	22.6	15.0*

Source: Deloitte Access Economics calculation (2023) using Horton et al (2016).[82] *Specsavers billing data upon data request was used to estimate these values, where specific service types were not available in literature.

The following table contains the population projections used as inputs for the demand-side model, which is discussed in Chapter 5.

Table B.2: Population projections, 2022 to 2042

	2022	2027	2032	2037	2042
Population					
Region					
North Island	3,921,990	4,069,757	4,236,070	4,394,236	4,538,878
South Island	1,200,680	1,245,013	1,285,216	1,319,986	1,349,928
Age					
0-4	302,870	297,653	295,890	297,230	302,818
5-14	660,780	633,747	619,292	614,342	614,462
15-24	641,210	678,752	699,132	684,278	670,792
25-34	742,360	700,877	698,428	740,610	763,766
35-44	662,620	745,878	785,066	763,212	762,372
45-54	648,940	628,415	669,582	752,116	792,640
55-64	623,780	639,355	628,070	614,566	657,522

[82] Horton P et al., The Australian optometric workforce 2005 (2006) 89(4) *Clinical and Experimental Optometry* 229-240.

	2022	2027	2032	2037	2042
65-74	477,500	543,100	590,252	612,440	604,828
75-84	269,860	333,093	388,748	451,380	497,062
85+	92,750	113,900	146,826	184,048	222,544
Gender					
Male	2,541,850	2,636,708	2,739,872	2,836,976	2,925,918
Female	2,580,820	2,678,062	2,781,414	2,877,246	2,962,888
Aotearoa New Zealand (total)	5,122,670	5,314,770	5,521,286	5,714,222	5,888,806

Source: Deloitte Access Economics calculation (2023) using Stats NZ (2023).[83] Note: totals may not add up due to rounding.

Table B.3: FTE optometrist demand by region

	2022	2027	2032	2037	2042
FTE optometrist demand					
Region					
Auckland region	237	271	304	338	371
Bay of Plenty region	57	64	70	76	81
Canterbury region	131	152	169	186	203
East Coast region	7	8	9	10	10
Hawkes Bay region	25	27	28	29	29
Manawatu region	29	31	33	35	36
Marlborough region	13	14	15	17	18
Nelson region	25	29	31	34	36
Northland region	25	29	32	35	38
Otago region	40	49	56	63	69
Southland region	14	17	19	20	22
Taranaki region	10	9	8	8	7
Tasman region	14	16	18	19	21
Waikato region	52	60	66	72	79
Wellington region	95	107	116	126	135
West Coast region	4	5	5	6	6

Source: Deloitte Access Economics calculation (2023).

[83] Stats NZ (2023) Statistical area 2 population projections, characteristics, 2018(base)-2048(update), <https://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE8621&_ga=2.162468156.1214492373.1682295928-805917779.1678853845>, accessed 1 May 2023.

Limitation of our work.

General use restriction

This report is prepared solely for the use of Specsavers. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose to update and revise the optometry workforce modelling and analyse changes in models of care for optometry in Aotearoa New Zealand. You should not refer to or use our name or the advice for any other purpose.

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