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COST ESTIMATE OF A FEDERAL DENTAL CARE PROGRAM FOR UNINSURED CANADIANS



**OFFICE OF THE PARLIAMENTARY BUDGET OFFICER
BUREAU DU DIRECTEUR PARLEMENTAIRE DU BUDGET**

The Parliamentary Budget Officer (PBO) supports Parliament by providing economic and financial analysis for the purposes of raising the quality of parliamentary debate and promoting greater budget transparency and accountability.

In response to a request based on a motion from Mr. Don Davies (Vancouver Kingsway), this report estimates the cost of establishing a Federal dental care program for uninsured Canadians with a total household income below \$90,000 as of January 1, 2021.

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Executive Summary

In February 2020, the PBO received a request based on a motion from Mr. Don Davies (Vancouver Kingsway) to estimate the cost of establishing a Federal dental care program for uninsured Canadians with a total household income below \$90,000. The program is expected to start on January 1, 2021. Program parameters such as coverage, contribution requirements, and eligibility criteria were provided to the PBO as part of the request.

This report estimates the cost to the federal government of implementing a dental care program based on that request. The cost estimate incorporates the potential effects of a behavioural response, due to improved access to dental care. The estimate reflects PBO's latest labour market outlook, and the consequential eligibility impacts for unemployed individuals and their dependent children to the federal dental care program.

The scope of our analysis is limited to the federal government. Therefore, we do not estimate the savings to provincial and territorial health care systems from improved oral health, following the introduction of the proposed dental care program. We also do not account for the impact of such a program on other stakeholders such as private insurers and employers currently offering dental care insurance. Furthermore, our cost estimate assumes a private delivery mechanism, which means the federal government will not directly incur any of the capital or labour costs generally associated with operating a public delivery system.

We estimate that close to 6.5 million Canadians will benefit from the proposed program during the first year. The number of beneficiaries is expected to decrease to 6.3 million by 2025 due to changes in population age distribution and an improvement of labour market conditions.

After accounting for beneficiaries' contributions, PBO estimates that ongoing program costs for the federal government would average \$1.5 billion through to 2024-25. Furthermore, due to currently unmet dental care needs, the federal government will face a one-time upfront cost of around \$3 billion mostly to cover the treatment cost of untreated caries in the eligible population.

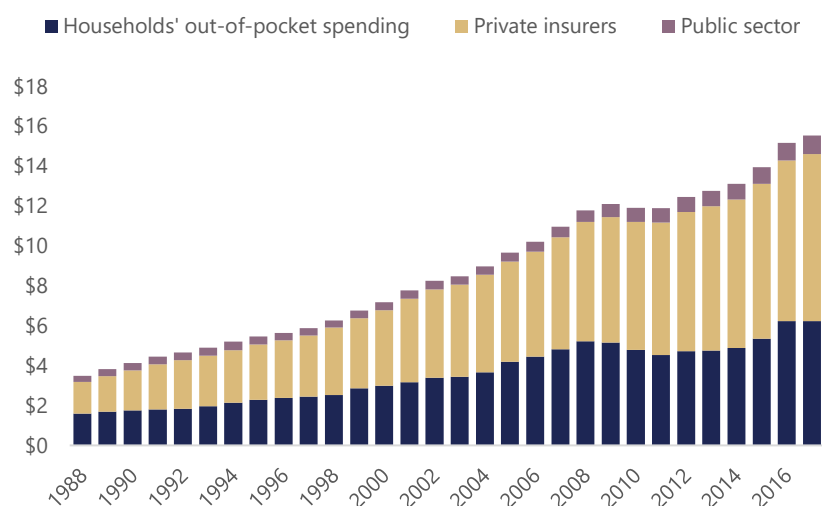
1. Dental care in Canada

In Canada, dental care is not covered under the Canada Health Act (Government of Canada, 1985), except for surgical-dental services.¹ As such, the vast majority of dental services is financed by the private sector, which includes private insurers and households.

Figure 1-1 shows that although public sector spending on dental care has increased over the years, going from \$311 million in 1988 to \$933 million in 2017, it still represents a small portion of national spending on dental care. Indeed, of the \$15 billion spent on dental services in 2017, only 6% was attributed to the public sector (federal, provincial and municipal governments).

Figure 1-1

Spending on dental care in Canada: 1988 to 2017
(\$ Billions)



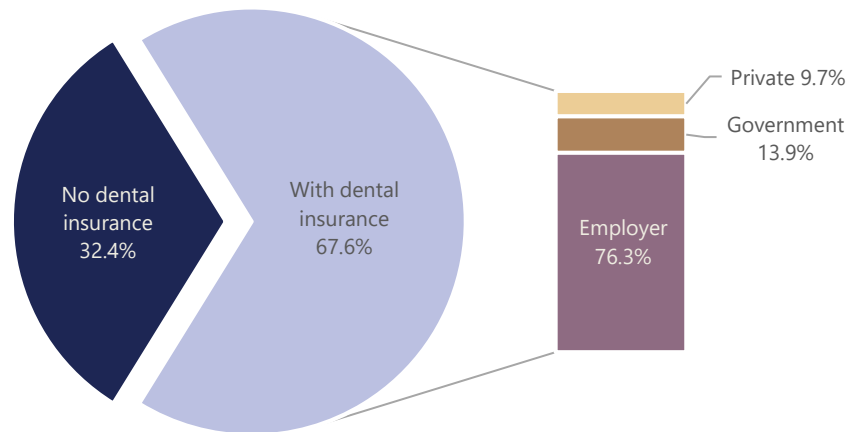
Source: Canadian Institute for Health Information, "National Health Expenditure Trends, 1975 to 2019".

It has been estimated that the share of dental services directly funded by the federal government represents around 35% of total public spending on dental services (Canadian Dental Association, 2017). Federal spending on dental care focuses on military personnel, veterans, federal prisoners, refugees, indigenous population, and members of the Royal Canadian Mounted Police.

The remaining 65% of public spending on dental care is attributed to provinces and municipalities which fund various dental care programs for Social Assistance recipients, children, seniors, or those with disabilities. A more detailed list of public health dental programs is available through the “2015 update of the Environment Scan of publicly financed dental care in Canada” (Shaw & Farmer, 2016).

As seen in Figure 1-2, around 32.4% of the Canadian population has no dental insurance, that is 12 million individuals. Among those who have insurance, 76.3% have dental insurance through their employer, 13.9% benefit from publicly funded dental insurance, while 9.7% have private insurance.

Figure 1-2 Projected dental insurance coverage in 2020



Sources: Statistics Canada’s Social Policy Simulation and Database/Model, 2013-14 Canadian Community Health Survey, Office of the Parliamentary Budget Officer.

The present report estimates the cost to the federal government of providing dental care to uninsured Canadians with a total household income below \$90,000 in 2021.

2. Scope of a Federal dental care program for uninsured Canadians

In February 2020, the PBO received a request to estimate the cost of establishing a Federal dental care program for uninsured Canadians with a total household income below \$90,000.² The program is expected to start in January 1, 2021.

The following program parameters were provided to the PBO:

- The plan's coverage would be similar to that of the Non-Insured Health Benefits (NIHB) program currently offered by the federal government
- There will be no cost-sharing for individuals with a household income under \$70,000 – costs would be fully-paid by government. Co-payments will be required for those with a household income between \$70,000 and \$90,000 income. The proportion of co-payment would increase linearly with each dollar of income up to 100% contribution by the individual with \$90,000 of household income
- All income thresholds will be indexed to inflation
- Existing provincial and territorial dental programs would continue
- By default, the program will be administered by the federal government, or by provinces and territories upon agreement.

The scope of our analysis is limited to the federal government. Therefore, we do not estimate the savings to provincial and territorial health care systems from improved oral health, following the introduction of the proposed dental care program.

We also do not account for the impact of the proposed program on other stakeholders, such as private insurers and employers currently offering dental care insurance. We assume that employers currently offering dental insurance as a part of their benefit package do not change or reduce their coverage in response to the new federal program. Therefore, the PBO's estimate does not incorporate the potential effects of personal and corporate income tax deductions associated with dental care expenses and insurance premiums.

Furthermore, our cost estimate assumes a private delivery mechanism, that is in private dental practices. This means the federal government will not incur any capital or labour costs, which would be the case with a public delivery system.³

Finally, due to constraints induced by data available from the Canadian Health Measures Survey (CHMS), the cost estimate excludes retreatment costs.

3. Estimation methodology

Our methodology aims to provide a cost estimate that accounts for population needs for dental care, as well as cost disparities across Canadians provinces and age groups. It was also important to produce an estimate within the framework of the request received by the PBO, with regards to income levels and eligible dental procedures. Appendices A, B and C provide detailed information about our data sources, model and assumptions. The present chapter provides an overview of our approach.

3.1. Eligible individuals

We first started by estimating the number of individuals who would be eligible to participate in the federal program when implemented. More specifically, individuals had to:

- have a household income under \$90,000 in 2021 (this income threshold was increased each year based on PBO's inflation forecast);
- be without dental insurance.

It is important to note that not all eligible individuals will participate in the program. Therefore, we used the proportion of the population making regular visits to dentists as a proxy for the share of eligible participants who would access the program (Health Canada, 2010).

3.2. Dental care needs and cost

Our model considers two categories of dental care needs: routine care and disease treatment. Routine care would consist of a dental exam, cleaning and polishing services. Disease treatment varies according to age and is based on the diseases identified through the CHMS for which coverage is available through the proposed program.

While routine care is provided to all beneficiaries each year, we assume that beneficiaries with treatment needs are cared for in the first year of the program. For subsequent years, treatment is only offered to beneficiaries entering a new age group.⁴ The total cost of care is then calculated as a function of projected procedure costs by province, population growth, and dental care needs.

3.3. Behavioural changes and administration costs

In Canada, the rate of dental care use increases with household income. The high cost of dental care services has often been cited as a reason for inequalities regarding access to care (Canadian Academy of Health Sciences, 2014). For instance, an estimated 17% of Canadians have avoided visiting a dentist for affordability reasons (Health Canada, 2010). With the introduction of a federal dental care program, we assume utilization rates will increase since income would no longer be a barrier to access. To measure this possible increase in utilization, we assume utilization rates for all beneficiaries reach those of high-income individuals, segmented by age group. This potential increase in utilization is considered as a behavioural response in our model and is included in our estimate for the cost of care.

Another behavioural response incorporated in our model is the inclusion of privately insured individuals to the federal program. This population is to be distinguished from individuals who have access to dental care through employer-sponsored plans. Our assumption is that, since privately insured individuals pay insurance premiums out-of-pocket, it is likely they will join the federal program once implemented because they are not required to maintain their existing dental insurance coverage.

In addition to these behavioural responses, we assume the federal government will support administration costs related to the processing of claims. These costs are calculated as a share of benefits paid, based on a similar ratio calculated for the dental portion of the federal Non-Insured Health Benefits program for First Nations and Inuit persons.⁵

4. Results

Total program cost is the sum of the cost of care and administration costs. The cost of care incorporates the effect of including individuals with private insurance in the proposed dental care program, as well as the behavioural responses anticipated through an increase in utilization rates and privately insured individuals joining the federal program.

The cost of care is relatively higher during the first calendar year of the program, thus reaching \$1.4 billion in 2020-21 and \$4.6 billion in 2021-22 (Table 4-1). These estimates are consistent with our assumption that pre-existing oral conditions will be treated in the first calendar year of the program, which would span across two fiscal years. The cost of care is then expected to average \$1.7 billion between 2022-23 and 2024-25.

Table 4-1 Cost of care (\$ Millions)

	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Cost without behavioural changes	1,090	3,579	1,246	1,283	1,361	8,558
Effect of privately insured joining the program	70	228	80	82	87	546
Effect of increased utilization	232	763	271	293	322	1,881
Cost of care	1,391	4,570	1,597	1,658	1,770	10,986

Source: Office of the Parliamentary Budget Officer.

Around 6.5 million Canadians (82% of the eligible population) are expected to benefit from the proposed federal program in 2021. The number of beneficiaries is expected to reach to 6.3 million by 2025, due to changes in population age distribution and improved labour market conditions.⁶

The average cost of care per beneficiary is highest in the first two fiscal years of the program, reaching \$570 in 2020-21 and \$512 in 2021-22. Starting in 2022-23, the average cost per beneficiary decreases to \$251. This latter figure is comparable to an average per capita cost of \$302 reported in 2018-19 for the dental portion of the NIHB (Government of Canada, 2020).

As shown in Table 4-2, including administration costs brings total program cost to \$1.4 billion in fiscal year 2020-21, and \$4.6 billion in 2021-22. Total program costs are then projected to decrease and average \$1.7 billion annually between 2022-23 and 2024-25.

Table 4-2 Net cost to the federal government (\$ Millions)

	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Cost of care	1,391	4,570	1,597	1,658	1,770	10,986
Administration cost	26	87	30	31	34	209
Total cost	1,418	4,657	1,627	1,689	1,803	11,194
Contributions	163	535	186	191	204	1,279
Net cost to the federal government	1,255	4,122	1,441	1,498	1,599	9,916

Source: Office of the Parliamentary Budget Officer.

Beneficiaries with household incomes between \$70,000 and \$90,000 represent 23% of the cost of care. Their contribution was estimated by applying a 50% contribution rate to their cost of care.⁷ Therefore, the savings resulting from beneficiaries' contributions will reduce total program costs by approximately 11% annually. After accounting for contributions, net program cost to the federal government is estimated at \$1.3 billion in fiscal year 2020-21 and \$4.1 billion in 2021-22 (Table 4-2). The net program cost is expected to average \$1.5 billion annually between 2022-23 and 2024-25.

4.1. Treatment costs

Except for the first calendar year, routine care costs represent the majority of the total cost of care (excluding administration cost and beneficiaries' contributions). Table 4-3 presents detailed costs for each type of care offered under the program.

Table 4-3 Cost per type of treatment (\$ Millions)

	2020-21	2021-22	2022-23	2023-24	2024-25
Routine care	369	1,473	1,465	1,479	1,536
Sealants	3	10	0	0	0
Fluoride treatment	2	6	0	0	0
Caries[†]	982	2,976	125	170	222
Edentulism	24	74	5	6	8
Periodontics	10	31	2	2	3
Cost of care	1,391	4,570	1,597	1,658	1,770

Source: Office of the Parliamentary Budget Officer.

Notes: [†] Caries include caries treatment for children and teenagers, treatment for coronal and root caries for adults. Total may not add due to rounding.

4.2. Sensitivity to procedure costs

It is possible that procedure costs increase faster or slower than we anticipate. Table 4-4 illustrates that a one percentage point increase in the growth rate of procedure costs would increase net program costs by 0.89% on average between 2020-21 and 2024-25. This would represent an increase of \$89 million over the projection period.

Table 4-4 Sensitivity of estimate to changes in procedure costs

	Net cost (\$M)	Sensitivity of net cost to the growth in procedure costs	Expected change in net cost (\$M)
2020-21	1,255	0.92%	12
2021-22	4,122	0.92%	38
2022-23	1,441	0.90%	13
2023-24	1,498	0.87%	13
2024-25	1,599	0.85%	14
Total	9,916		89

Source: Office of the Parliamentary Budget Officer.

Appendix A: Costing methodology

This appendix presents our data and general approach to costing the Federal dental care program for uninsured Canadians. Our approach is based on the treatment needs of the eligible population, as well as the types of procedures covered and population characteristics such as age, disease and location.

Data

The data used to produce our cost estimate comes from four main sources:

- **Canadian Health Measures Survey (CHMS)** provided information on disease prevalence based on age, details on affected teeth, and treatment information for some of the most prevalent dental conditions;
- **Statistics Canada:** a custom version of Statistics Canada's Social Policy Simulation Database/Model Health (SPSD/M Health) was used to extract population count by age group, income, province and dental insurance coverage status;
- **Telus Health Analytics' Dental Data Metrics:** this dataset contained approximately 700,000 dental procedures' claims to private insurers in 2018. It spans across various Canadian provinces and was used to compute the average costs of various dental procedures for adults and children;
- **Buck** provided information on the rate of increase in dental practitioners' fees between 2012 and 2019. This data was used to grow procedure costs obtained for 2018 through to 2025.

General assumptions and exclusions

We used a number of assumptions to supplement available data. They mainly relate to disease prevalence and treatments.

Disease prevalence

The disease parameters used in the model are from the CHMS (Health Canada, 2010) which aimed to provide *national* estimates for dental conditions that have a prevalence of 10% or higher for five age groups. For the purpose of producing this cost estimate, we extended national data to the provinces.

The CHMS did not provide information on the frequency or likelihood of retreatment. As such, this parameter is excluded from our cost estimate.

Treatment assumptions

We also made assumptions regarding the treatment of the diseases identified through the CHMS. These assumptions are based on data gathered from the survey itself, as well as literature review and discussions with academics specialized in dentistry. It is important to keep in mind that actual

treatment for some individuals could be different. More details on treatment assumptions are provided in Appendix C.

The model

The total cost of the plan depends on the following components:

- The cost of providing routine care
Based on most recent data available from the CHMS, most Canadians do not need dental treatment (Health Canada, 2010). As such, we assume they will be using the Federal program only for routine care, which will consist of a dental exam, cleaning and polishing.
- The cost of treating diseases affecting the beneficiaries
We assume individuals in need of dental treatment will be treated in the first year of the program, according to the disease prevalence rates obtained from the CMHS. Beneficiaries are treated according to the diseases affecting their age groups.
- Behavioural response
With the introduction of a federal dental care plan, we assume access to dental care services will no longer be constrained by income, and more people will participate in the federal plan. Therefore, we use the es observed for higher-income individuals to approximate the higher number of beneficiaries.

We also include individuals paying for private insurance (not-employer sponsored) in our target population as a behavioural response to the federal program.
- Administration costs
Administration costs are calculated as a share of benefits paid, including the effect of a behavioural response. This percentage is calculated based on data from the NIHB program and is estimated at 1.9% (Government of Canada, 2020).
- Beneficiaries' contributions
Beneficiaries with a total household income between \$70,000 and \$90,000 in 2021 are expected to contribute at an average rate of 50%. The income thresholds are adjusted each year to reflect inflation growth.

Cost of routine care

We assume that not all individuals who are eligible to the plan will access care. As such, we use the observed percentage of higher-income individuals making annual visits to the dentists to approximate utilization rates. These utilization rates are then used to estimate the number of individuals who will benefit from the plan.

For each age group i , and province j , we start by calculating the population under care (that is, beneficiaries) using the following equation:

$$Beneficiaries_i^j = Eligible\ population_i^j \times Utilization\ rate_i$$

For each age group within a given province, the cost of routine care is the product of *Beneficiaries* and *Procedure cost*. The total cost for this province is the sum of the cost of routine care for the various age groups:

$$Cost\ routine\ care^j = \sum_i (Beneficiaries_i^j \times Procedure\ cost_i^j)$$

The total cost of routine care for the federal government is the sum of *Cost routine care* of all provinces:

$$Total\ cost\ routine\ care = \sum_j Cost\ routine\ care^j$$

Treatment costs

According to the CHMS, only a small portion of the population needs treatment (*% with needs*). We assume the latter will all receive treatment in the first year of the program, while only new members joining a different age group will be treated the subsequent years. The population under care will be adjusted to account for this assumption.

Year 1: all individuals in need of treatment will be treated

$$Beneficiaries_i^j = Eligible\ population_i^j \times Utilization\ rate_i \times \% \text{ with needs}_i$$

Subsequent years: Only new individuals joining a new age group are eligible for treatment

$$Beneficiaries_i^j = \Delta\ population_i^j \times Utilization\ rate_i$$

With $\Delta\ population_i^j = Total\ population_i^j(t) - Total\ population_i^j(t-1) > 0$ being the net increase in the number of individuals within a specific age group, relative to the previous year.

Using the prevalence rates identified in CHMS for the general population, we derive the number of individuals affected by a disease k as follows:

$$Affected\ population_{i,k}^j = Beneficiaries_i^j \times Prevalence\ rate_{i,k}$$

For each type of disease identified, the treatment cost in a given province is calculated by multiplying *Affected population* by *Procedure costs* for each age group within the province. The treatment cost for each type of disease in this province is the sum of the treatment costs across age groups:

$$Treatment\ cost_k^j = \sum_i (Affected\ population_{i,k}^j \times Procedure\ cost_i^j)$$

Total treatment cost for the Federal government is the sum of *Treatment cost* of all diseases in all provinces:

$$Total\ treatment\ cost = \sum_k \sum_j Treatment\ cost_k^j$$

Appendix B: Types of dental care services

There are several types of dental care services available, and they can be grouped into nine major categories:

- **Diagnostic services** include services oral examinations and radiographs
- **Preventive services** include services such as cleaning (also known as scaling), polishing, sealants, and fluoride treatments
- **Restorative services** are concerned with the treatments for missing or damaged teeth. Procedures in this category include fillings, crowns, etc.
- **Endodontic services** concern with the morphology, physiology and pathology of the dental pulp and periradicular tissues. Root canal treatments are considered as part of these services.
- **Periodontal services** concern the diagnosis, prevention, and treatment of diseases and conditions of the supporting and surrounding tissues of the teeth or their substitutes and the maintenance of the health, function and aesthetics of these structures and tissues.
- **Prosthodontic services** concern the diagnosis, restoration and maintenance of oral function, comfort, appearance and health of the patient by the restoration of the natural teeth and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes.
- **Orthodontic services** concern the supervision, guidance and correction of the growing or mature dentofacial structures and the diagnosis, prevention and treatment of any abnormalities associated with these structures.
- **Adjunctive services** are considered as necessary treatment of a non-dental medical condition. Procedures include sedation and general anaesthesia.
- **Oral and maxillofacial surgery**, which is concerned with and in includes the diagnosis, surgical and adjunctive treatment of disorders, diseases, injuries and defects, involving the functional and aesthetic aspects of the hard and soft tissues of the oral and maxillofacial regions and related structures.

These definitions are based on information available from the Canadian Dental Association and the American Dental Association websites.⁸

Appendix C: Treatment assumptions

This appendix presents the treatment assumptions used to produce our cost estimate. The diseases under consideration for treatments are those described by the CHMS as the most prevalent among the Canadian population, and for which usable data is available.

Treatment assumptions also relied on the minimum basket of services covered as specified in the request received by the PBO: diagnostic services, including examinations and radiographs; preventive services, including scaling, polishing, sealants and fluorides; restorative services, including fillings and crowns; endodontic services, including root canal treatments; periodontal services, including deep scaling; prosthodontic services, including partial and complete dentures; surgery, including extractions; orthodontic services, including non-cosmetic braces; and adjunctive services, including sedation and general anesthesia.

There are two sets of dental care services offered: routine care and disease treatment.

Routine dental care

All individuals participating in the plan (after adjusting for utilization rates) will be receiving routine care. This consists of an annual dental exam, two units of scaling (cleaning) and one unit of polishing once a year.⁹

Disease treatment

The treatments vary according to age groups. CHMS data is available for five age groups: 6 to 11, 12 to 19, 20 to 39, 40 to 59, 60 to 79. To account for the remaining population outside of those groups, the first and last age groups have been grossed-up to factor in eligible population under 6 and over 79.

A common assumption to disease treatment is that all individuals requiring treatment will be eligible for a full set of radiographs.

Children (6 to 11)

- Sealant treatments are provided to children requiring such services, on four teeth;
- Fluoride treatments are applied for high risk children, which we assume to be those receiving sealants;
- Caries for this age group are mostly treated by amalgam restoration, according to available data. The remaining portion of the treatment will

consist of more advanced procedures: pulpotomy or pulpectomy or extraction, and anesthesia (Cameron & Widmer, 2013).

Teenagers (12 to 19)

- Sealant treatments are provided again on all four teeth previously treated for children aged 6 to 11;
- Caries for this age group are mostly treated by amalgam restoration. The remaining portion of the treatment will consist of a combination of procedures: root canal, crown, anesthesia.

Edentulous adults (20 to 79)

Individuals in this age group will benefit from removable partial or complete dentures, according to the share of the affected edentulous population using dentures. Other types of prosthetics are not covered by the plan.

Dentate adults (20 to 79)

Individuals in this age group are mainly affected by coronal caries, root caries, and severe periodontal disease.

- The large majority of caries are treated by amalgam restoration and extraction (coronal caries only). The remaining portion of the treatment will also consist of a combination of procedures: root canal, crown, anesthesia;
- Individuals suffering from severe periodontal disease will receive root planing and cleaning services (two units of each).

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Notes

1. Surgical-dental services refer to any medically or dentally required surgical-dental procedures performed by a dentist in a hospital, where a hospital is required for the proper performance of the procedures (Government of Canada, 1985).
2. M-20 Dental care plan for uninsured Canadians, [https://www.ourcommons.ca/members/en/don-davies\(59325\)/motions/10618899](https://www.ourcommons.ca/members/en/don-davies(59325)/motions/10618899) (accessed March 18, 2020).
3. In Finland, for example, 45% of dentists and dental hygienists work in the public sector (Labrie, 2015).
4. The implicit assumption is that these new entrants will have the same disease prevalence of their new age group, regardless of the fact they might have been treated for diseases affecting the members of their previous age group.
5. Costs related to the processing of dental claims represented approximately 1.9% of dental benefits paid by the NIHB in 2018-19 (Government of Canada, 2020).
6. The number of eligible individuals decreases by the end of the estimation period as labour conditions improve.
7. Beneficiaries only contribute to the cost of care, not to administration costs.
8. See http://www.cda-adc.ca/en/oral_health/specialties/ and <https://www.ada.org/en/publications/cdt/glossary-of-dental-clinical-and-administrative-ter#d> (both accessed on March 3, 2020).
9. Units refer to time. For instance, for cleaning and polishing services one unit of time equals 15 minutes.