6 Capacity to supply dental visits: impact of changes in key inputs

This section investigates the potential outcomes of various policy directions by assessing the impact of changes in key inputs or existing trends on supply projections of dental visits. The sensitivity of supply projections to various changes is assessed by comparing alternative scenarios against what is referred to as the standard projection. The standard projection and its inputs are described in Section 3.4.

6.1 Impact of increased numbers of dental graduates

Increasing numbers of dentist graduates

In 2003 there were five Australian dental schools; Griffith University commenced an undergraduate course in 2004. Under the standard supply projection the number of graduates entering the labour force was 237 per year until 2008, increasing to 307 per year from 2009. Taking into account the 5-year lag between commencement and completion of a dentistry course, the earliest possible time that changes in the numbers of dentistry places would be evident in the labour force (at time of publication) is 2013.

To explore the impact of increasing graduate numbers on the supply of dental visits, three scenarios were modelled—increases in graduate completions of 70, 140 and 210 in 2013. Increments of 70 were chosen as an approximation of an additional dental school plus incremental increases in current dental school numbers. Hence, the first scenario (+70) would approximately simulate the impact on supply of opening an additional dental school in 2008, while the second scenario (+140) simulates 2 additional dental schools in 2008 and so forth.

The standard projection results in a 33.3% increase in numbers of dentists, from 10,104 in 2005 to 13,465 in 2020. Increasing the number of graduates by 70 in 2013, increases the projected number of dentists to 13,995 in 2020, 3.9% more dentists than the standard projection. The capacity to supply dental visits under this scenario projected to be 34.8 million visits in 2020, 3.3% more visits than the standard projection (33.7 million visits). The second scenario, a 140 increase in graduate completions in 2013, results in a projected 7.9% more dentists than the standard projection and a corresponding increase in supply of 6.7%, while the third scenario, an additional 210 graduates, results in 11.8% more dentists than the standard and 10.0% additional dental visits supplied in 2020 (Table 12).

Table 12: The impact of increases in numbers of dentistry course completions, projected number of dentists, dentists per 100,000 population and total dental visits supplied, 2005, 2010, 2015 and 2020

Scenario[a]	2005	2010	2015	2020	Per cent increase, 2005 to 2020	Per cent increase over standard projection
Number of employed dentists						
Standard projection	10,104	11,345	12,513	13,465	33.3	. .
+70 graduates	10,104	11,345	12,720	13,995	38.5	3.9
+140 graduates	10,104	11,345	12,926	14,524	43.7	7.9
+210 graduates	10,104	11,345	13,133	15,054	49.0	11.8
Employed dentists per 100,000 population						
Standard projection	49.5	52.7	55.2	56.6	14.3	. .
+70 graduates	49.5	52.7	56.1	58.8	18.8	4.0
+140 graduates	49.5	52.7	57.0	61.1	23.2	7.9
+210 graduates	49.5	52.7	58.0	63.3	27.7	11.8
Total dental labour force supply, number of visits[b] (millions)						
Standard projection	29.52	31.41	32.84	33.70	14.1	. .
+70 graduates	29.52	31.41	33.30	34.82	18.0	3.3
+140 graduates	29.52	31.41	33.76	35.95	21.8	6.7
+210 graduates	29.52	31.41	34.23	37.07	25.6	10.0

(a) The standard projection has no additional graduates in 2013 and is based on 237 graduates for 2003 to 2008 and 307 graduates for 2009 to 2020. The +70 scenario has an additional 70 graduates per year from 2013 (a total of 377), the +140 scenario has an additional 140 graduates per year from 2013 (a total of 447), and the +210 scenario has an additional 210 graduates per year from 2013 (a total 517 graduates).

(b) Includes visits provided by allied dental practitioners. Only unique visits, i.e. visits supplied independent of a visit of a dentist, are counted towards total labour force supply.

Increasing numbers of allied dental practitioner graduates

In recent years there has been the emergence of a new university-based qualification, the Bachelor of Oral Health (BOH). Graduates of this course can practice either as a dental hygienist or dental therapist. In 2003 the number of graduates from these courses was relatively small but numbers of dual-qualified hygienists and therapists are expected to grow rapidly throughout the current decade. The work patterns of these dual-qualified allied dental professionals is currently uncertain and, at the time of publication, there appeared to be no indication in the labour force data of the future work patterns of BOH graduates. Graduates may not be evenly split across the two professions, may favour (or employers may favour) movement into one occupational area over the other; alternatively, they may practise in both simultaneously. While there is considerable uncertainty about the future roles and practice of these two groups, several hygiene (non dual qualified) courses still operate; hence, separate projections of the dental therapist and hygienist labour force were conducted.

When projecting the number of dental visits supplied by therapists and hygienists, the numbers were discounted such that only visits supplied independently of a visit to a dentist were counted towards the estimate of supply by the entire labour force (see Appendix B). This allows reconciliation of supply estimates with demand estimates, as demand side data records a simultaneous visit to a dentist and hygienist, or a therapist and dentist, as one dental visit.

Dental hygienists were discounted to a greater degree than therapists as they provide fewer unique visits. Consequently, assumptions about the movement of BOH graduates into one profession versus the other have implications for the projected overall supply of dental visits.

Several scenarios with differing assumptions about the future occupational role of BOH graduates were assessed (in each of these scenarios recruitment for dental prosthetists was not altered). The first scenario assumes that 50% of BOH graduates will practise principally as therapists and 50% principally as hygienists (standard projection, 50/50 split). The second scenario was based on a ratio of hygienists to therapist of 30/70 and the third scenario was the converse of the second (70/30). Under the 30/70 split scenario, where more BOH graduates practise as therapists than hygienists, allied supply was projected to be 12.1% more than that projected under the standard projection (50/50 scenario, 4.82 million visits). In contrast, under the 70/30 split scenario, it was projected that supply of allied dental visits would be 12.8% less than the standard projection (3.75 million visits) (Table 13). The impact on total dental labour force supply is negligible as the contribution of allied supply is relatively small compared to that of dentists.

Table 13: The impact of changes in the hygienist to therapist graduate ratio on the projected numbers of therapists and hygienists and contribution of total allied dental visits to total dental supply, 2005, 2010, 2015 and 2020

Scenario	2005	2010	2015	2020	Per cent increase over standard projection
Number of employed allied dental practitioners					
Standard projection, 50/50 split					
Therapists	1,271	1,300	1,261	1,204	. .
Hygienists	831	1,339	1,705	1,977	. .
Hygienist/therapist split, 30/70					
Therapists	1,327	1,468	1,513	1,520	26.2
Hygienists	773	1,165	1,445	1,651	−16.5
Hygienist/therapist split, 70/30					
Therapists	1,213	1,126	1,000	877	−27.2
Hygienists	887	1,507	1,957	2,292	15.9
Total allied labour force supply, number of visits[a] (millions)					
Standard projection					
(50/50 split)	4.06	4.31	4.35	4.30	. .
30/70 split	4.15	4.59	4.77	4.82	12.1
70/30 split	3.96	4.01	3.91	3.75	−12.8
Total dental labour force supply, number of visits[a] (millions)					
Standard projection					
(50/50 split)	29.52	31.41	32.84	33.70	. .
30/70 split	29.61	31.69	33.26	34.21	1.5
70/30 split	29.42	31.11	32.40	33.14	−2.0

(a)   Includes visits provided by allied dental practitioners. Only unique visits, visits supplied independent of a visit to a dentist, are counted towards total labour force supply.

Note: Assumptions of standard projection: the dental hygienist projection was based on annual recruitment of 172 per year (including RTP) and a discounted supply rate of 20% of 2,182.25 per clinically practising hygienist. The dental therapist projection was based on annual recruitment of 90 (including RTP) and a supply rate of 2,174.85 per clinically practising therapist discounted by approx 50% of the estimated supply of school dental dentists. The dental prosthetist projection was based on annual recruitment of 30 and a supply rate of 3,317.79 per clinically practising prosthetist.

The following scenario investigates the impact on allied dental supply and the total dental labour force supply if numbers of hygienist and therapist graduates were to increase. The additional graduates are assumed to be evenly split across the two professions. The earliest that an increase in commencements could be realised is 2008; hence, increases in the stock of allied dental practitioners would be evident from 2010. Under this scenario, the additional contribution of allied dental visits to overall supply would be 1 million visits, 23.7% more than under the standard projection (Table 14). Aggregate supply for the total dental labour force would increase by 3.0% to 34.7 million visits.

Table 14: The impact of increasing therapist/hygienist graduate numbers from 2010 on the projected contribution of allied dental visits to total dental supply, 2005, 2010, 2015 and 2020

Scenario	2005	2010	2015	2020	Per cent increase over standard projection
Number of employed allied dental practitioners					
Standard projection					
Therapists	1,271	1,300	1,261	1,204	. .
Hygienists	831	1339	1705	1977	. .
+100 per year					
Therapists	1,271	1,350	1,517	1,613	34.0
Hygienists	831	1,339	1,925	2,358	19.3
Total allied labour force supply, number of visits (millions)					
Standard projection	4.06	4.31	4.35	4.30	. .
+100 per year	4.06	4.41	4.98	5.32	23.7
Total dental labour force supply, number of visits[a] (millions)					
Standard projection	29.52	31.41	32.84	33.70	. .
+100 per year	29.52	31.51	33.47	34.71	3.0

(a)   Includes visits provided by allied dental practitioners. Only unique visits, i.e. visits supplied independently of a visit to a dentist, are counted towards total labour force supply.

Note   Assumptions of standard projection: the dental hygienist projection was based on annual recruitment of 172 per year (including RTP) and a discounted supply rate of 20% of 2,182.25 per clinically practising hygienist. The dental therapist projection was based on annual recruitment of 90 (including RTP) and a supply rate of 2,174.85 per clinically practising therapist discounted by approx 50% of the estimated supply of school dental dentists. The dental prosthetist projection was based on annual recruitment of 30 and a supply rate of 3,317.79 per clinically practising prosthetist.

6.2 Changes in numbers of successful ADC candidates

Policies directed at increasing graduate numbers provide a reliable and long term supply outcome; however, the lead time is at least 5 years. In comparison, migration of overseas-trained dentists into Australia provides a solution with a shorter lead time.

Currently there are two pathways for overseas-trained dentists to gain registration in Australia. Dentists who gained their qualifications in the United Kingdom, Ireland or New Zealand are automatically recognised by state and territory registration boards. Entrants from other countries are required to pass the ADC's three-stage examination process taking approximately 2–4 years. Numbers of successful ADC candidates have increased markedly in recent years from 37 in 2002 to 158 in 2006. This is largely due to the following factors: there have been substantial increases in the numbers applying, dentist migration is encouraged, and they are able to apply to migrate via the professionals and other skilled migrant program as dentists have been included on DIMIA's 'Australia's skilled occupation list'. There have also been new preparatory programs developed to assist overseas graduates in successfully passing ADC exams, an increase in the number of locations where the examinations can be taken, and a higher frequency at which the examinations are offered.

In the future, the numbers of overseas-trained dentists may be influenced by migration policies and by world events, which may alter the attractiveness of Australia as a migration destination.

To explore the possible impact of changing numbers of ADC candidates, three scenarios were modelled: the standard projection assuming 100 ADC candidates per year, the second scenario assuming 50 candidates per year and the third scenario assuming 150 per year. The second scenario projects 4.8% less dentists than the standard projection, and 4.3% less visits supplied in 2020, or approximately 1.4 million visits. The third scenario projects that by 2020 there will be 4.3% more visits supplied than the standard projection (Table 15).

Table 15: The impact of changes in the numbers of ADC candidates, projected number of dentists and dental visits supplied, 2005, 2010, 2015 and 2020

Scenario	2005	2010	2015	2020	Per cent increase over standard projection
Number of employed dentists					
Standard projection (100 per year)	10,104	11,345	12,513	13,465	. .
50 per year	10,104	11,149	12,048	12,821	–4.8
150 per year	10,104	11,542	12,942	14,108	4.8
Total dental labour force supply, number of visits[a] (millions)					
Standard projection (100 per year)	29.52	31.41	32.84	33.70	. .
50 per year	29.52	30.95	31.87	32.27	–4.3
150 per year	29.52	31.86	33.82	35.12	4.2

(a)   Includes visits provided by allied dental practitioners. Only unique visits, i.e. visits supplied independently of a visit to a dentist, are counted towards total labour force supply.

6.3 Changes in dentists' attrition and retention rates

Research on dentists' job satisfaction has found that, while dentists are generally satisfied, there are areas of concern (Luzzi et al. 2005). Issues such as 'burn out', lack of autonomy and musculoskeletal complaints are perceived to be related to retention. Hence, it is not inconceivable that policies addressing these issues may influence the levels of attrition, either for the labour force overall or for specific age and sex subgroups.

Lengthening the working life of dentists

Dentist attrition rates are at their lowest for dentists in their forties and increase as they age (Figure 9), attrition of male dentists increasing from less than 1% in the 45–49 years age group to approximately 8% in the 60–64 years age group. Policies aimed at lengthening the working life of dentists until the age of 65 years may influence the relatively higher attrition rates observed in this age group.

To explore the effect of changes in the attrition rates for dentists aged 50–64 years of age, two scenarios were projected. In each scenario the attrition rates were incrementally adjusted over the period of the projection in order to simulate the gradual change that a policy initiative directed at influencing retention would incur.

The first scenario, low attrition, assumes that current attrition rates will incrementally decline and be 30% lower by 2020. The second scenario examines the impact if attrition was to increase by 30%.

Compared to the standard projection, the low attrition scenario would result in an estimated 1.6% increase in the total number of dental visits supplied (or 0.47 million visits). In contrast, the high attrition condition would result in an estimated 1.5% decrease in the number of visits supplied (or 0.50 million visits) (Table 16).

Table 16: The impact of changes in attrition rates of dentists aged 50 to 64 years, projected numbers of dentists and visits supplied, 2005, 2010, 2015 and 2020

Scenario	2005	2010	2015	2020	Per cent increase over standard projection
Number of employed dentists					
Standard supply projection (observed attrition rates)	10,104	11,345	12,513	13,465	. .
Low attrition (−30%)	10,110	11,398	12,658	13,736	2.0
High attrition (+30%)	10,099	11,293	12,375	13,215	−1.9
Total dental labour force supply, number of visits[a] (millions)					
Standard supply projection (current attrition rates)	29.52	31.41	32.84	33.70	. .
Low attrition (−30%)	29.53	31.52	33.14	34.23	1.6
High attrition (+30%)	29.51	31.29	32.56	33.20	−1.5

(a)   Includes visits provided by allied dental practitioners. Only unique visits, i.e. visits supplied independently of a visit to a dentist, are counted towards total labour force supply.

Decreasing attrition of female dentists

Currently the overall attrition rates for female dentists are on average higher than those for male dentists (estimated to be 4.8% for females and 3.6% for males). There is evidence in the wider workforce that female participation in the labour force is increasing. Women's participation in the Australian labour force is projected to increase in all age groups except the 15 to 19 years and 65 years or older groups. The largest increase in participation rates is expected to occur in the 55–59 years age group (ABS 1999). Therefore, it seems logical to expect that the same social and economic pressures shaping these trends in the wider workforce may also impact on female dentists, ultimately leading to increases in their participation rates. Alternatively policies may be implemented that specifically address retention of female dentists.

To explore the impact on supply if female dentist attrition rates were to decline, two scenarios were assessed. The first scenario assumes that the overall female attrition rate will become similar to male attrition by 2020. Hence, female attrition rates were reduced by 20% in each age group. In the second, more conservative scenario, female dentist attrition was reduced by 10% by 2020. In each scenario the attrition rates were incrementally adjusted over the period of the projection in order to simulate the gradual change that would likely occur.

Under the first scenario (20% decline) projected supply by 2020 would be 1.8% more than estimated by the standard projection and under the second scenario (10% decline) projected supply would total 0.9% more then the standard projection (Table 17).

Table 17: The impact of declining female attrition rates, projected number of dentists and dental visits supplied, 2005, 2010, 2015 and 2020

Scenario	2005	2010	2015	2020	Per cent increase over standard projection
Number of employed dentists					
Standard supply projection (observed attrition rates)	10,104	11,345	12,513	13,465	. .
Decline in attrition rates (−20% by 2020)	10,108	11,388	12,649	13,763	2.2
Decline in attrition rates (−10% by 2020)	10,106	11,366	12,581	13,611	1.1
Total dental labour force supply, number of visits(a) (millions)					
Standard projection (observed attrition rates)	29.52	31.41	32.84	33.70	. .
Decline in attrition rates (−20% by 2020)	29.53	31.50	33.13	34.31	1.8
Decline in attrition rates (−10% by 2020)	29.52	31.45	32.98	34.00	0.9

(a) Includes visits provided by allied dental practitioners. Only unique visits, i.e. visits supplied independently of a visit to a dentist, are counted towards total labour force supply.

6.4 Shifts in productivity trends

For the purposes of the supply projections, productivity is assessed in terms of visits supplied per dentist per annum. The average number of dentist visits supplied per year has been declining for the last four decades. The number of services per visit and the average length of a visit increased between 1983–84 and 2003–04, while the average hours worked per week remained stable (Table 1). It is considered unlikely that this trend will suddenly stabilise; however, the number of visits supplied cannot continue to decline indefinitely, and at some stage this trend should slow and stabilise. The standard supply projection assumes that visits supplied per annum will continue to decline at half the rate that was observed from 1983–84 to 2003–04, and this was considered a conservative scenario.

In order to show the impact of changes in productivity, two scenarios were produced. The high supply scenario assumes that the number of visits will remain static at the 2003–04 supply rate and therefore ignores the observed historical decline in productivity. The low supply scenario assumes that the number of visits will continue to decline at the same rate observed between 1983–84 and 2003–04, and the 'standard' supply projection assumes that decline will continue at half this rate. The high supply scenario predicts that there will be an additional 10.7% visits supplied in 2020 above the standard projection, an increase of 3.6 million visits (Table 18).

Table 18: The impact of changes in productivity and projected number of visits supplied, 2005, 2010, 2015 and 2020

Scenario	2005	2010	2015	2020	Per cent increase standard over projection
Number of employed dentists[a]					
Standard supply projection	10,104	11,345	12,513	13,465	. .
Total dental labour force supply, number of visits[b] (millions)					
High supply projection (no decline in productivity, supply rates remain static)	29.86	32.70	35.24	37.30	10.7
Standard projection (productivity declining at 50% observed rate)	29.52	31.41	32.84	33.70	. .
Low supply projection (productivity declining at 100% observed rate)	29.18	30.11	30.44	30.09	−10.7

(a)   Projected number of employed dentists is as per the standard projection under all productivity scenarios. Productivity scenarios vary the levels of visits supplied per dentists but there are no changes in the projected number of practitioners.

(b)   Includes visits provided by allied dental practitioners. Only unique visits, i.e. visits supplied independently of a visit to a dentist, are counted towards total labour force supply.

Note: The number of projected dentists does not alter under these scenarios as only the rates of supply are altered, (see Appendix B).

6.5 Summary

The projected supply for dental visits in 2020 is compared in Figure 19 according to the various scenarios presented in the previous sections against the 'no PCD growth' and 'half PCD growth' projections. All supply scenarios assessed except the 'continued decline in productivity' scenario exceeded the 'no PCD growth' projection (33.6 million visits) but none exceeded the 'half PCD growth 'projection (38.8 million visits) (Figure 19).

In summary, the standard supply projection was the most sensitive to differing productivity assumptions. The standard supply projection assumes that productivity will continue to decline but only at half the rate of decline observed in the previous two decades. The two productivity scenarios, that is 'no decline' and 'continuation of decline', serve to illustrate the extremes. The absolute difference between these scenarios and the standard projection is approximately 3.6 million visits by 2020, equates to approximately 1,300 dental providers (based on current productivity levels).

Increases in dentist recruitment beyond the standard projection recruitment levels (307 graduates per year) also resulted in substantial increases in supply above the 'no PCD growth' projection. If dentist graduates were to increase by 140 (totalling 447 graduates per year from 2013), excess supply above the 'no PCD growth' projection, would be 2.2 million visits by 2020. There would be approximately an additional 800 dental providers in comparison to the standard supply projection.

Changes in the numbers of successful ADC candidates have an immediate impact on supply relative to changes in domestic graduate numbers. Changes in ADC numbers can be increased without the lead-time associated with training dentists. However, projections based on 150 ADC candidates per year would only increase supply capacity by 1.4 million visits by 2020.

The standard projection model appeared least sensitive to changes in attrition rates. The scenarios examined were relatively conservative, with small changes being incrementally implemented to reflect the gradual impact of any attrition/retention-related policy initiative. Hence, if these changes in attrition did occur, they would have a greater impact on a supply projection that progressed for another decade, i.e. to 2030. Attrition may also be influenced by changes in social trends and expectations, or changes in macro-economic conditions. For example, it has been well documented that one of the key determinants of retirement intentions is the expected level of post-retirement income; consequently, if superannuation fund growth were to decline or shift negative, as it did in the early 1990s, retirement rates may be affected.

Increases in numbers of allied dental practitioners did not have as great an impact as similar increases in dentist graduates. Allied dental practitioners do not have the same level of productivity as dentists (in terms of visits supplied per annum). However, the limited impact of allied dental practitioner increases is largely an artefact of the discounting of allied dental visits so that their contribution to total aggregate supply reflects only the number of unique visits supplied by allied dental practitioners.

It is unlikely that these scenarios will occur in isolation as represented in the preceding sections. For the impact on supply if one or more scenarios simultaneously occur, refer to Appendix H.
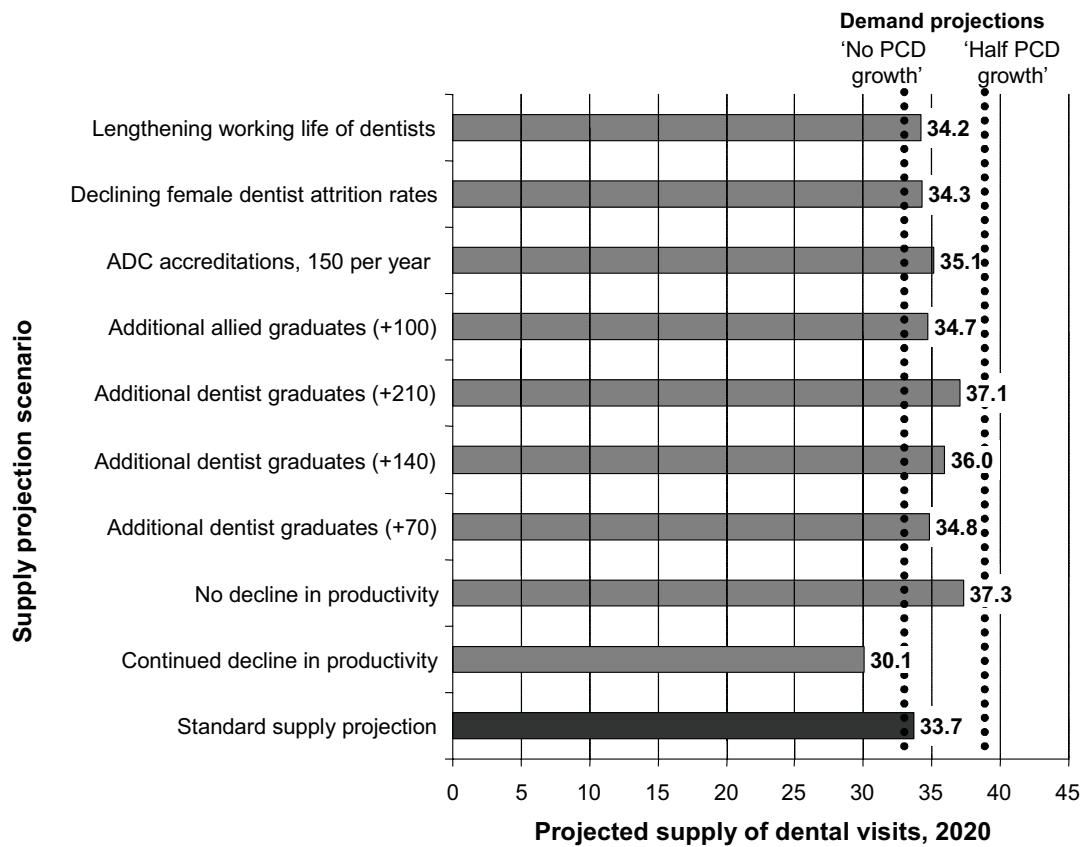
Notes

1. 'No PCD growth' projection estimates demand for dental visits to be 33.6 million visits by 2020. See section 3.4 for assumptions of 'half PCD growth' projection.

2. 'Half PCD growth' projection estimates demand for dental visits to be 38.8 million by 2020. See section 3.4 for assumptions of 'half PCD growth' projection.

3. Total dental labour force supply includes visits supplied by allied dental practitioners. Only allied visits supplied independently of a visit to a dentist are counted towards the total labour force supply.

Figure 19: Projected total number of dental visits supplied by various scenarios, 2020