Optometric supply and demand in Australia: 2011–2036

Ernest Healy† DipArt&Design BAHons BEd PhD
Patricia M Kiely‡ BScOptom PhD
Dharma Arunachalam* MSc PhD

†Centre for Population and Urban Research, Monash University, Clayton, Victoria, Australia
‡Optometry Australia, Melbourne, Australia
E-mail: p.kiely@optometry.org.au

Background: The effective size of the optometric workforce is dependent on graduate numbers, retention rates and immigration and is influenced by age, gender and working hours of optometrists. This paper presents modelling results of the relationship between the projected Australian optometric workforce and projected demand for optometric services for the period 2011 to 2036. Nine hypothetical optometric supply-side and demand-side scenarios are presented.

Methods: Data from the Australian Bureau of Statistics on age and gender of people listing optometry as their major qualification in the 2011 census were projected over a 25-year period, accounting for factors such as concordance with Health Workforce Australia figures for registered optometrists in Australia in 2011, ageing, attrition, hours worked, new graduates and immigration. Data were compared to the numbers of optometrists calculated as necessary to meet the demand for services of the Australian population to 2036 using nine different scenarios.

Results: It was estimated that there would be a surplus of over 1,200 equivalent full-time optometrists (EFTO) in 2036 for the highest service demand scenario of 13.8 million Medicare services, where 21 hours of a 38-hour week per EFTO were allowed for the provision of optometric services under Medicare. Substantial surpluses were predicted in all states and territories except Queensland, Tasmania and the Northern Territory where predicted supply was within six EFTO of predicted demand.

Conclusions: Projections using current weightings for mortality, attrition, proportion of optometrists in active practice, working hours, immigration, new graduates and 21 hours per EFTO per week available for Medicare services indicate that in 2036, there will be excess optometrists in relation to projected demand for services, if service utilisation is maintained at current levels or increased by 10 or 20 per cent. Substantially greater excesses result if each EFTO has 28 or 35 hours per week available for Medicare services.

Key words: Australia, Medicare statistics, optometrist, population, projection, workforce

According to Health Workforce Australia (HWA), a ‘co-ordinated, long-term reforms by government, professions and the higher education and training sector’ are needed to secure a sustainable and affordable health workforce capable of maintaining high quality health care for Australia’s future.1 In 2012, HWA provided ‘Australia’s first major, long-term, national projections for doctors, nurses and midwives’ and ‘the best available planning information’ on Australia’s future health workforce.1 These projections were based on data obtained from the Australian Institute of Health and Welfare’s Medical and Nursing and Midwifery Labour Force Survey that had been gathered by the Australian Health Practitioner Regulation Agency (AHPRA) at the time of re-registration of members of these professions.2

Workforce projection analyses have the potential to investigate issues such as workforce shortages, workforce maldistribution and inefficiency in training; however, by April 2014, HWA had not undertaken this work for the optometric workforce in Australia, although they had undertaken work to present a snapshot of the optometric workforce in 2011 and 2012.2

To facilitate workforce mobility across Australia and 3. To enable continuous development of a flexible, responsive and sustainable Australian health workforce. Optometry is one of the 14 health professions currently regulated under the NRAS. Each profession has a National Board that regulates the profession, registers practitioners and develops standards, codes and guidelines for that profession. The Australian Health Practitioner Regulation Agency (AHPRA) administers NRAS and provides administrative support to the National Boards. www.health.gov.au/internet/main/publishing.nsf/content/work-nras (Accessed 12 May 2014)
HWA analysis of workforce dynamics indicators (average age, percentage aged over 55 years, annual change in average hours, dependence on internationally trained professionals and duration of training) showed “no real areas of concern” for the optometric workforce in 2011 and 2012. Female optometrists had a younger age profile and worked fewer hours than their male counterparts and there had been a fall in both male and overall average weekly hours from 1996 to 2011. It was suggested that with increasing numbers of women entering the workforce and the likelihood of them working fewer hours, there could be a continued decrease in working hours in the future and a need for flexible work practice.2

Optometry Australia (previously Optometrists Association Australia) has undertaken optometric workforce studies over many years3–11 but the work undertaken by HWA in 2011 and 2012 covered the majority of the analyses undertaken in these studies. Nevertheless, fewer studies12–14 have been published addressing projections of the optometric workforce into the future.

In this study, Optometry Australia has concentrated its efforts on studying the demand for and supply of optometrists in Australia from 2011 to 2036.

In 2008, Optometry Australia engaged the demographic services of the Centre for Population and Urban Research at Monash University to make projections regarding the supply of optometrists and the demand for optometric services for the period 2001 to 2031 and to assess whether the projected supply of optometrists was likely to be sufficient to meet the demand for services over this period. The study indicated that in 2031, there would be adequate numbers of optometrists to meet the demand for services.14

Since the 2008 study, some of the basic conditions influencing the demand for and supply of optometric services have changed. Two new schools of optometry have opened in Australia. Provided that the courses offered in these new schools are granted full accreditation so that their graduates are permitted to register to practise optometry in Australia, there will be a substantial increase in the number of people entering the profession from 2015 onwards. This increased training capacity presents the possibility of more than double the number of graduates in 2015 (estimated at approximately 300) compared to 2011 (estimated at 136 based on information supplied by the heads of schools at the three schools producing graduates in that year). The graduate numbers for 2015 were calculated from student enrolments in 2013 in the courses at the five schools as reported by the heads of schools for the cohorts expected to complete in 2015 (that is, year 2 of the program at The University of Melbourne, year 3 of the courses at University of New South Wales, Queensland University of Technology and Flinders University and year 2 of the program at Deakin University, a total of 308).1

In addition, over the past several years there has been a significant increase in Australian government policy settings relating to population growth, principally in relation to the foreshadowed scale of net overseas migration to Australia over the coming decades. The expected increase in graduate numbers and changed expectations about the scale of population growth in Australia led Optometry Australia to again engage services of demographers to analyse projections for optometry.

The brief given was that projections regarding demand for services were to take account of the changing age and gender composition of the Australian population over that period using three scenarios: maintenance of the rate of Medicare service provision per capita (servicing rate)15 calculated for 2011/2012, a 10 per cent increase in this servicing rate and a 20 per cent increase in this servicing rate. The projections were also to use different scenarios regarding the number of hours available for optometric consultations under Medicare (the universal health care scheme in Australia). In part, this was to account for the likelihood that optometrists provide other services not covered by Medicare. These scenarios were suggested as 21, 28 and 35 hours available for Medicare consultations within the 38-hour work week worked by the hypothetical equivalent full-time optometrist (EFTO), in keeping with the figure used by HWA.2 The three scenarios were chosen to reflect the variability in numbers of hours that practitioners might have available for Medicare consultations, with the smallest value of 21 hours similar to the 22.2 hours that was estimated as being needed for Medicare consultations per EFTO in the 2009 workforce study.11 The values of 28 and 35 were used because it was considered that the equivalent full-time optometrist might have much more of the 38 hours per week that they spend at the practice available for consultations under Medicare.

Projections regarding the supply of optometrists were also to address the changing age and gender composition of the optometric workforce and factors relating to mortality, attrition from other factors and hours worked.

METHODS

In all, nine optometric demand scenarios were calculated. The basic parameters of these scenarios were based on the three optometric contact hours available for services under Medicare per week (that is, 21, 28 and 35 hours) for three different per capita servicing rates: the rate observed in 2011/2012 using Medicare data for different age groups,15 a 10 per cent increase in these servicing rates and a 20 per cent increase in these servicing rates. A standard working week (used as the basis for the calculation of an equivalent full-time optometrist) was considered to be 38 hours. It was assumed that 46 working weeks constituted a working year for an optometrist (to allow for annual leave, sick leave and other time away from the practice).

Demand-side assumptions

To simplify calculations regarding the demand for optometric services, Medicare services were divided into two broad categories: ‘initial’ and ‘other’. Initial consultations were assumed to take 30 minutes and other consultations an average of 20 minutes with the ratio of these consultation types taken as 3:2. The methodology underlying how these figures were derived is shown in Appendix 1.

The assumptions regarding hours and weeks worked were used to convert further assumptions about weekly contact hours into the number of consultations per year that could be provided by a hypothetical optometrist with 21, 28 and 35 hours patient contact per week. The different scenarios and the
associated allocation of time to initial and other Medicare consultations are shown in Table 1.

The projected population for each year between 2011 and 2036 was converted to the number of consultations required (based on 2011–2012 age by gender servicing rates), which were then converted into demand, expressed in terms of equivalent full-time optometrists. The assumed annual net overseas migration assumption for the demand-side projections was 220,000. Net overseas migration is defined as the difference between the sum of all movements into and out of Australia, including both residents and migrants. Most of the growth in the net overseas migration is due to the arrival of persons born outside Australia.

In the years immediately prior to the Global Financial Crisis (2004 to 2007), Australia’s annual net overseas migration levels ranged between approximately 138,000 and 244,000 persons per year. In this context, earlier optometric labour force projection research for Optometry Australia had reasonably assumed a net overseas migration of 180,000; however, since the Global Financial Crisis, net overseas migration increased markedly, varying between approximately 172,000 and 241,000 during the period 2009 and 2012. Although population projections should not be taken as predictions, there is currently strong bi-partisan agreement for high immigration and population growth into the foreseeable future, a view that has strengthened with the recent slowing of the minerals investment boom. Whereas the Australian Bureau of Statistics’ September 2008 mid-level population projection assumed a net overseas migration of 180,000 persons per year, the mid-level projection of the Bureau’s updated, November 2013 projections, assumes a net overseas migration of 240,000 and a low projection net overseas migration assumption of 200,000. Prior to the release of the November 2013 projection series (the most recent), the high net overseas migration assumption had been 220,000. The November 2013 projection series had not been released at the time of commencement of the research reported here. Nevertheless, an assumption of 220,000 net overseas migration remains plausible in light of the most recent Australian Bureau of Statistics projections.

Supply-side assumptions
A key initial input for the supply-side projection was the population of persons with a qualification in optometry in Australia (and states and territories respectively) in 2011 — the projection commencement year. This population represents people practising optometry, people trained in optometry but working in other areas or, in some cases, people trained in optometry, who have never practised the profession. The initial calculation was to plot the natural attrition of this 2011 cohort between 2011 and 2036, using Australian Bureau of Statistics Life Tables (2010–2012) to estimate expected losses due to mortality for each five-year period between 2011 and 2036.17

The estimation of the age/gender specific shares of eligible optometrists actually working as optometrists was undertaken as a subsequent stage in the projection process and the assumptions used in this estimation are discussed under ‘other attrition’.

Two sources of data for the 2011 count of persons eligible to practise optometry were available. These were the Australian Bureau of Statistics 2011 Census count of optometrists19 and the count of persons, who were registered as optometrists in the 2011 HWA data set.19 Neither data set was ideal. While the 2011 HWA optometric data set provided an accurate count of persons registered and practising as optometrists in 2011, it is likely to undercount persons, who were trained in optometry but who for various reasons were not registered and thus, not working in the profession. A further limitation with HWA data is that the count of optometrists is not in the five-year age groups needed for the projection calculations. In contrast, the 2011 Census data appear to give a more balanced count of persons who had a qualification in optometry but who were not working in the profession. The Census data set (TableBuilder) also provides person counts in five-year age groups, something required by the projection method developed.18 Despite these advantages the Census data yielded a smaller count of persons working in optometry in 2011 than did the HWA data. A further consideration was that the 2011 TableBuilder

Table 1. Scenarios used to calculate the number of equivalent full-time optometrists needed to meet the demand for Medicare services

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Consultation type</th>
<th>Number of consultations per week</th>
<th>Hours per consultation</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1:</td>
<td>Initial consultations</td>
<td>30</td>
<td>0.5</td>
<td>15</td>
</tr>
<tr>
<td>966 contact hours per year</td>
<td>2,300 consultations per year</td>
<td>21 hours per week</td>
<td>Other consultations</td>
<td>20</td>
</tr>
<tr>
<td>50 consultations per week</td>
<td>Initial consultations</td>
<td>40</td>
<td>0.5</td>
<td>20</td>
</tr>
<tr>
<td>Scenario 2:</td>
<td>1,288 contact hours per year</td>
<td>3,068 consultations per year</td>
<td>28 hours per week</td>
<td>Other consultations</td>
</tr>
<tr>
<td>66.7 consultations per week</td>
<td>Initial consultations</td>
<td>50</td>
<td>0.5</td>
<td>25</td>
</tr>
<tr>
<td>Scenario 3:</td>
<td>1,610 contact hours per year</td>
<td>3,832 consultations per year</td>
<td>35 hours per week</td>
<td>Other consultations</td>
</tr>
<tr>
<td>83.3 consultations per week</td>
<td>Initial consultations</td>
<td>50</td>
<td>0.5</td>
<td>25</td>
</tr>
</tbody>
</table>

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Census data did not have a discrete occupational identifier for optometrists but only a four-digit occupation code for ‘Optometrist and Orthoptist’; however, it was decided that the use of the Census six-digit Field of Study code for optometry would capture persons employed and/or trained as optometrists, as distinct from orthoptists. Table 2 compares the HWA and 2011 ABS Census counts.

The 2011 Census Field of Study 060901 - Optometry count was used as the input for the commencement year of the supply-side projections. This count was not significantly different from the HWA count but allowed disaggregation by five-year age groups. As noted, this Field of Study code does not include orthoptics, which is included under code 061799 for Rehabilitation therapies NEC (not elsewhere classified).

Graduate supply

Based on graduate numbers between 2011 and 2013 supplied to Optometry Australia by the heads of the optometry schools, the average annual number of graduates in optometry (from the three longstanding courses in Australia) at the commencement of the projections, 2011, was taken to be 130. This served as the annual addition to the optometric workforce for the first four years of the projections. At the time that this workforce projections study was initiated, the number of students in the five optometry courses in Australia that were in the cohort that was expected to graduate in 2015 was 308. Thus, from 2015, the annual number of graduates was taken to be 300, to account for the additional graduates expected from Flinders and Deakin Universities and was applied throughout the projection period thereafter.

The share of annual graduates in optometry assumed to reside and work in each state/territory is based on the share of Australia’s working optometrists in each jurisdiction in 2011 according to the 2011 HWA data set. This approach was adopted because the state in which persons are trained in optometry does not directly indicate their state/territory of origin or the jurisdiction in which they will subsequently practise.

The distribution of graduates by gender for each state/territory is assumed to reflect the 2011 gender ratio of male to female optometrists for each jurisdiction in 2011, as found in the HWA optometry data set.

The age distribution of graduates for each state/territory is based on Australian domestic optometric graduate data from the early 2000s and is not assumed to change throughout the projection period.

Immigration

The annual number of overseas-trained optometrists assumed to enter the Australian workforce through migration each year was set at 30. Department of Immigration 2012–2013 visa-issue data for settlers to Australia indicated 28 optometrists and orthoptists. Although this figure does not distinguish between optometrists and orthoptists, overseas arrivals and departures data for the years 2009–10 and 2010–11 indicate a net figure of around 35 optometrists to Australia over these two years. The figure of 30 was based on Department of Immigration figures together with HWA data that indicated a fluctuating figure between around 20 and 40 in recent years. The figure of 30 migrants with optometry as their occupation was divided equally between state/territory jurisdictions. It was also divided equally between the genders. It was assumed that migrant professionals would fall between the ages of 20–24 and 40–44 years, as professional migrants probably arrive under the ‘Independent migrant’ category, where age is a selection criterion. In recent years, there has been increasing attention given to the influx of skilled temporary-entry migrants, which has predominantly consisted of professionals. In this regard, the 457 visa subclass has received the most attention; however, the national count of 457 visa holders, whose occupations are listed as optometry has remained relatively small with only moderate growth in recent years. The count grew from 18 persons in June 2006 to 39 by March 2014. Therefore, it was concluded that the overall supply from this source would likely remain very minor.

Natural attrition - mortality

Although state/territory, age-specific mortality rates are available, national rates were used for each jurisdiction. This is because in jurisdictions, such as the Northern Territory, where mortality rates are considerably higher than the national average, the rates would misrepresent the mortality of optometrists and other professionals, for whom rates would be much lower than the general population.

<table>
<thead>
<tr>
<th>Field of study optometry</th>
<th>Field of study optometry and occupation optometry</th>
<th>Registered optometrists employed as clinicians</th>
<th>In optometry workforce in Australia</th>
<th>Registered optometrists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>2,286</td>
<td>1,697</td>
<td>1,815</td>
<td>2,082</td>
</tr>
<tr>
<td>Women</td>
<td>2,176</td>
<td>1,554</td>
<td>1,625</td>
<td>1,958</td>
</tr>
<tr>
<td>Gender not stated/ not adequately described</td>
<td>4,462</td>
<td>3,251</td>
<td>3,440</td>
<td>4,186</td>
</tr>
</tbody>
</table>

1AHPRRA collects registration data via the 14 national health registration boards. In accordance with the Memorandum of Understanding between HWA and AHPRRA and AIHW, AHPRRA provides a snapshot of de-identified registration data to AIHW each year, as well as results from a non-compulsory workforce survey. Workforce survey forms go to HWA. AIHW edits and cleanses registration data and provides to HWA. HWA converts hardcopy workforce survey forms to electronic data and supplies to AIHW. www.ahpra.gov.au/About-AHPRRA/What-We-Do/Who-we-work-with/Memoranda-of-Understanding.aspx (Accessed 13 May 2014)

Table 2. Comparison of figures for the number of people who studied optometry and the number of people registered as optometrists in 2011 from the Australian Bureau of Statistics (ABS) census data and Health Workforce Australia (HWA)
The respective mortality rates for males and females, calculated for five-year age groups, \(^{17}\) are shown in Appendix 2.

‘Other’ attrition

A significant source of attrition is people, who are trained as optometrists who do not work in the profession or do not continue to work in the profession. As with many other professions, there tends to be a decline in participation in optometry with age, an outcome generally more pronounced among women. The profile applied in producing the supply-side projections for Australia is shown in Figure 1.

A gender by age attrition profile was calculated for each state/territory based on data from the 2011 Census. For each five-year age group of males and females, the count of persons who had optometry as their occupation was calculated as a percentage of persons, who had optometry as their field of study. The inverse share is for persons who, although trained in optometry, were not practising at the time of the 2011 Census.

In the cases of the Northern Territory, the Australian Capital Territory and Tasmania, the attrition profile of South Australia was used to provide a more plausible distribution. This is because the count of persons qualified in optometry in each of these jurisdictions, taken separately, was too small to provide an adequate attrition profile for projection purposes. It was considered that an incomplete age distribution of persons in the present should not be used as a basis for projecting participation outcomes over an extended period. The South Australian profile seemed suitable because of the intermediate population size in that state.

The female profile shows a dip in employment between the 25 to 29 years and 40 to 44 years age groups. It is assumed that this reflects departure from the work force for childbirth and care. Nevertheless, there is a more or less steady decline in female work force involvement in the age groups beyond 40 years. By contrast, the male profile maintains a higher level of employment in optometry across age groups, with a more abrupt decline in optometric employment only after 55 years.

The attrition profiles vary somewhat between jurisdictions. The gender and age-specific rates of employment used for those trained in optometry for the states and territories are shown in Table 3.

Conversion to equivalent full-time optometrists

The final stage in the supply-side projections is to convert the projected number of optometrists into a count of equivalent full-time optometrists (EFTO). This is necessary because the demand-side projections are expressed in EFTO. To understand the potential implications of the optometric demand projections, the projected supply of optometrists must be expressed in the same terms.

The conversion involves using 2011 Census data to disaggregate males and females employed in optometry by five-year age groups and by their weekly hours worked. The hours-worked groupings used are: less than 16 hours, 16 to 24 hours, 25 to 34 hours, 35 to 39 hours, 40 to 44 hours and 45 hours and over. A point was chosen within each of these ranges and calculated as a fraction of 38, the number of hours deemed to constitute a standard working week. The weightings thus derived were used to calculate the number of EFTO for each age group, for men and women. Those deemed to be working 38 hours within the 35 to 39 hours range were given a weighting of 1. Those with weekly working hours in the ranges less than 35 to 39 hours were given a weighting less than 1. Those with weekly working hours in the ranges greater than 35 to 39 hours were given a weighting greater than one. For those with working hours in the ‘less than 16 hours’ and ‘45 and over’ categories, a specific number of hours was chosen to calculate the weighting. For those whose weekly working hours were ‘not stated’, the assumed weighting was assigned as 1.1. As the proportion of persons employed as optometrists, who did not state their working hours was small, this was considered a reasonable decision.

A specific set of weightings was calculated in this way for each state/territory jurisdiction.

The weightings used for the supply projections were developed to bring the count of EFTO in the 2011 base year closer to the count found in HWA optometrist data for that year. As 2011 Australian Census data appear to undercount the number of registered, practising optometrists, this seemed a reasonable correction. The weightings produced a figure of 3,353, the beginning point for the calculation of the supply of optometrists. HWA data indicated that in 2011, the number of EFTO in clinical practice was approximately 3,500. This adjustment of hours worked weightings was achieved by applying the weekly hours worked for each hourly range, as indicated in Table 4.

Thus, the specific age by gender weightings derived for Australia are shown in Table 5.

A set of weightings was similarly calculated for each state/territory. In the cases of Tasmania, the Australian Capital Territory and the Northern Territory, age by gender weekly hours worked data were aggregated to calculate the EFTO conversion weights because each jurisdiction’s data were not sufficiently complete to use as a basis for projection. The resulting set of weightings was used for each of these jurisdictions.

**RESULTS**

The assumptions and corrections for mortality, working hours, age, attrition et cetera, were used to obtain the figures for demand and supply of equivalent full-time optometrists in Australia and its states and territories for the time frame 2011 to 2036 as shown in Figure 2. The starting point used for supply was 3,353 EFTO in 2011 with an estimated supply in 2036 of 7,264 EFTO.

In Australia as a whole, for every year from 2011 to 2036, the predicted supply of EFTO was greater than the number required to meet demand for each of the nine demand-based scenarios (Figure 2). In all states and territories after 2016, the projected supply of EFTO was much greater than the demand for services calculated using current servicing rates and with a 10 per cent increase in servicing rates for each of the three scenarios regards the number of hours available for Medicare consultations (Figure 2). All locations except the Northern Territory (all years in the projected period),
South Australia (prior to 2021) and Tasmania (prior to 2031) were also projected to have sufficient optometrists to cater for the scenario, where there was a 20 per cent increase in servicing rates. The small deficits in these states are more than covered by the large surpluses in the other states, indicating that relocation of a small number of optometrists or provision of visiting optometric services could address any shortfalls.

For Australia as a whole, the major increases in the difference between the supply and the greatest demand scenario commenced after 2016, shortly after the time, at which the two new schools of optometry are expected to produce graduates and reaching an expected oversupply of EFTO of 1,234 in the year 2036. Oversupplies of over 500 EFTO are predicted in both Victoria and New South Wales in 2036.

DISCUSSION

Limitations

STARTING POINT
Because of the need to use Australian Bureau of Statistics figures allocating optometrists to age and gender groups in the calculations in this study, the starting point of the projections may underestimate the 2011 population of EFTO by approximately 200, meaning that at any date within the projection period, the supply of EFTO would actually be greater than the number calculated. This further reinforces the likelihood of an oversupply of optometrists at all years within the projection period.

NEW GRADUATE NUMBERS
Another potential source of inaccuracy in the projection figures relates to the assumed

<table>
<thead>
<tr>
<th>Weekly hours worked ranges</th>
<th>&lt;16</th>
<th>16-24</th>
<th>25-34</th>
<th>35-39</th>
<th>40-44</th>
<th>45+</th>
<th>Not stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of hours used in weighting calculation</td>
<td>14</td>
<td>23</td>
<td>32</td>
<td>38</td>
<td>43</td>
<td>55</td>
<td>42</td>
</tr>
<tr>
<td>Weight</td>
<td>0.37</td>
<td>0.61</td>
<td>0.84</td>
<td>1.00</td>
<td>1.10</td>
<td>1.45</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Table 3. Gender and age-specific rates of employment in optometry for persons qualified in optometry, 2011, Australian states and territories

Table 4. Weightings used to convert part-time hours to equivalent full-time optometrists count
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Table 5. Specific age by gender weighting derived for Australia

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Weighting for men</th>
<th>Weighting for women</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–24</td>
<td>0.94</td>
<td>1.04</td>
</tr>
<tr>
<td>25–29</td>
<td>1.01</td>
<td>0.99</td>
</tr>
<tr>
<td>30–34</td>
<td>1.02</td>
<td>0.88</td>
</tr>
<tr>
<td>35–39</td>
<td>1.13</td>
<td>0.73</td>
</tr>
<tr>
<td>40–44</td>
<td>1.13</td>
<td>0.82</td>
</tr>
<tr>
<td>45–49</td>
<td>1.11</td>
<td>0.83</td>
</tr>
<tr>
<td>50–54</td>
<td>1.17</td>
<td>0.91</td>
</tr>
<tr>
<td>55–59</td>
<td>1.16</td>
<td>0.89</td>
</tr>
<tr>
<td>60–64</td>
<td>1.14</td>
<td>0.85</td>
</tr>
<tr>
<td>65+</td>
<td>0.99</td>
<td>0.61</td>
</tr>
<tr>
<td>Total</td>
<td>1.11</td>
<td>0.88</td>
</tr>
</tbody>
</table>

number of graduates entering the profession each year. In 2014, the data supplied by the heads of the five optometric programs indicated that the number of graduates in 2015 might be closer to 280 than to 300 but figures for the years after that varied. It is difficult to account for numbers of student who fail a year, change to another course or drop-out altogether. If a figure of 280 rather than 300 were used from 2015 onwards, there could be approximately 900 fewer EFTO in 2036 giving approximately 6,364 EFTO rather than the figure of 7,264. Given that the most demanding scenario indicates a need for 6,030 EFTO in 2036, there would still be an excess of around 330 EFTO.

Changes in Government and university policies and practices may see changes in enrolment and graduation numbers, thus resulting in outcomes at variance with the projections made.

OPTOMETRISTS FROM NEW ZEALAND

It is also possible that changes in New Zealand graduation numbers and the state of the New Zealand economy could impact the numbers of optometrists trained in New Zealand, who come to practise in Australia. Because of the Trans-Tasman Travel Arrangement that allows Australian and New Zealand citizens to enter each other’s country to visit, live and work, without needing to apply for authority, optometrists can practise in either or both countries provided they register with the relevant registration authority(ies). As New Zealand citizens are not counted as part of Australia’s annual migration program, figures for New Zealand optometrists coming to practise in Australia are not included in the figures used to address overseas migration.22 Interrogation of Optometry Australia’s database for recent and immediate graduates (n = 270) as at May 2014 indicated that at least 18 of these graduates had obtained their qualification in New Zealand, suggesting that a figure of 10 NZ graduates per year entering the optometric workforce in Australia might not be unreasonable. Such entry could, in part, counterbalance any excess in the estimate of 300 new graduates entering the workforce from the Australian schools.

OPTOMETRISTS TRAINED OUTSIDE AUSTRALIA AND NEW ZEALAND

It is unclear what will happen regarding migration from overseas of optometrists after 1 December 2014, when there will be changes to the Optometry Board of Australia registration requirements, such that optometrists trained outside Australia, who pass the Competency in Optometry (COE) examination offered by the Optometry Council of Australia and New Zealand will either need to pass the OCANZ Assessment of Competence in Ocular Therapeutics or pass an approved program of postgraduate study in ocular therapeutics.23 The first requirement limits eligible applicants to those from countries, where training has included appropriate therapeutic training. The second requirement will maintain the current eligibility criteria for those wishing to sit the OCANZ examination but will limit optometrists able to comply to those for whom the cost of a therapeutics course in addition to the cost of the COE is not prohibitive.

MEDICARE DEMAND SCENARIOS

Growth in use of optometric services is dependent on a number of factors, such as ease of access, costs, increases in the Australian population, ageing of the population and increased use per capita. To address the projected demand for optometric services, three demand scenarios have been used in the study, all of which take into account the changing age and gender structure of the Australian population. The first maintains a servicing rate consistent with that observed in 2011/2012 using Medicare data for different age groups. It would seem unlikely that this demand would occur since the use of services that Optometry Australia has observed over time indicates an increasing use per capita, rather than an increase based solely on population increases. It is possible that demand could plateau for reasons such as introduction of new treatments that could minimise the need for spectacles, new treatments that decrease the need to monitor diseases, increased costs to the individual for services and so on.

Based on historical data, it appears more likely that demand will increase and two further scenarios were used - one with a 10 per cent increase in demand for Medicare services and the other with a 20 per cent increase.

The use of the 20 per cent increase scenario was based on the findings shown in Figure 3, where the total numbers of Medicare services in each year from 2001 to 2013 were plotted, a regression curve fitted and a value calculated (on the basis of the regression curve) for the number of services projected to be delivered in 2036 resulting in a figure of 13.78 million services. This figure prompted the use of the 20 per cent increase scenario, where 6,030 optometrists working 21 hours to accommodate a 20 per cent increase in Medicare servicing equates to 6,030 by 2,300 consultations in a year, which is 13.87 million consultations. It is not clear whether there will continue to be such an increase in use of Medicare services into the future.

IMMIGRATION TO AUSTRALIA

Changes to the Federal Government policies on immigration cannot be predicted to 2036; however, current policy assumptions have been factored into the population projections used to calculate the demand for services. As noted, there appears to be strong bipartisan support for high net overseas migration levels for several decades to come.

Allocation of new graduates to states

The study assumed that the proportion of graduates in optometry to reside and work in each state/territory would remain as it was in the 2011 HWA data set. This is a potential source of error as the two new optometry schools have indicated that they aim to address rural shortages. Nevertheless, the impact of their approaches on distribution is not yet known. As with attempts to encourage general medical practitioners to work in regional locations with unmet need, persuading optometric graduates to practise in such remote locations may also prove problematic.
Figure 2. Projections of demand and supply of equivalent full-time optometrists (EFTO), in Australia and its states and territories, 2011 to 2036
Working hours and servicing rate variations

The choice of working hours and servicing rates provided in the paper does not restrict the application of the data for other working hour scenarios and servicing rates. Values for other working hour values or servicing rates can be calculated through multiplication of the figures provided. For example, to calculate the demand for optometrists, if on average, they were to provide clinical services for 14 hours per week, the values in the 28 hour scenarios would need to be doubled; ratios for other working hours could be calculated in a similar way. With respect to servicing rates, the demand would be the base value for a given working hours scenario multiplied by ‘1/Lx’ where x is the percentage increase required divided by 100.

Consequences of an oversupply of professionals

A significant oversupply has not yet occurred for the profession of optometry in Australia. However, there could be effects similar to those experienced by the profession of pharmacy in the US. There it has been suggested that a pharmacist oversupply could be a ‘salient long-term mercantile industry strategy to address their rising labor expenses’.24 In this context, concerns have been raised regarding:

- whether there are enough qualified, experienced academics for the additional schools of pharmacy24
- whether there are sufficient high-quality clinical placement sites24
- whether ‘market forces of survival of the fittest’ should be allowed to correct the imbalance in the profession25,26
- difficulty in filling managerial and clinical specialist roles, possibly associated with an expansion in academia28
- increased new graduate joblessness rate26
- the possibility that an increased joblessness rate will cause a decrease in applications to pharmacy schools,26,27 leading to difficulty meeting enrolment targets and subsequent decreases in anticipated tuition revenue, possibly resulting in downsizing or closing of programs and leading to a loss of academic positions26
- the possibility of wage stagnation and reduction24,27
- less job flexibility27
- dilution of quality in student applicants, faculty members and administrative leaders27
- whether the schools are serving the best interests of every student26 and
- lack of guarantee that the growth in the number of graduates will be fully compensated by new jobs created in response to factors, such as health-care demands of an ageing population.27

It has been suggested that market demands will eventually reverse the oversupply of pharmacists in the US, but it is also suggested that this may be a ‘long, slow and painful process’.27 It has also been argued in the US that an oversupply in pharmacy has presented opportunities. Some of these may be relevant in optometry in Australia, for example, how ‘resources can be fully used to contribute to the health and wellbeing of patients’,28 broadened or new roles and activities for practitioners,25,26 seeking traditionally hard-to-reach communities28 and task-shifting from the medical profession.29 Nevertheless, experience with general medical practitioners in Australia may caution against such optimism. For example, despite periodic oversupply of general medical practitioners, it has proven difficult to encourage practitioners to locate in remote locations with a shortage of such services.29

CONCLUSION

Under any of the demand and supply projection scenarios described in this paper, there is significant predicted oversupply of optometrists with respect to predicted demand for services in 2036. These predictions assume there is not a significant change in the contexts, in which optometry is practised. The possibility of unemployment or underemployment raises questions about supporting continued investment in the predicted numbers of student enrolments and graduates. This investment includes financial investment from Government, time investment from private practitioners, who provide clinical placements as well as financial, time and other personal investment from students. Whether or not investing in the predicted number of student placements or graduates is in the best interests of the Government, community, profession or indeed, the future graduates themselves, should be the subject of serious consideration by Government and stakeholders.

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20. Department of Immigration and Citizenship, unpublished visa issued data, held by Centre for Population and Urban Research, Monash University, Melbourne.

SUPPORTING INFORMATION

Appendix 1 and Appendix 2 may be found in the online version of this article at the publisher’s web site.