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Income-tested and in-kind: The material wellbeing effects of the Canadian Dental Care Plan¹

Geranda Notten²

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² Graduate School of Public and International Affairs, University of Ottawa, 120 University Private, Ottawa, Ontario, Canada, K1N 6N5; e-mail: gnotten@uottawa.ca.

Abstract

Rich countries increasingly rely on income-testing and their income-tax system to deliver both cash and in-kind transfers to recipients. This research measures the material wellbeing effects of the Canadian Dental Care Plan (CDCP) that was introduced in 2023. Using four measures of material deprivation, it reveals material wellbeing effects that are either missed entirely or are misestimated by income (poverty) measures. It further demonstrates three new Cost-Effectiveness Ratios (CER) that further contribute to filling current evidence gaps. The CDCP is income-tested and covers dental care costs of households with an income below \$90,000 who do not have a dental plan. Using microdata from 2023 and 2025, the research uses the staggered introduction of the CDCP and the doubly robust difference-in-difference estimator to estimate the impact of the CDCP on seniors. The research estimates that the CDCP reduced the incidence of dental care deprivation among seniors by 8.7 percentage points, which amounts to a 62 percent decline compared to the 2023 baseline. Further estimates indicate, among others, that the CDCP averted close to 700 thousand cases of dental care deprivation at a cost of about 50 million dollar per percentage point reduction in dental care deprivation. This suggests that the CDCP made a substantive contribution toward addressing the specific barrier it was designed to reduce. More broadly, this research shows that outcome-based measures of material wellbeing, such as dental care deprivation, provide unique insights on the material wellbeing effects of social and health programs and thereby also offer novel opportunities for assessing their cost-effectiveness.

Keywords: *Material deprivation, dental care deprivation, oral health, program evaluation, cost-effectiveness, social policy, health policy, income-testing, in-kind transfers, Canadian Dental Care Plan (CDCP).*

JEL Classification: *I31 General Welfare, Wellbeing, I32 measurement and Analysis of Poverty, I38 Government Policy; Provision and Effects of Welfare Programs*

1. Introduction³

Rich countries increasingly rely on income-testing and their income-tax system as part of their efforts to deliver cash and in-kind transfers to recipients (Ferrarini, Nelson, and Höög 2013; Petit, Tedds, and Robson 2026). Measuring the effectiveness of in-kind transfers is challenging because the metric used to determine eligibility (income) may not or only partially capture the program's effect as in-kind transfers reduce the need to spend rather than increase their income (Notten, G. and Kaplan 2021). This research provides important insights for policymakers by demonstrating material wellbeing effects that are missed entirely or are misestimated by income (poverty) indicators.

This research measures the effects and cost-effectiveness of the Canadian Dental Care Plan (CDCP) on material wellbeing using four material deprivation indicators capturing material outcomes. The CDCP provides partial or full coverage of dental care costs of households with an income below \$90K who have no dental plan and uses the income tax system for the income-test. The dental care program was rolled out gradually and initially focused on seniors (Government of Canada n.d.).

The research uses secondary data on material deprivation, household income (categorical, self-reported, before taxes), and various respondent and household characteristics collected by national charity Food Banks Canada in the spring of 2023 and 2025. It uses the gradual roll out of the CDCP to identify its effect on seniors using working age respondents aged 25-64 not living with children under the age of 18 as a control group and thereby provides an estimate of the intention to treat (ITT). A doubly robust difference-in-difference estimator estimates the program's effects in terms of dental care deprivation status, the number of deprivations, and material deprivation status. The Gross, Marginal and Incremental Cost-Effectiveness Ratios (CER) are based on the estimated program effects and are combined with custom program information provided by Health Canada.

The research finds that the CDCP reduced the incidence of the dental deprivation item among seniors by 8.7 percentage points (± 5.1), which amounts to a 62 percent decline compared to the 2023 baseline. The CDCP also reduced the overall number of deprivations of seniors with 0.22, but this effect did not translate into a statistically significant reduction of the overall material deprivation rate. The study estimates that the CDCP averted 694,397 cases of dental care deprivation, at a cost of 50.1 million dollar per percentage point reduction in dental care deprivation (incremental CER). On a per case basis, estimated costs of reducing dental care deprivation are \$2,776 (gross CER) and \$1,068-2,137 (marginal CER). Outcome-based measures of material wellbeing, such as dental care deprivation, provide unique insights on the material

³ AI statement: I acknowledge that Microsoft Copilot was used as a research assistant to support this work. Specifically, it was employed as one support in addition to traditional research tools and activities to help identify relevant sources, suggest coding approaches, engage in discussions of methodological options, interpretation of results and write up. All outputs were critically evaluated and independently verified by the author.

wellbeing effects of social and health programs and thereby also offer novel opportunities for assessing the cost-effectiveness of such programs.

This study starts off with a review of the role of income-testing in social policy, its strengths and weaknesses and is followed by a description of the CDCP's introduction, its key features and a review of oral health in Canada. Subsequent sections discuss the data, methodology, results and end with a concluding discussion.

2. Income, material wellbeing and income tax systems as a social policy instrument

Income tax systems have increased in importance as an instrument of social policy in Canada and elsewhere (Béland 2019; Ferrarini, Nelson, and Höög 2013; Morel, Touzet, and Zemmour 2018; Pavolini, Jessoula, and Natili 2024; Petit, Tedds, and Robson 2026). Adding a distributive purpose to the tax system's traditional role of revenue generation, this fiscalization of welfare takes various forms. First, the system delivers cash transfers and reduces tax burdens through tax returns to meet social goals (Barrios et al. 2020), such as supporting families with the costs of raising children or persons with a disability with the higher cost of meeting needs. Compared to the visibility of spending on programs and social security contributions, social tax expenditures are much more hidden (Hacker 2002; Mettler 2011), which in turn explains the attractiveness of their use to build consensus across party lines, particularly in the context of budget austerity and strong control of public expenditures (Morel, Touzet, and Zemmour 2018). Second, and often used in conjunction with tax expenditures, is income-testing, which involves using the information from the income tax system to determine the eligibility for a program and the level of support received through it (Petit, Tedds, and Robson 2026). These supports can be cash or in kind (Barr 2020), with the Canada Dental Care Plan being an example of the latter.

Governments' capacity to administer and capture taxes from income has increased with advances in information technology and a diminished importance of cash money in the economy. While this means there is potential to target specific populations through the tax system by using its information on income, family composition and labour market attachment, one also risks perceiving this capability as more accurate than it is in reality (Notten, G. and Kaplan 2021; Notten and Sène 2025).

First, income is not that accurate a measure of a family's actual living standard (Notten, G. and Kaplan 2021). This is because income is only one financial resource with savings, access to credit and financial help from family and friends being alternatives. Similarly, servicing debt reduces one's income leaving less to finance current needs. Moreover, families' needs and circumstances differ in myriads of ways that go well beyond the information collected through the tax system. The result is that families who look identical for in the eyes of income tax system, may require different levels of financial resources to meet the same basic needs thus culminating different living standards. Second, even in countries like Canada, about 10-12 percent of potential tax filers do not file taxes and therefore miss benefits they would otherwise receive (Robson and Schwartz 2020).

Outcome-based measures of material wellbeing, such as material deprivation, outperform income in tracking living standards as they measure adverse outcomes that arise due to a lack of money. Poverty research consistently shows that such measures provide new insights in material wellbeing (Alkire 2015; Fusco, Guio, and Marlier 2011; Nolan and Whelan 2010; Notten, G. and Kaplan 2021; Saunders and Brown 2020). Research comparing income poverty and material deprivation indicators consistently shows that measurement errors are substantial (Alkire 2015; Bossert, Chakravarty, and D'Ambrosio 2013; Fusco, Guio, and Marlier 2011; Nolan and Whelan 2010; Notten 2015; Notten et al. 2024; Notten, G. and Kaplan 2021; Scott et al. 2022), with the number of false negatives (households mistakenly counted as not poor by income poverty measures) often outweighing the number of false positives (households mistakenly counted as poor). Recent research for Canada suggests that there may be about two times as many false negatives than false positives (Notten et al. 2024). This is why many governments in OECD countries routinely collect material deprivation data so they can use the resulting indicators as a complement to income indicators (Notten, G. and Kaplan 2021).

It is therefore important to cross-validate program design and evaluation with outcome-based measures, and particularly when income is used to identify the target group and the generosity of support, as missing material wellbeing effects makes such programs look less beneficial and more costly (Notten, G. and Kaplan 2021). First, social policy evaluations based on income indicators may partially or entirely miss effects of *in kind benefits* that reduce households' need to spend, such as subsidized day care and subsidized dental care (Notten, G. and Kaplan 2021). Second, they may also not count program benefits experienced by materially deprived families as poverty reduction when families' income is above the income-poverty threshold (Notten, G. and Kaplan 2021; Notten and Sène 2025). Third, the income thresholds used to determine eligibility could still leave out many families experiencing adverse outcomes in living standards, such as being unable to afford basic dental care. All aspects play a role in the Canadian Dental Care Plan as it is income-tested, provides in kind transfers, and the level of insurance coverage depends on the level of income.

In sum, an overreliance on income as a measure of material wellbeing affects i. the understanding of material wellbeing and lack thereof in society, ii. governments' capacity to reach their intended target group through program design and iii. estimates of the costs and benefits of programs through program simulations (before implementation) and evaluations (after implementation). This, in turn, could have policy implications. It could lead to policy designs that are too narrowly targeted by undercounting benefits of broader, more universal, schemes. It could also lead to certain policy tools being underused or undervalued in their capacity to (also) improve material wellbeing such as those that work through reducing the need for family spending by providing in kind transfers / subsidies.

3. The Canadian Dental Care Plan and the context of dental care in Canada

The Canadian Dental Care Plan (CDCP), launched in December 2023, aims “to make dental care accessible and affordable for eligible Canadian residents”(Government of Canada n.d.). The

program fulfills a commitment made by the minority Liberal government as part of its Supply and Confidence Agreement with the NDP (Prime Minister of Canada 2022) and builds on evidence that millions of Canadians suffer from poor oral health because they cannot afford the costs of oral care (Quiñonez 2014), with many of them having no dental plan (Abdelrehim and Singhal 2024).

The CDCP covers families with an adjusted annual family net income (AFNI) under \$90,000 who do not have a private dental plan (Government of Canada 2024, n.d.). [It] “covers essential services such as diagnostic and preventive services, basic services such as restorations, endodontic procedures, periodontal services, and extractions, and major services such as crowns, removable prosthodontic services, and oral surgery.” (Public Health Ontario et al. 2025, p. 20). Treatments are fully covered for incomes below \$70K while there is a co-payment of 40% and 60% respectively for incomes between 70 to under 80K and 80K to under 90K. Costs are covered up to the maximum allowable fee, which is often lower than billed costs (Public Health Ontario et al. 2025, p. 23).

The CDCP is funded by Health Canada under its Health Care Systems core responsibility and is administered by the Oral Health Branch. Service Canada is responsible for managing program applications and annual renewals, whereas Sunlife handles claim management with dentists’ offices. To become and stay eligible beneficiaries need to file income taxes and renew their application annually. The program can be combined with provincial / territorial programs, with coordination taking place between federal and provinces’ dental programs and the federal government being the first payer (Public Health Ontario et al. 2025).

Table 1: Timeline roll-out Canadian Dental Care Plan and Food Banks Canada surveys

2023, April-May	Baseline data (N=4,625)
2023, December	CDCP enrolment opens for seniors aged 87+ with the age limit reduced monthly.
2024, May	CDCP enrolment opens for seniors aged 65 to 69 and access to care starts for those enrolled.
2024, June	CDCP enrolment opens for individuals qualifying for a Disability Tax Credit, and children under 18.
2025, February-March	Post-treatment data (N=10,000)
2025, May	CDCP expanded to all remaining eligible Canadians

Source: Food Banks Canada (Food Banks Canada n.d.; Notten et al. 2024), Public Health Ontario et al (2025, p. 7), Government of Canada (n.d.).

The CDCP enrollment was staggered starting with seniors age 87 and up in December 2023 and, with monthly reductions in the eligible age, including all seniors aged 65 and up in May 2024 (Table 1). Access to care through the CDCP began in May 2024. Since June 2024, other new

beneficiaries included individuals qualifying for a Disability Tax Credit and children under 18.⁴ As of May 2025, all remaining eligible Canadians qualified (Public Health Ontario et al. 2025).

The CDCP represents a significant expansion of Canada's welfare state. By the end of March 2025, over 3.4 million Canadians had been approved for coverage under the CDCP, with approximately 1.7 million receiving at least one dental service at 98% of participating oral health providers (Government of Canada n.d.). At the time of writing up this research, there were over 6.5 million approved applicants with over 4.5 million applicants receiving care (Government of Canada 2026b). At full enrollment, the program is expected to be serving around 9 million Canadians (Government of Canada n.d.). During the 2024-25 fiscal year, the CDCP comprised 27 percent of Health Canada's funding under the Health Care Systems core responsibility, amounting to about 2 billion dollars (Government of Canada n.d.).

Costs are a major barrier to accessing basic oral health care in Canada with many foregoing out-of-pocket spending on dental care (Gondro et al. 2025). Unlike in many other OECD countries where basic oral health care is part of publicly mandated health insurance, basic oral health care (like pharmacare) was historically excluded from provincial and territorial health insurance programs in Canada (Lexchin 2022). This exclusion of oral health from public mandated health insurance leaves many persons and their dependents planless, with persons aged 65 and up being by far the demographic with the lowest dental plan coverage (Lovei and Abdille 2025; Statistics Canada 2025). We highlight three reasons for the large number of planless Canadians. First, while employers get tax advantages if they offer dental insurance, employers are not obliged to provide it leaving many typically more vulnerable and self-employed workers without coverage (Lovei and Abdille 2025). Second, while "all jurisdictions have some form of needs-based dental care", they exclude many planless persons because they are targeted to specific populations such as children, social assistance recipients, seniors, and persons with disabilities (Farmer et al. 2022, 9) and the income thresholds are much lower than the CDCP's adjusted family net income threshold of \$90,000 (Canadian Dental Association 2023). Third, while private plans are available, ongoing spending on such plans competes with spending on other basic needs and still requires out-of-pocket spending when accessing dental care services (Gondro et al. 2025; Notten, G. and Kaplan 2021; Proaño et al. 2025).

By reducing the cost-induced barrier to accessing a basic service, the CDCP is expected to have downstream benefits in terms of health, material wellbeing and opportunities for beneficiaries, and at a health care system level (Vujicic et al. 2024). Expected health benefits include reduced pain, discomfort and disability (Quiñonez 2014) and not having to avoid eating foods because of mouth problems (Statistics Canada 2025). Another material wellbeing benefit could involve the freeing up of money for other essentials for families with few(er) financial resources, who would otherwise be paying for dental care services out of pocket (Notten, G. and Kaplan 2021; Proaño et al. 2025). Poor oral health also negatively affects many aspects of life such as performance at school and in the workplace and quality of life (CAHS 2014). The program is also expected to reduce pressures on the free hospital emergency treatments, which function as a last resort for

⁴ Children under 12 in <90K families were already covered since 2022 via the Interim Canada Dental Benefit (Flood et al. 2023)..

those who cannot but postpone needed treatments because they cannot afford dental care, and the overuse of physicians, in order to access antibiotics and opioids (Levy, Goodman, and Eskander 2023; Quiñonez 2014; Yalnizyan and Aslanyan 2011).

Even with the CDCP, there will remain dental care coverage gaps in the population. Individuals with access to private dental insurance are excluded from the CDCP (Government of Canada 2023; Lovei and Abdille 2025), even though private plans vary considerably in generosity (Bremo n.d.; Canadian Dental Care n.d.). Many plans include co-payments, annual reimbursement maximums, and limits on major restorative or orthodontic services, implying that access to private coverage does not necessarily guarantee more comprehensive financial protection than the CDCP and still requires out-of-pocket spending (Government of Canada 2026a). Moreover, actual out-of-pocket payments for CDCP beneficiaries tend to be higher because dental associations have higher recommended fees than those allowed by the CDCP (Public Health Ontario et al. 2025). Finally, none of the government sources explicitly mention that the income threshold of 90K will be adjusted for inflation, which will lead to the erosion of program eligibility over time. Given that the 90K threshold was already mentioned in 2022 (Flood et al. 2023), the income eligibility threshold should be 100.5K in 2026 when accounting for a cumulative consumer inflation of about 11.6 percent over four years.

This paper studies the effect of the CDCP on material wellbeing using various outcome-based measures of adverse material wellbeing that are indicative of a poverty level living standard (Notten et al, 2024). Income-based poverty measures, such as Canada's official poverty measure, cannot capture such effects. This study therefore measures progress on poverty reduction that would otherwise be missed and demonstrates how these effects can feed into a baseline for cost-effectiveness analyses.

4. Data and methodology

This study uses online survey data collected in the spring of 2023 (N=4,750) and 2025 (N=10,000). These cross-sectional data are anonymized and were collected using quota sampling (oversampling small provinces and groups such as persons identifying as Indigenous and single parents) and include a population weight that aligns the sample with the 2021 Census. National charity [Food Banks Canada](#) funds the annual collection of these data and worked with market research companies Elemental DCI (2023) and Pollara (2025) for survey implementation, data cleaning and collection (Food Banks Canada n.d.; Notten et al. 2024; Ozga et al. 2026). Both surveys hold information on material deprivation, household income (categorical and self-reported before taxes), and various respondent and household characteristics (e.g., gender, race, education, country of birth, employment status, household type, household size, number of children, home ownership).

The timing of these two surveys aligns well with the timing of the roll out of the CDCP (Table 1). The 2023 survey functions as a baseline at approximately 6 months before the start of program enrollment and 12 months before the start of access to care. The 2025 survey is expected to capture the treatment effects at about 9-10 months after the program became

available to all seniors. Since the program requires filing income taxes, an application, finding a dentist accepting CDCP patients, and receiving care, this time span seems an appropriate minimum for measuring post-treatment effects. It is likely that not all eligible seniors already had been enrolled in the spring of 2025.

This paper measures the effect of the CDCP on seniors as they were the first demographic to access the program. Unfortunately, the data do not allow for a precise assessment of program eligibility: there is no information on whether respondents have a dental plan and their self-reported income is only available as a categorical variable (rather than the very specific income definition used to assess program eligibility). This paper therefore defines seniors aged 65 and up as the treatment group, which yields an estimate of the intention to treat (ITT). As a robustness check, a secondary definition includes seniors whose self-reported income is below 100K. While still being an estimate of the intention to treat, the estimated effect under this second definition is expected to be larger because it excludes seniors that are less likely to qualify. This study further includes two ‘placebo’ groups focusing on seniors who are much less likely to qualify, namely those having an income above 100K or 150K. The CDCP should not affect these high-income seniors. The placebo groups can thus assess the presence of a generic age trend even though they cannot rule out a low-income-specific differential trend.

Table 2: Sample size, by year and treatment / control (T/C) group definitions

	2023	2025	Total
T/C1: Age only	2,674	5,617	8,291
- Treatment: Age 65+	794	1,748	2,542
- Control: Age 25-64 & no children	1,880	3,869	5,749
T/C2: Age and income	2,057	3,733	5,790
- Treatment: Age 65+ & income <100K	661	1,323	1,984
- Control: Age 25-64, no children & income <100K	1,396	2,410	3,806
T/C3: ‘Placebo’ seniors and income (100K)	1,529	2,635	4,364
- Placebo: Age 65+ & income ≥100K	133	425	558
- Control: Age 25-64, no children & income <100K	1,396	2,410	3,806
T/C4: ‘Placebo’ seniors and income (150K)	1,438	2,555	3,993
- Placebo: Age 65+ & income ≥150K	42	145	187
- Control: Age 25-64, no children & income <100K	1,396	2,410	3,806

Source: Author’s calculations.

Note: Sample sizes for preferred regression model (model 3) takes account of observations lost due to missing values in outcome variables (dental care item) and self-reported income category.

The control group are adult respondents aged 25-64 who live in a household that does not include children under the age of 18. Children living in families meeting the income and dental plan criteria were able to enroll as of June 2024 and were therefore excluded (Table 1). A second definition restricts the control group further to those with an income below 100K. The data hold

no information on whether respondents of working age were eligible for the Disability Tax Credit (DTC) and would thus also qualify for the CDCP as of June 2024. It is therefore expected that the control group includes some individuals qualifying for and potentially benefitting from the CDCP. Given the relatively low proportion of working age individuals qualifying for the DTC (Zwicker 2025), this contamination is likely to be a small fraction of the overall control group.

Table 2 lists the sample sizes for all treatment / control group definitions. Sample size declines considerably when restricting the analysis to seniors of different income levels. Since this study works with secondary data, it does not report statistical power as post-hoc power calculations do not provide new insights compared to the statistical significance tests of the parameter of interest and its confidence interval (Dziak, Dierker, and Abar 2020). It should also be noted that the income information in our survey is not comparable to the definition used by the Canada Revenue Agency (Adjusted Net Family Income). The survey income is self-reported income before taxes and only available in broad categories and is thus a very crude proxy at best.

The outcome variables in this study are measures of material deprivation. Material deprivation is an outcome-based concept of poverty, reflecting the inability to afford the goods, services and activities that many view as necessary for attaining a basic living standard (McKnight et al. 2024; Notten, G. and Kaplan 2021; Townsend 1979). The concept focuses on the adequacy of financial resources commanded by households to access necessities that are predominantly purchased on markets. What are considered necessities reflects the views of Canadians, including those with lived experience (Notten et al. 2024). This research uses the Canadian material deprivation scale developed by Notten et al (2024), which followed the methodology used for the European Union’s official material deprivation indicator (Guio et al. 2016). The Canadian scale holds 11 items. Table A1 in the annex lists the survey questions for each item and the item incidence rates by treatment / control groups and year.

This study uses four measures of material deprivation: the percentage of persons that cannot afford regular dental care at least once a year⁵, one of the items on the scale, the percentages of materially deprived persons measured at thresholds of respectively two and three deprivations, and the average number of item deprivations. Table 3 displays the level of material deprivation outcomes for each treatment / control group definition and year. Irrespective of the measure, deprivation levels are much lower for seniors compared to working age adults not living with children under the age of 18. Deprivation levels are also higher for persons with lower incomes. Deprivation levels between 2023 and 2025 are either constant or increase for most groups and indicators, except for dental care deprivation, which declines substantively for the treatment groups (Table 3, T/C 1 and T/C2 and Figure 1).

This main results of this paper use the improved doubly robust differences-in-differences (DiD) estimator (Sant’Anna and Zhao 2020) and compare changes in material deprivation outcomes for seniors (65+) to those for working-age adults between 2023 (pre-policy) and 2025 (post-policy).

⁵ The survey question asks whether “...everyone in your household is able to get regular dental care, including teeth-cleaning and fillings, at least once a year” (Notten et al. 2024).

The paper also shares estimates using a traditional DiD estimator and a logit estimator. The traditional DiD and outcome regressions of the doubly robust DiD are estimated using an Ordinary Least Squares estimator. Since the CDCP was introduced first to seniors (Table 1), identification relies on comparing conditional parallel trends over time between the eligible age group and a younger, (largely) ineligible comparison group using a standard DiD interaction term. Concerns of staggered-adoption DiD designs regarding forbidden comparisons and negative weights do thus not apply here (Roth et al. 2023). The study performs graphical and formal checks for balance and overlap to assess the validity of the doubly robust DiD estimator.

Having only one pre-treatment data point precludes running established methods for assessing the validity of the conditional parallel trends assumption (Rambachan and Roth 2023). Instead, this research compares trends of food insecurity statistics between age groups. Food insecurity reflects the inadequate or insecure access to food due to financial constraints and is also an indicator of material deprivation (Notten, Liu, and Tarasuk 2025). Statistics Canada started collecting nationally representative food insecurity since 2019, with 2025 being the most recent statistics available (Statistics Canada 2026). This research also reviews whether there were other significant changes disproportionately or exclusively affecting seniors at provincial and federal levels between 2023 and 2025.

The models are estimated in Stata 19⁶ and include control variables to improve precision, to adjust for composition changes across repeated cross-sections (income category (only for treatment / control definition 1), household size, home ownership, education level) and help mitigate differential trends correlated with observables (country of birth, Indigenous, race, province). Table 4 displays the sample characteristics used to differentiate between treatment and control groups (age and income category) and as control variables. Whereas compositional changes in the share of age groups and province are small by design (these characteristics are used in the survey's quota sampling strategy), they are substantive for some of the control variables therefore warranting testing for the need of their inclusion in the model. Unless reported otherwise, all results are obtained using the survey weights that align the cross-sectional samples with the 2021 Census.

Cost-effectiveness calculations are based on three metrics that focus on the public payer perspective (Bardach and Patashnik 2023). As it is not common practise to use deprivation outcomes in cost-effectiveness calculations, this research therefore contributes to the literature by providing baseline estimates for such metrics.

The first metric is the gross Cost Effectiveness Ratio (CER) which expresses the costs per additional senior able to afford dental care and is calculated as follows:

$$1) \text{ Gross CER} = \frac{\text{Program cost (\$)}}{\text{Number of dental care deprivation cases averted}}$$

Where: Number of dental care deprivation cases averted = $A = N * \Delta p$

⁶ Using reg (DiD), drdid drimp (doubly robust DiD), logit (non-linear for limited dependent variables), nbreg (for the count variable) and teffects ipw followed by tebalance summarize for the formal balance test.

The number of dental care deprivation cases averted (A) is based on the doubly robust difference-in-difference estimate of program impact, reflecting the change in the probability of being able to afford regular dental care (Δp)⁷ and the number of seniors in Canada (N). Information on the program costs is senior specific and applies to the period covering May 2024 to June 2025. These numbers, not available in Health Canada's departmental results report, were provided by its Oral Health Branch for the purpose of this study.

The gross CER reflects the all-in budget cost per case as its calculation folds the spending on beneficiaries who did not experience dental care deprivation before the plan or who remain deprived after accessing the plan into the costs per case averted. The calculation also implicitly assumes that the cost of claims paid per beneficiary does not vary between beneficiaries who were not experiencing dental care deprivation before the CDCP and those who did. This assumption is likely violated, with average claim amounts likely being higher among those who experienced dental care deprivation before the program. This is because their CDCP access enables the fulfilling the backlog of previously unmet dental care needs (Parliamentary Budget Officer 2020).

This study therefore also reports the marginal CER, which estimates the incremental resource cost of averting a typical case of dental care deprivation. Ideally, this requires information on the dental care costs of CDCP beneficiaries receiving care who did not have a dental plan before (e.g., the average claim paid per member for this subgroup of beneficiaries). As this information is not available, this study instead projects a marginal CER range based on the size of the backlog premium (k).

2) Marginal CER = $k \times \text{average claim per beneficiary receiving care (\$)}$

Where k varies from 1 to 2. A value of one implies that previously deprived beneficiaries receiving care have the same claim amounts as previously non-deprived beneficiaries. A value above one means that that average claim amounts of previously deprived beneficiaries are higher, and thus that a larger share of current program spending is going towards reducing (pre-existing) dental care needs. Information on the average claims paid amount per senior beneficiary is provided by Health Canada for the purpose of this study.

The third metric is the Incremental CER, which is used in health economics and measures the cost per percentage point reduction in dental care deprivation (York Health Economics Consortium 2025).

3) Incremental CER in dental care deprivation = $\frac{\text{Program cost (\$)}}{h}$

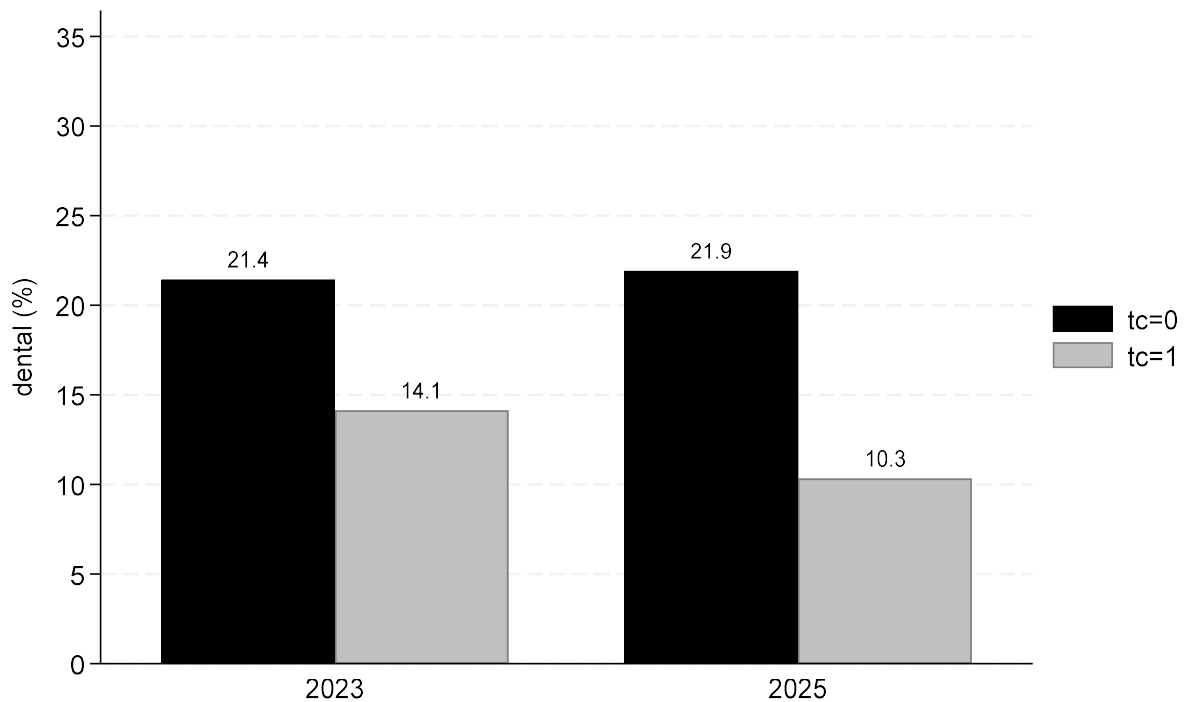
Where: $h = \frac{\text{Number of dental care deprivation cases averted (A)}}{\text{Number of beneficiaries receiving care (Nbrc)}} * 100$

The hit rate (h) is an estimate of the percentage of beneficiaries whose dental care deprivation status switched from deprived to non-deprived and thus reflects the percentage point reduction in

⁷ The cost-effectiveness calculations also include sensitivity analyses using the upper and lower bounds of the confidence intervals of the effectiveness estimate (Δp).

dental care deprivation among program beneficiaries. ICER estimates are used to evaluate whether a new medical intervention provides good value for money by comparing the estimate to a preset threshold to assess whether the intervention is sufficiently cost-effective (York Health Economics Consortium 2025).

Figure 1: Dental care deprivation, by age 65+ (treated=1) and age 25-64 with no children (control=0), percent



Source: Author's calculations.

Note: T/C1 compares seniors (treated) to respondents aged 24-64 with no children (control). Sample size (T/C1) for preferred regression model (model 3) takes account of observations lost due to missing values in outcome variables (dental care item) and self-reported income category.

Table 3: Material deprivation outcomes, by year and by treatment / control (T/C) group definitions

	Dental care deprivation		Material deprivation (threshold: 2 items)		Material deprivation (threshold: 3 items)		Number of deprivations	
	Percent		Percent		Percent		Average number	
	2023	2025	2023	2025	2023	2025	2023	2025
T/C1: Age only								
- Treatment: Age 65+	14.1	10.3	11.1	14.5	6.8	8.6	0.50	0.62
- Control: Age 25-64 & no children	21.4	21.9	29.3	30.7	20.0	22.3	1.30	1.45
T/C2: Age and income								
- Treatment: Age 65+ & <100K	16.8	12.4	13.5	18.3	8.2	11.0	0.59	0.76
- Control: Age 25-64, no children & <100K	26.8	30.0	36.7	42.0	25.5	31.6	1.61	1.95
T/C3: Seniors and income ($\geq 100K$)								
- Placebo group: Age 65+ & $\geq 100K$	0.4	3.7	0.6	3.7	0.6	2.8	0.04	0.17
- Control: Age 25-64, no children & <100K	26.8	30.0	36.7	42.0	25.5	31.6	1.61	1.95
T/C4: Seniors and income ($\geq 150K$)								
- Placebo group: Age 65+ & $\geq 100K$	0.0	2.1	0.0	2.6	0.0	0.7	0.03	0.08
- Control: Age 25-64, no children & <100K	26.8	30.0	36.7	42.0	25.5	31.6	1.61	1.95

Source: Author's calculations.

Note: Sample sizes for preferred regression model (model 3) takes account of observations lost due to missing values in outcome variables (dental care item) and self-reported income category.

Table 4: Sample characteristics (T/C1), overall and by age 65+ (treated=1) and age 25-64 with no children (control=0), percent

	All			Treated			Control		
	2023	2025	Δ	2023	2025	Δ	2023	2025	Δ
Age: 25–64	69	69	1	0	0	0	100	100	0
Age: 65+	31	31	-1	100	100	0	0	0	0
Household size: 1	34	30	-4	31	33	2	36	29	-7
Household size: 2	44	52	8	58	58	0	37	49	12
Household size: 3+	22	18	-4	11	9	-2	14	12	-2
Income < 100K	78	67	-11	84	76	-8	75	63	-13
100K < Income < 150K	14	19	6	10	16	6	15	21	6
Income $\geq$ 150K	8	14	6	6	8	2	9	16	7
Homeowner	72	63	-9	84	72	-13	67	59	-8
Full time employed	38	39	2	6	4	-2	52	55	3
Completed university	28	41	13	24	34	10	29	44	14
Born in Canada	74	78	5	74	81	7	73	77	4
Indigenous	4	7	3	2	5	3	4	8	3
White	75	49	-26	84	53	-32	71	47	-24
Atlantic provinces	8	8	0	11	8	-3	7	8	1
Quebec	23	25	2	20	26	6	25	25	0
Ontario	34	37	3	27	37	10	37	37	-1
Prairie provinces	20	16	-4	24	15	-9	18	17	-1
British Columbia	14	14	0	18	14	-4	13	14	1

Source: Author's calculations.

Note: Sample sizes (T/C1) for preferred regression model (model 3) takes account of observations lost due to missing values in outcome variables (dental care item) and self-reported income category. Rounded to nearest integer. Differences (Δ) based on unrounded numbers and using 2023 as a reference.

5. Results

5.1 Effectiveness of the CDCP

This study finds that the CDCP has resulted in a substantive decrease in dental care deprivation among seniors and a larger impact on seniors reporting an annual income below 100K. There is also some evidence that the CDCP may have reduced the overall number of deprivations among seniors. Effects on the broader material deprivation measures are negative but not statistically significant from zero.

Starting off with the dental care deprivation item, Table 5 displays the results for the leading treatment / control group definition using various model specifications. Comparing seniors to working age adults not living with children under the age of 18 (T/C1), the standard difference-in-differences interaction model (DiD) without covariates (M1) shows that seniors (Treated = 1) have a dental care deprivation rate that is 7.25 percentage points lower than the control group (Treated=0). The post-treatment coefficient (Post=1) shows that the dental care deprivation rate in 2025, while 0.49 percentage points lower, is not statistically significant different from zero. The estimated impact of the CDCP (Treated=1 x Post=1) is a reduction of 4.21 percentage points but the effect is statistically indistinguishable from zero.

However, conditioning on composition (M2) uncovers a positive secular trend of 2.9 percentage points (Post=1), against which the senior decline in dental care deprivation is more pronounced with a reduction of 5.3 percentage points ($\pm$ -4.6). This effect is also known as the intention to treat (ITT) for eligibility. With loadbearing covariates, the identifying assumption becomes conditional parallel trends, rendering a linear DiD unreliable (Roth and Sant'Anna 2023; Sant'Anna and Zhao 2020).

Switching to the improved doubly robust DiD estimator (M3), the effect grows in magnitude to a reduction of 8.7 percentage points ($\pm$ -5.1). The effect size remains statistically significant from zero with point estimates in the range of 7.2 and 9.6 percentage points for model specifications with fewer variables or the addition of interaction terms (Table 5 includes results for M4 and M5, other results are available in the reproduction files).⁸ Variables indicating indigenous and white are included because they are associated with treatment assignment and therefore improve covariate balance.

The second treatment / control group definition (T/C2), shown in Table 6, compares seniors reporting an income below 100K to working age adults not living with children under the age of 18 who also report an income below 100K. The estimated reduction in dental care deprivation under the preferred model (M3) is 11.0 percentage points ($\pm$ -6.1) with effects stable across alternative model specifications. This larger effect is expected since the T/C2 definition excludes seniors who are much less likely to qualify for the CDCP and thereby reduces the contamination

⁸ With a non-linear DiD estimator (logit) the effect is negative and statistically significant. Using predictions under the four treatment-period combinations, the effect is a dental care deprivation reduction of 6.2 percentage points under T/C1 (results available in reproduction files).

of the treatment sample. This effect cannot be labeled as the average treatment effect on the treated (ATT) because there remains considerable contamination with seniors who are not eligible for the CDCP or have not applied despite being eligible.

Table 5: Impact of CDCP on dental care deprivation for seniors, various specifications

	T/C1: Age only				
	DiD		Doubly robust DiD		
	M1	M2	M3	M4	M5
Treated=0	0	0			
Treated=1	-0.0730***	-0.0646**			
Pre=0	0	0			
Post=1	0.0049	0.0286*			
Treated=1 x Post=1	-0.0429	-0.0531*	-0.0871***	-0.0868***	-0.0719***
Household size: 1		0			
Household size: 2		0.0212			
Household size: 3+		0.0832***			
Income < 100K		0			Income categories excluded
100K ≤ Income < 150K		-0.1305***			
Income ≥ 150K		-0.1657***			
Homeowner		-0.1259***			
Completed university		-0.0678***			
Born in Canada		-0.0223			
Indigenous		0.0367			
White		0.018			
Atlantic provinces		0		Provinces excluded	
Quebec		-0.0608***			
Ontario		-0.0512**			
Prairie provinces		-0.0278			
British Columbia		-0.0409*			
Constant	0.2143***	0.3721***			
Observations	8,291	8,291	8,291	8,291	9,078

Source: Author's calculations.

Note: * p<0.05, ** p<0.01, *** p<0.001; estimated impacts and preferred model specification highlighted in gray; T/C1 compares seniors (treated) to respondents aged 24-64 with no children (control). M3 is the preferred model, and it includes all covariates; M4 excludes the province dummies; M5 excludes the income categories.

Table 6: Impact of CDCP on dental care deprivation for seniors reporting an income below 100K, various specifications

	T/C2: age & income $\leq 100K$			
	DiD		Doubly robust DiD	
	M1	M2	M3	M4
Treated=0	0	0		
Treated=1	-0.1001***	-0.0780**		
Pre=0	0	0		
Post=1	0.032	0.0293		
Treated=1 x Post=1	-0.0753*	-0.0712*	-0.1099***	-0.1100***
Household size: 1		0		
Household size: 2		0.0300*		
Household size: 3+		0.0780***		
Homeowner		-0.1318***		
Completed university		-0.0892***		
Born in Canada		-0.0235		
Indigenous		0.0211		
White		0.0195		
Atlantic provinces		0		Provinces excluded
Quebec		-0.0857***		
Ontario		-0.0658**		
Prairie provinces		-0.0485*		
British Columbia		-0.0530*		
Constant	0.2678***	0.4045***		
Observations	5,790	5,790	5,790	5,790

Source: Author's calculations.

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; estimated impacts and preferred model specification highlighted in gray; T/C2 compares seniors reporting an income below 100K (treated) to respondents aged 24-64 with no children and reporting an income below 100K (control). M3 is the preferred model, and it includes all covariates; M4 excludes the province dummies.

Comparing a placebo group of seniors with an income above 100K to working age adults not living with children under the age of 18 who report an income below 100K (T/C3), yields no statistically significant effect of the CDCP (Table 7, 4th column). Similarly, comparing a placebo group of seniors with an income above 150K to the same control group also yields no statistically significant program effect (Table 7, 5th column). As seniors reporting higher incomes are much less likely to qualify for the CDCP, this robustness check strengthens the case that the estimated reductions found under the first two treatment/control definitions are a result of the CDCP.

The results for the other three material deprivation indicators and the main treatment / control group definition (T/C1 and T/C2) are displayed in Table 8, together with those of dental care deprivation. As a reminder, these indicators are based on the 11-item deprivation scale, including the dental care deprivation item, and therefore reflect material wellbeing more broadly. As with dental care deprivation, seniors experience considerably lower levels of material deprivation, both in terms of deprivation rates (16 and 11 percentage points less at deprivation thresholds of

respectively two and three deprivations) and the number of deprivations (0.69 deprivations less) than their working-age counterparts. The treatment effects (Treated=1 x Post=1) for the three broader deprivation indicators are all negative but most do not differ from zero in a statistical sense. Using the age-based sample (T/C1), the 0.22 reduction in the number of deprivations is statistically significant at the 5 percent level suggesting that the CDCP may have translated into a (modest) impact on the average material deprivation count.

Table 7: Impact of CDCP on dental care deprivation, all treatment / control group definitions

	M3 (preferred)			
	T/C1: age only	T/C2: age & income ≤100K	T/C3: placebo seniors with income ≥100K	T/C4: placebo seniors with income ≥150K
Treated=1 x Post=1	-0.0871***	-0.1099***	-0.0253	-0.0398
Observations	8,291	8,551	8,551	8,551

Source: Author's calculations.

Notes: * p<0.05, ** p<0.01, *** p<0.001; T/C1 compares seniors (treated) to respondents aged 24-64 with no children (control); T/C2 compares seniors reporting an income below 100K (treated) to respondents aged 24-64 with no children and reporting an income below 100K (control); T/C3 and T/C4 compare a placebo group of seniors reporting an income above 100K (T/C3) or above 150K (T/C4) to respondents aged 24-64 with no children (control). The treatment group's sample sizes for T/C3 and T/C4 are very small (see Table 2).

Table 8: Impact of CDCP on all material deprivation indicators (T/C1)

	M3 (preferred), T/C1: age only			
	Dental care deprivation	Material deprivation rate (2 items)	Material deprivation rate (3 items)	Number of deprivations
Treated=1 x Post=1	-0.0871***	-0.0318	-0.0365	-0.2231*
Observations	8,291	8,551	8,551	8,551
	M3 (preferred), T/C2: age & income ≤100K			
Treated=1 x Post=1	-0.1099***	-0.033	-0.0386	-0.2475
Observations	5,790	6,008	6,008	6,008

Source: Author's calculations.

Notes: * p<0.05, ** p<0.01, *** p<0.001; estimated impacts highlighted in gray; T/C1 compares seniors (treated) to respondents aged 24-64 with no children (control); differences in sample size between dental care deprivation and the other material deprivation indicators are explained in section 3.

5.1.1 Identification and validity checks

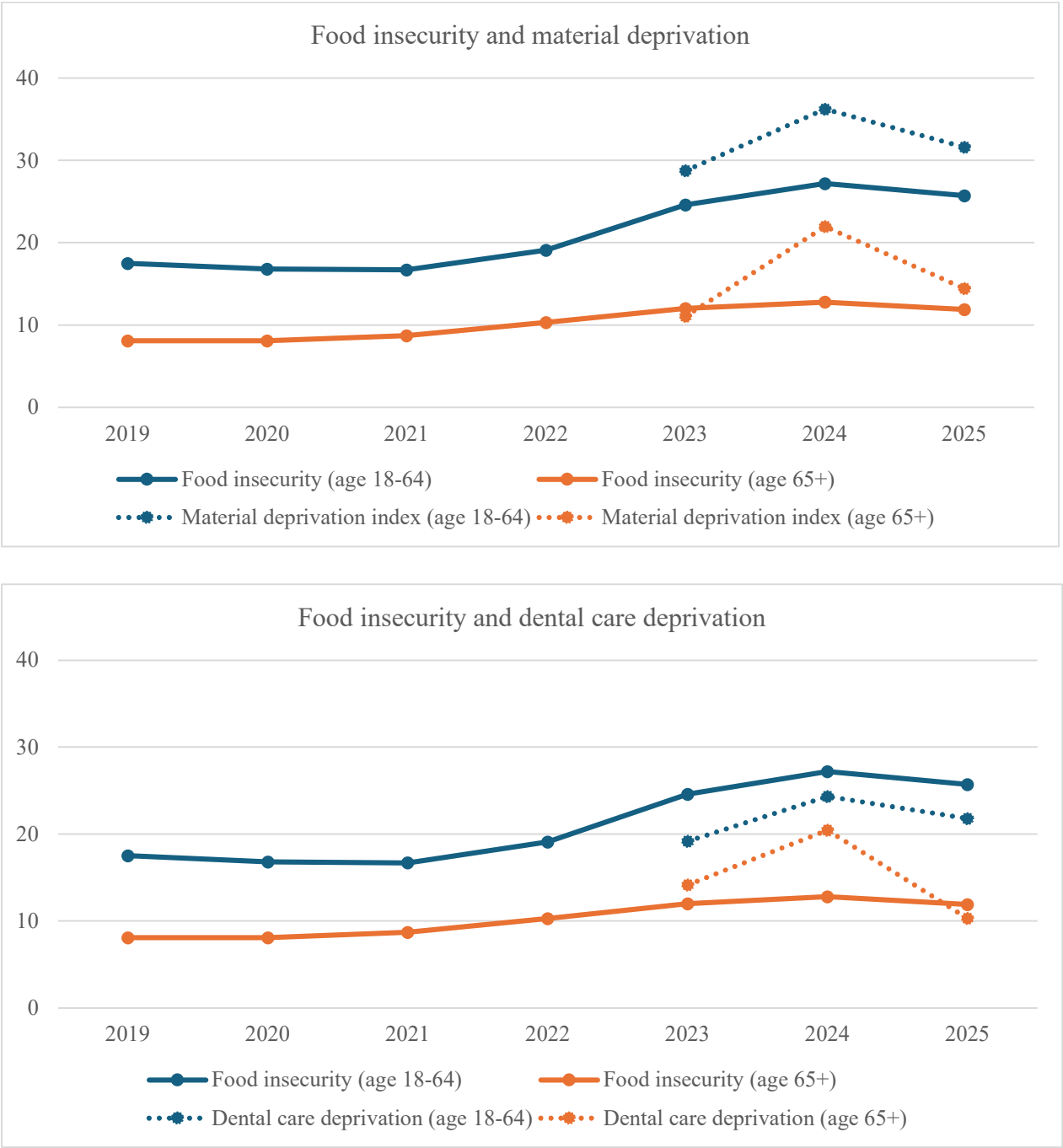
The preferred estimates rely on the improved doubly robust DiD estimator of Sant'Anna and Zhao (2020). Identification therefore requires conditional parallel trends and sufficient overlap in the distribution of observed covariates between treatment and control groups. Because only one pre-treatment survey wave is available, conditional parallel trends cannot be tested directly. This section therefore reviews balance and overlap diagnostics, placebo analyses, trends in food insecurity, and potential concurrent policy changes to assess the validity of the estimated effects.

The annex shows that weighting creates treatment and control groups that are highly similar in their observed characteristics (Figure A1), with the largest absolute weighted difference being 0.016 for household size 3 and up and the largest absolute variance ratio being 0.964 for indigenous. Furthermore, common support is good (Figure A2) despite evidence of bimodal shifts over time (Figure A3). The estimated impacts are robust to alternative specifications, with point estimates ranging from 7.2 to 9.6 percentage points under T/C1 (Table 5). Variables identifying Indigenous and White respondents are retained because they improve covariate balance and are associated with treatment assignment. The placebo analysis (Table 7, T/C3 and T/C 4) further supports the validity of the identification approach, with higher income seniors being unaffected by the CDCP.

In the absence of multiple pre-treatment datapoints, this study reviews pre-policy trends in a related indicator, food insecurity, which reflects the inadequate or insecure access to food due to financial constraints (Notten, Liu, and Tarasuk 2025). Figure 2 displays the prevalence of food insecurity over time for persons aged 18 to 64 and those aged 65 and above. As with material deprivation indicators, seniors experience food insecurity at considerably lower rates than those of working age. Trends are broadly similar between groups, relatively stable between 2019 and 2021, followed by a strong increase since 2021 and only a very modest decline between 2024 and 2025. The difference in food insecurity rates between seniors and working age adults is relatively stable between 2019-2021 and 2024-2025 but it diverges between 2022 and 2024. While the gap widens most between 2022 and 2023, it still widens a bit further between 2023 and 2024. Figure 2 further displays the annual material deprivation (top panel) and dental care deprivation (bottom panel) rates for the 18 to 64 and 65 and up age groups from 2023 to 2025. While the material deprivation trend is strikingly parallel between both age groups, the dental care deprivation trend starts out parallel until 2024 and then deviates due to the much stronger decline among those aged 65 and up.

The food insecurity evidence thus suggests that age-specific trends in material hardship cannot be entirely ruled out. However, several findings argue against such trends being the sole explanation for the observed decline in dental care deprivation among seniors: (1) the decline is specific to dental care deprivation rather than material deprivation more broadly; (2) the timing coincides with CDCP implementation (Table 1); (3) placebo groups show no significant effects (Table 7); and (4) covariate balance and overlap diagnostics support the validity of the doubly robust DiD design (Figures A1, A2, A3 in the annex).

Figure 2: Trends in food insecurity, material deprivation and dental care deprivation, by age group, percent



Source: Statistics Canada, Food insecurity by selected demographic characteristics, Table: 13-10-0835-01. Material deprivation: Author’s calculations using data from Food Banks Canada’s Poverty Report Card surveys. Note: Food insecurity data points refer to the year in which the food insecurity data were collected whereas the original Statistics Canada labeling refers to the income reference year, which is one year earlier. Food insecurity includes marginal, moderate and severe food insecurity. The material deprivation index is based on a scale of 11 items (including the dental care deprivation item) and a deprivation threshold of two items.

It is furthermore unlikely that concurrent changes in programs for seniors play a substantive role in the strong decrease in dental care deprivation among seniors since 2024. Old Age Security for seniors aged 75 and above was permanently increased with 10 percent in July 2022 (Government of Canada n.d.) but neither the food insecurity, dental care deprivation nor material deprivation overall shows a substantive improvement between 2022 and 2024. Benefits in income security programs for seniors are automatically indexed for inflation, quarterly in the case of OAS and the Guaranteed Income Supplement (GIS) and annually for the Canada Pension Plan (CPP). The observed patterns in seniors' and working age persons' material living conditions do not suggest that this gradual increase in nominal benefits of seniors led to differential changes in purchasing power of both groups.

Moreover, the CDCP coordinates with provinces that had pre-existing and ongoing dental care programs. The CDCP is the primary payer if persons are also qualifying for provincial and territorial dental care whereas it is the last payer for federal programs (Public Health Ontario et al. 2025). Also, balance billing is not permitted, nor does one program provide additional services when frequency limits are met through another program (Public Health Ontario et al. 2025). In that respect, the CDCP has likely taken over some the costs and its associated dental care impacts from the provinces, an effect that our data cannot capture.

A review of major provincial and territorial dental programs identified few substantive eligibility expansions during the 2023-2025 study period. One notable exception is Ontario, where income thresholds for the Ontario Seniors Dental Care Program (OSDCP) were increased in August 2024 from \$22,200 to \$25,000 for single seniors and from \$37,100 to \$41,500 for senior couples (Government of Ontario 2024; Oral Health 2024). Because OSDCP benefits can be combined with coverage under the Canadian Dental Care Plan (CDCP), this expansion may have contributed modestly to the observed decline in dental care deprivation among seniors. However, no similarly prominent expansions were identified across other provincial and territorial public dental programs during the study period, suggesting that the CDCP remained the predominant nationwide policy change affecting access to dental care.⁹

In sum, the credibility of the preferred doubly robust DiD estimates is strengthened by good covariate balance after weighting, adequate overlap between treatment and control groups, the absence of effects among placebo groups of higher-income seniors, and the specificity of the estimated impacts to dental care deprivation. The comparison with food insecurity trends and the review of concurrent policy changes provide additional evidence consistent with the interpretation that the observed decline in dental care deprivation reflects the introduction of the CDCP. Nevertheless, because only one pre-treatment survey wave is available, the conditional parallel trends assumption cannot be tested directly. As a result, the estimated impacts may still differ from the true program effect if important unobserved determinants of dental care deprivation evolved differently between seniors and working-age adults over time (e.g., a stronger responsiveness of working age adults to economic conditions).

⁹ Review using Co-pilot Premium on 17 August 2026 asking for concurrent policy changes in provincial / territorial dental plans between 2023 and 2025 in provinces other than Ontario. No substantive eligibility expansions were found.

5.2 Cost-effectiveness of the CDCP

Given that the CDCP was gradually rolled out over the target population, with ages 65 and up being able to access care as of May 2024, it is not surprising that eligible seniors make up the lion's share of eligible applicants and members served between May 2024 and June 2025 (Table A2). Table 9 shows that the about 3 million eligible senior applicants (Nea) and the 1.8 million beneficiaries receiving care (Nbrc) make up a substantive share of the close to 8 million seniors living in Canada (N). Total program costs (PC) for seniors amount to \$1.9 billion, with an average claim amount of \$1,068 paid per beneficiary (Cpb). The discrepancy between the number of eligible applicants and the lower number of beneficiaries receiving care signal that future use of the plan, and therefore its cost, can be expected to grow. The effectiveness estimate (Δp) is drawn from the econometric analysis presented in section 5.1 of this paper (8.7 ± -5.1).

Table 9: Program information, persons aged 65 and up only

Type of information:	Number:	Source:
Persons aged 65+ (N)	7,972,097	Statistics Canada, Table: 17-10-0005-01, midpoint of 2024 and 2025 populations
Eligible applicants (Nea)	3,009,511	Health Canada May 2024 – June 2025
Beneficiaries receiving care (Nbrc)	1,804,185	
Program Costs: Claims paid amount by Sun Life (PC)	\$1,927,386,055	
Claims paid amount per beneficiary receiving care (Cpb)	\$1,068	
Intention To Treat (Δp)	8.7 (± -5.1)	Own calculations, Table 5 (M2, Treated=1 x Post=1)

Notes: The ITT is rounded to first digit; calculations are based on unrounded estimates.

The estimates presented here are illustrative rather than precise. They are based on a covariate-adjusted effectiveness estimate with a wide confidence interval, which is extrapolated to the senior population in Canada, and in part relies on assumptions regarding the size of claims of persons whose deprivation status was averted relative to the size of claims of persons whose deprivation status did not change. The estimates nonetheless provide an original perspective by illustrating the cost per deprivation averted, which would enable making comparisons against other evaluations of this and other in-kind programs on the same footing. This study is the first to provide such estimates, which can thus serve as a baseline against which to compare future research.

Table 10: Cost-effectiveness of the Canadian Dental Care Plan

	Point estimate	Confidence interval
Number of dental care deprivation cases averted ($A = \Delta p * N$)	694,397	288,582-1,100,212
Hit rate ($h = (A / N_{brc}) * 100$)	38.5%	16.0-61.0%
Inflation factor ($i=1/h = \text{gross CER} / \text{marginal CER}$)	2.6	1.6-6.3
Equation 1: Gross CER ($PC / A = C_{pb} / h$)	\$2,776	\$6,679-1,752
Equation 2: Marginal CER ($k * \text{claim per beneficiary}$)		
k=1.00	\$1,068	Point estimates only because calculation do not involve Δp .
k=1.25	\$1,335	
k=1.50	\$1,602	
k=2.00	\$2,137	
Equation 3: ICER in dental care deprivation (PC/h)	\$50,1M	\$120.5-31.6M

Source: Own calculations.

Notes: Section 4 introduces the three equations. Lower and upper bounds are estimated using the 95 percent confidence interval around the program impact estimate ($\Delta p=8.7 (\pm -5.1)$) reported in Table 5). Estimates rounded to the nearest integer or first digit. Abbreviations: Cost-Effectiveness Ratio (CER), Incremental CER (ICER), (M) and backlog premium (k).

This study's first cost-effectiveness perspective, the gross CER, focuses on the costs per person able to afford dental care (Table 10). Extrapolating the estimated impact on dental care deprivation among persons aged 65 and up in our survey to Canada's senior population, the CDCP has averted an estimated 698,397 cases of dental care deprivation or 38.5% of the beneficiaries receiving care. Plugging this information into the first equation yields a cost of \$2,776 per case averted. Given the width of the confidence interval of the program's impact estimate, the uncertainty around this CER is large (\$6,679-1,752).

Note that the gross CER of \$2,776 carries the full average claim (\$1,068) of the estimated 61.5 percent of senior beneficiaries whose prior deprivation status was not deprived and remained not deprived as they became CDCP beneficiaries. This group is also known as inframarginal. These inframarginal seniors were not deprived at baseline because they were paying out-of-pocket and/or covered by another plan (provincial/territorial, previous employer or private). For this group the CDCP substitutes private and/or provincial/territorial with federal spending (Currie and Gahvari 2008; Cutler and Gruber 1996). While spending on inframarginal beneficiaries did not affect dental care deprivation, it bought cleanings, fillings and the like and thereby had downstream health benefits. The 61.5 percent estimate is an upper bound on the inframarginal group: some CDCP beneficiaries remain dental care deprived despite receiving (some) basic dental care (e.g., because they have unmet needs beyond the maximum covered annual treatment and/or cannot afford out-of-pocket spending due to co-payment or costs above maximum covered amounts for treatment).

It is thus likely that the gross CER thus overstates the marginal cost of averting a dental care deprivation case and the inflation factor in Table 10 illustrates the magnitude. The marginal CER in Table 10 nets out these costs, and it accounts for potentially higher claims costs for persons whose deprivation status switched from deprived to not deprived because of the CDCP. In the absence of information on claims costs per previous insurance status of the beneficiary, this study selected various fictional but realistic values of the backlog premium (k). This yields a marginal CER range from \$1,068, which assumes equal costs for previously dental care deprived beneficiaries and previously non-deprived beneficiaries (k=1), to \$2,137 when the claims cost of previously dental care deprived beneficiaries is double that of previously non-deprived beneficiaries (k=2). Hence, the range of the marginal CER represents the uncertainty of the claims gradient and not the uncertainty in the estimated effect on dental care deprivation (Δp).

The Incremental CER metric focuses on a related perspective, namely the costs to achieve a one percentage point reduction of dental care deprivation in the senior population. Since the CDCP is estimated to avert dental care deprivation in 38.5% of the plan's beneficiaries receiving care (the hit rate h), reducing dental care deprivation among the target population with one percentage point costs 50.1 million dollars. Again, uncertainty around the impact estimate also yields wide confidence intervals around this cost-effectiveness estimate (\$120.5-31.6M).

Table 11: Government spending towards averting material deprivation

	Number of Nbrc	Share of Nbrc
Total CDCP beneficiaries receiving care (Nbrc):	1,804,185	100%
- Marginal - averted (A)	694,397	38.5%
- Non-averted (deprivation unchanged) (Nbrc-A)	1,109,788	61.5%
Deprivation-averting spending (marginal CER*A):	Dollar	Share of total cost
Marginal CER=\$1,068 (k=1)	\$742M	38.5%
Marginal CER=\$1,335 (k=1.25)	\$927M	48.1%
Marginal CER=\$1,602 (k=1.50)	\$1,113M	57.7%
Marginal CER=\$2,137 (k=2)	\$1,483M	77.0%
Implied average claim, non-averted beneficiaries:	Dollar	
k=1	\$1,068	
k=1.25	\$901	
k=1.5	\$734	
k=2	\$400	

Source: Own calculations.

Notes: The implied average claim for the non-averted beneficiaries is calculated as follows: (TC – Deprivation averting spending) / (Nbrc – A). Estimates rounded to the nearest integer or first digit. Abbreviations: Cost-Effectiveness Ratio (CER), (M) and backlog premium (k).

The difference between the gross CER and the estimated range of marginal CER yields a further insight, namely that potentially a larger share of program cost is going towards averting dental

care deprivation than one would expect based on the hit rate (h) and the average claim amount received per beneficiary (C_{pb}). In other words, a larger proportion of program spending is appropriately targeted. This happens when the average claim amount for beneficiaries whose status changed from dental care deprived to not deprived is higher than that for beneficiaries whose status has not changed ($k > 1$). If the average claim amount is the same ($k = 1$), then 38.5% of program spending is going towards averting deprivation, when $k = 2$ about three quarters of program spending goes towards averting dental deprivation (77.0%) (Table 11). While the true value of k is unknown, the last four rows of Table 11 show that k values between 1 and 2 yield a plausible range of implied average claim amounts for non-averted beneficiaries.¹⁰

6. Concluding discussion

This study is the first providing evidence that is consistent with the CDCP reducing dental care deprivation among seniors. The program reduces dental care deprivation among seniors by 8.7 percentage points (± 5.1), equivalent to a 62 percent decline relative to the 2023 baseline prevalence of 14.1 percent. If interpreted causally, this implies that the program eliminated most of the cost-related dental care deprivation experienced by seniors prior to the introduction of the CDCP. Given that the outcome directly measures the affordability of obtaining regular dental care, the estimated reduction suggests that the program made a substantive contribution toward addressing the specific barrier it was designed to reduce. The estimated effect reflects the intention to treat (ITT) because the secondary survey data lack the information to distinguish between eligible and non-eligible seniors. Using a crude proxy of income, this study shows that the effect is larger among seniors reporting an income below 100K whereas there is no reduction in dental care deprivation among seniors reporting an income above respectively 100 and 150K. The CDCP also reduced the overall number of deprivations of seniors with 0.22. Effects on the overall material deprivation status were also negative but not statistically significant. Combining these survey-based estimates with program and population data, the study estimates that the CDCP averted 694,397 cases of dental care deprivation, at a cost of 50.1 million dollar per percentage point reduction in dental care deprivation (incremental CER). On a per case basis, estimated costs of reducing dental care deprivation are \$2,776 (gross CER) and \$1,068-2,137 (marginal CER). The wide confidence interval around the impact estimate should caution against taking both impact and cost-effectiveness numbers at face value.

It is possible that the estimated population impact is underestimated as the program was still in its start up phase in 2025. This would be consistent with program data, which show that the number of eligible seniors was far higher than the number of seniors on behalf of whom expenses had been claimed by June 2025. In a mature program that offers coverage of basic dental care services, it is reasonable to expect that most eligible beneficiaries receive dental services at least once a year (in the absence of significant non-cost barriers to access). It is further possible that not everyone who would be eligible had already enrolled during the period

¹⁰ For instance, the CDCP covers one routine dental cleaning (scaling) and one routine check-up per year. In Ontario in 2024, this would cost between \$225 and \$450 not including costs such as x-rays or fillings (Source: <https://www.villagegreendental.ca/the-cost-of-a-dental-cleaning-in-ontario-in-2024/>).

covered in our data. Finally, when accessing care after a long period of unmet dental needs, catching up with a care backlog may still require spreading out treatments for financial reasons given that there are still out-of-pocket costs under the CDCP. If the population impact of this study is underestimating that of a mature program, the study's cost-effectiveness estimates make the CDCP look less cost-effective than it will be at maturity.

The reduction in dental care deprivation is consistent with a scenario in which a substantive group of now beneficiary seniors were previously forgoing dental care rather than accessing care while paying out-of-pocket. With cost being a key barrier for accessing dental care, it is further likely that many of the new beneficiaries are having a backlog of needed dental work thus resulting in (temporarily) higher claims cost for previously deprived beneficiaries compared to beneficiaries who were not dental care deprived. It should be noted, however, that for dental care deprivation levels to remain at lower levels, the affordability of receiving basic dental care needs requires ongoing program use. The survey question used to measure dental care deprivation captures this by specifically asking about the affordability of "regular dental care, including teeth-cleaning and fillings".

The presence of a backlog in dental care also has implications for the share of current program spending that is going towards averting dental care deprivation and the cost-effectiveness ratios of a mature program. First, given the absence of data on beneficiaries' prior dental plan status, this study's simulation with realistic backlog cost premiums shows that likely a larger share of the 2024-25 program costs has been spent on averting deprivation than a simple calculation based on the average claim per beneficiary and the number of averted cases would suggest (up to 77 percent compared to 38.5 percent if there were no backlog). Second, the presence of a backlog in dental care during the phase in of the CDCP further implies that program costs per senior beneficiary are expected to decline as the program matures and beneficiaries' backlog is reduced thus improving future cost-effectiveness ratios (a report from the Parliamentary Budget Office (2020) differentiates between routine and treatment costs, estimating a hump of treatment costs in the first year).

A further insight is that the introduction of the CDCP displaces both private spending (out-of-pocket and on private or employer provided dental plans) and provincial/territorial spending on (typically income-tested) dental programs that covered beneficiaries who now also qualify for the CDCP. This is because the federal government is the first payer of doubly-covered beneficiaries and beneficiaries cannot stack treatments that are covered by both programs (Public Health Ontario et al. 2025). On a consolidated public-sector view, spending on beneficiaries who are also covered by provincial/territorial programs is not new dental spending and is thus not considered in the CER estimates of this paper. However, the presence of prior spending lowered the federal costs as provincial/territorial beneficiaries have (less of a) backlog than previously not covered CDCP beneficiaries thus resulting in a lower marginal cost-effectiveness ratio.

Moreover, from a political perspective, federal spending on the CDCP thus partially represents an intergovernmental transfer, a novel angle that is revealed through the outcome-based lens provided in this paper. The CDCP involves the use of federal spending power (Banting 2008; Graefe and Fiorillo 2023) despite being labeled as falling under classic federalism rather than

shared-cost federalism (Dinan and Béland 2025). At the time of announcing the supply of confidence agreement, the CDCP was contested because many provinces already had dental care programs and they would rather see more federal funds flowing to their own programs, ideally without strings attached (Dinan and Béland 2025; Dryden 2024; Flood et al. 2023). Provinces' dental programs, however, cover only specific groups at lower income levels, leaving a large population without coverage (Farmer et al. 2022; Shaw and Farmer 2016). With the CDCP now being in its fourth year, the federal government seems to have reduced the scope for provincial contestation in two ways. First, by being the first payer of coverage for groups covered under both programs (Public Health Ontario et al. 2025). Second, by merely financing dental insurance and staying away from the delivery of dental services with Sunlife handling all claims between dentists and patients, a power falling under provincial / territorial jurisdiction (Dryden 2024; Flood et al. 2023).

Whether this study's findings are reflective of the program's impact on younger age groups is an issue for further research. Dental care deprivation rates and material deprivation among children and working age populations are considerably higher than those for seniors (see Figure 1 and Table 3). However, the degree to which the CDCP reduces dental care deprivation among non-senior populations depends in part on what proportion qualifies for the program. Family incomes of working age adults are more likely to exceed the 90K threshold even though their income may be insufficient to meet the needs of, on average, more members and they are more likely to face higher housing costs and/or debts (e.g. rent, mortgage, other debts). The lack of automatic indexation of the income threshold is a concerning flaw in the program's design¹¹ and it is particularly relevant for families with working age adults as they are more likely to lose coverage as their nominal income increases, irrespective of whether that changes their purchasing power. From a program cost perspective though, younger beneficiaries have lower average dental costs than senior beneficiaries, which would translate in lower CER's (Table A2).

In sum, this study is the first to estimate the CDCP's effect on dental care deprivation, broader measures of material deprivation, and its cost-effectiveness for a sub-group of beneficiaries (seniors) during the roll-out phase of the program. The dental care deprivation perspective captures a material wellbeing effect that is closely associated with the stated goal of the program and that income measures of material wellbeing would miss entirely. Moreover, this study's cost-effectiveness estimates based on dental care deprivation offer a template for cost-effectiveness ratios reflecting the material wellbeing effects of in-kind transfers, a contribution that is both methodological and empirical, and particularly given limited oral health data collection in Canada (Flood et al. 2023; Levy, Goodman, and Eskander 2023). However, given the wide confidence interval around the impact estimate, the extrapolation of its impact to Canada's senior population, and missing information on the backlog premium, the estimates presented in this paper should be interpreted as illustrative rather than precise. They represent a baseline against which to compare future research.

¹¹ Calculations by the Parliamentary Budget Officer were based on a program design that incorporated automatic indexation (Parliamentary Budget Officer 2020).

Beyond impact and cost-effectiveness estimates based on better data, there are other topics that merit future research. First, the CDCP does not cover persons that have access to a private dental plan that may be considerably less generous than the CDCP. Getting an understanding of how many persons and dependents fall into this category, their dental care deprivation status, and policy options to improve their coverage seems pertinent to make further progress on reducing cost-induced dental care deprivation in Canada. Second, to what degree is non-take up among the eligible population an issue? One known hurdle to program access is the need to file taxes, with an estimated 10 percent of Canadians not filing their taxes (Petit, Tedds, and Robson 2026; Robson and Schwartz 2020). The need for annual re-application to remain eligible for the CDCP also risks discontinuation in care despite an unchanged eligibility status. Flood and co-authors (2023) further list other barriers such as stigma, fear, distrust and knowledge about oral health that can also prevent take-up. Third, with 98 percent of oral health providers participating (Government of Canada n.d.), general access to providers is less likely to be a problem, even though increased demand for their services due to the CDCP may involve a longer wait. Accessing providers may nonetheless be challenging for certain groups, such as those living in remote areas and/or areas with fewer or no permanent providers (Levy, Goodman, and Eskander 2023). Fourth, does the CDCP disincentivize provinces and employers to offer private dental plans? Such longer-term effects will gradually increase the costs of the mature program (Cutler and Gruber 1996; Parliamentary Budget Officer 2020).

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8. Annex

Table A1: Material deprivation items, survey questions and incidence rates, by T/C1 and year

Item	Questions	2023		2025	
		Treated	Control	Treated	Control
Meat	Are you/is everyone in your household able to eat meat or fish or a vegetarian equivalent at least every other day?	3.2	8.5	4.6	8.8
Clothes	Do you/does everyone in your household have appropriate clothes to wear for special occasions, such as a job interview, wedding, or funeral?	4.1	13.4	5.6	14.2
Footwear	Do you/does everyone in your household have at least one pair of properly fitting shoes and at least one pair of winter boots?	0.6	4.5	1.1	4.5
Dental care	Are you/is everyone in your household able to get regular dental care, including teeth-cleaning and fillings, at least once a year?	14.1	21.4	10.3	21.9
Temperature	Are you able to keep your house or apartment at a comfortable temperature all year round?	4.3	8.4	2.7	6.8
Transportation	Are you/is everyone in your household able to get around your community whenever you/they need to?	0.5	4.5	1.0	4.4
Spending money	If you wanted to, could you spend a small amount of money each week on yourself?	9.7	19.8	9.4	23.4
Unexpected expense	If you had an unexpected expense today of \$500, could you cover this from your own resources?	8.1	25.4	13.4	28.6
Bills	Are you currently able to pay your bills on time?	1.3	10.0	3.0	10.8

Gifts	Are you able to buy some small gifts for family or friends at least once a year?	2.5	9.4	4.0	11.8
Special occasions	Are you able to participate in celebrations or other occasions that are important to people from your social, ethnic, cultural, or religious group?	3.7	9.6	7.9	14.9

Source: Calculations by authors.

Note: Questions as used in the 2023 survey. Those who responded “no” to an item deprivation question were subsequently asked whether this was “because you cannot afford it, or for some other reason?” Respondents who selected “because you cannot afford it” were considered deprived for that item. There were minor changes in the phrasing of these questions in the 2024 survey, with those in the 2025 survey remaining identical to the 2024 survey. Most pertinent to mention is that in the 2024 and 2025 dental care survey question the “at least once a year” was removed from the question. The reproduction files hold a document detailing all changes in questions between the 2023 and 2024/2025 surveys. Sample size (N=8,291) restricted to observations featuring in the preferred model (Table 5, doubly robust DiD, M3).

Figure A1: Covariate balance for T/C1: Age only, Model 3

Covariate balance summary

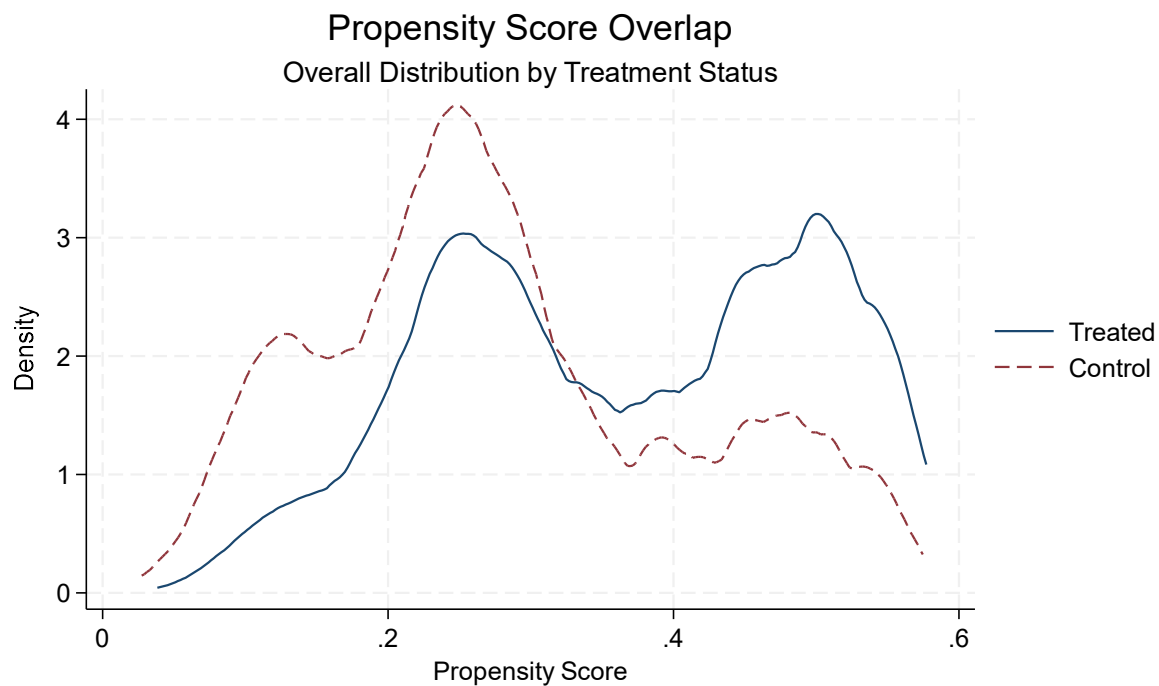
	Raw	Weighted
Number of obs =	8,291	8,291.0
Treated obs =	2,542	4,149.6
Control obs =	5,749	4,141.4

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
hh_size				
2	.2401833	-.0236053	.9698799	.9999376
3+	-.3514606	.0051105	.5071242	1.008192
inc_cat				
100K < In~150K	-.1302379	.0062096	.7947991	1.010336
Income >= 150K	-.225273	.0092505	.5557342	1.021383
homeowner	.3198255	.0159448	.7857513	.9900986
university	-.1589592	-.0062689	.9248066	.9972929
cad_born	.0570576	.0207576	.9173553	.9687735
indigenous	-.1240259	.0072908	.6411233	1.024428
white	.1843585	.0113141	.9409254	.9968847
prov_cat				
QC	-.0302171	.0036448	.9611856	1.004721
ON	-.0597609	.0008975	.9555484	1.00066
MB/SK/AB	.0428684	-.0059327	1.065355	.9910946
BC	-.0086455	-.0039653	.9810209	.9910897

Source: Calculations by authors.

Note: Estimated using teffects ipw followed by tebalance summarize.

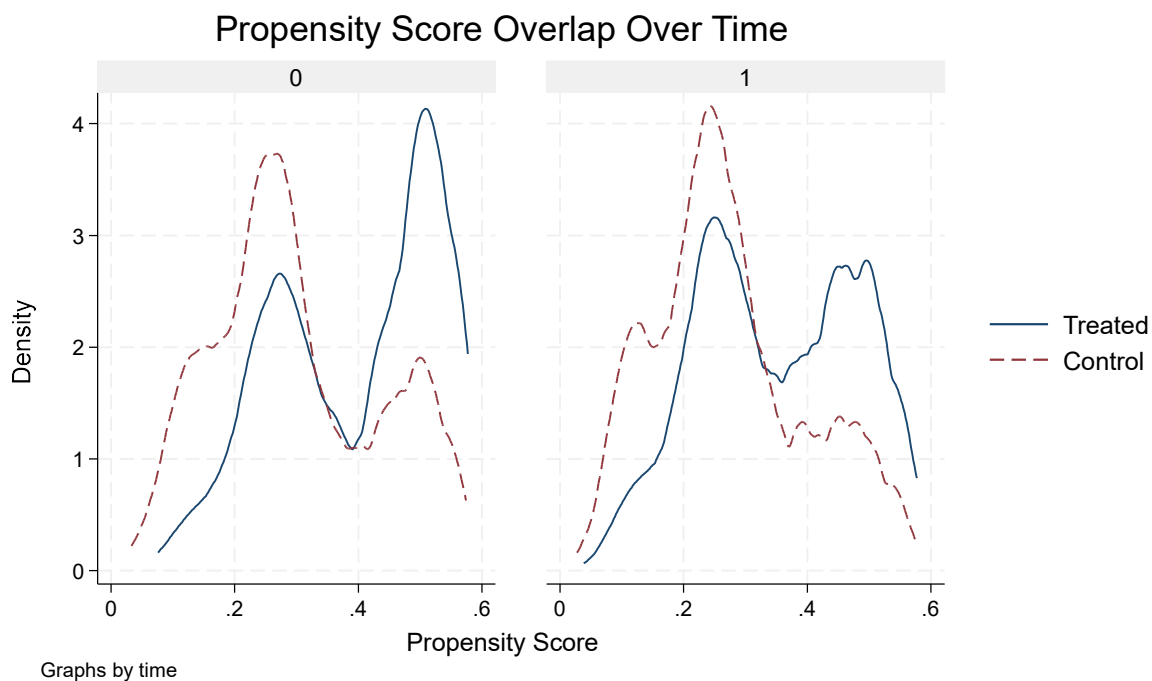
Figure A2: Propensity score overlap, for T/C1: Age only, Model 3



Source: Calculations by authors.

Note: To predict the propensity scores, the model cannot be estimated using survey weights.

Figure A3: Propensity score overlap over time, for T/C1: Age only, Model 3



Source: Calculations by authors.

Note: To predict the propensity scores, the model cannot be estimated using survey weights.

Table A2: Benefit May 2024 to June 2025, indicators by age cohort

Age cohort	Eligible applicants	Number of members served	Claims paid amount by Sun Life	Claims paid amount per member
Under 18	488,971	216,430	\$136,103,676	\$629
18-64	103,310	50,035	\$49,324,287	\$986
65+	3,009,511	1,804,185	\$1,927,386,055	\$1,068
Total	3,601,792	2,070,650	\$2,112,814,017	\$1,020

Source: Health Canada, custom table provided to author by email on 2 June 2026.