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Modeling the cost of inaction in treating obesity in Canada

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Abstract

Background Obesity prevalence continues to rise in Canada, highlighting a growing public health concern. This study updates estimates of the societal cost of inaction in treating obesity, emphasizing the significant economic burden stemming from both direct healthcare costs and indirect productivity losses.

Methods We combined data from national surveys and published literature to estimate the 2023 national economic implications of obesity. Comparing adults with obesity (BMI ≥ 30) to those with healthy weight (25 > BMI ≥ 18.5), we assessed healthcare costs, absenteeism, presenteeism, disability pensions, mortality-related costs, workforce participation, and earnings. Canadian data were used where possible, supplemented by U.S. data, standardized to 2023 CAD$.

Results The cost of inaction in treating obesity in Canada was $27.6 billion in 2023, including $5.9 billion in direct healthcare and $21.7 billion in indirect costs. Excess healthcare costs are driven by higher utilization of medical services. Indirect costs include approximately $8.2 billion from reduced workforce participation, $6.8 billion from presenteeism, $3.8 billion in lower earnings among employed with obesity, $2.0 billion from lost wages due to premature mortality, $682 million from absenteeism, and $268 million from disability pensions.

Conclusions The economic implications of not addressing obesity effectively are substantial, emphasizing the urgent need for utilizing effective chronic disease management strategies. Our findings highlight the disproportionate impact on women and the broader economic consequences, underscoring the imperative for tailored policy interventions. Investing in comprehensive, evidence-based obesity management not only enhances individual well-being but also yields significant societal and economic benefits.

Keywords Obesity cost, Direct healthcare cost, Workforce productivity cost, Absenteeism, Presenteeism, Disability pension, Mortality-related costs, Lost wages

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Background

In 2022, 30% of adult Canadians were reported to be living with obesity according to the Canadian Community Health Survey (CCHS) [1]. Obesity is defined as a progressive, relapsing, complex chronic disease characterized by abnormal or excessive adipose tissue that negatively impacts health [2]. This definition emphasizes that obesity is not merely about an individual's size or weight. Nevertheless, most prevalence data, including the CCHS (Normal Weight: $24.9 > BMI > 18.5$, Overweight: $29.9 > BMI > 25$, Class I Obesity: $34.9 > BMI > 30$, Class II Obesity: $39.9 > BMI > 35$, Class III Obesity: $BMI \geq 40$), rely on body mass index (BMI) classification, reflecting a gap between evolving definitions and current research practices [3].

Obesity is a significant risk factor for many chronic illnesses including type 2 diabetes, cardiovascular disease, respiratory disease, osteoarthritis, cancer and certain mental health conditions [4]. According to Statistics Canada, 13.4% of Canadians with obesity had type 2 diabetes, compared to 2.9% of Canadians with normal weight [5]. The increase in the prevalence of obesity has led to the concomitant increase in the prevalence of type 2 diabetes further straining the healthcare system. Furthermore, due to its role in chronic inflammation and metabolic dysregulation, obesity can exacerbate the negative health outcomes and durations of acute illnesses such as COVID-19 and influenza [6].

Obesity's impact on population morbidity and mortality suggests that it plays a notable role in economic health and productivity. An increase in obesity-related complications can lead to more absenteeism and presenteeism in the workplace [7]. Furthermore, a higher risk of disability and early retirement from the workforce suggests that obesity can exact a long-term economic toll on workers and employers [8].

Higher use of healthcare resources incurs a direct cost for treatment on public payers and employers, and reduced health associated with obesity can reduce labor force participation. One study estimated a fiscal burden of obesity of $23.0 billion on Canada's economy in 2021 due to depressed employment and loss of direct tax revenues [9]. These factors, when paired with direct healthcare costs, were estimated to cost Canadians $752 per capita in taxes. The economic, social, and health costs of Canada's growing obesity epidemic present a strong, multi-faceted incentive for its expanded treatment.

This study provides updated estimates of the cost of inaction in treatment of obesity from a societal perspective and quantifies the components of this cost. Such information helps to underscore the importance of obesity prevention and treatment.

Methods

Overall model structure

The study utilized a series of statistical models for different economic outcomes, integrating person-level survey data with published studies to estimate the 2023 economic cost of obesity. These models were used sequentially, each tailored to specific components, including direct medical costs, absenteeism (missed work days due to chronic condition and injury), presenteeism (reduced productivity at work due to illness), disability costs (excess benefit payments for obesity-related disability), mortality related costs (due to premature mortality), reduced workforce participation (fewer individuals with obesity participating in the labor force) and lower earnings. Each model output was then combined to provide an overall estimate of obesity's economic burden. All economic inputs and outcomes were standardized to 2023 CAD$. The study's statistical analyses were conducted using R software version 4.2.3 and the code is available upon request.

Study sample

We analyzed pooled adult sample records from the CCHS and the Medical Expenditure Panel Survey (MEPS) which included all adults ($Age \geq 18$) whose BMI information was available [10, 11]. The CCHS is a nationally representative, cross-sectional survey that collects health status and healthcare utilization data among Canadians, making it reflective of the general Canadian population across key demographic characteristics such as age, gender, and socioeconomic status. Survey weights are used to adjust for potential sampling bias, ensuring representativeness. CCHS collects self-reported data on height and weight to compute BMI, which is used to estimate the number of people with obesity by age group and gender (Supplementary Table S1). CCHS also collects self-reported utilization of doctor visits and hospital stays, which we use to estimate excess medical costs associated with obesity. CCHS, however, does not collect utilization data on emergency visits, home health visits, or prescription refills. CCHS also collects data on labor force participation.

The MEPS is designed to be representative of the U.S. population and provides detailed data on healthcare service utilization. While the Canadian and U.S. populations differ in terms of healthcare systems, both datasets are comparable in terms of key demographic variables such as age distribution and obesity prevalence, allowing for meaningful cross-country comparisons. Like with the CCHS, survey weights adjust for potential sampling bias. We use MEPS to calculate the differences between adults with obesity and adults with healthy weight in annual utilization of emergency visits, home health visits, and prescription refills. This approach assumes that obesity's

impact on utilization of emergency visits, home health visits, and prescription refills is similar in both countries [12, 13]. This assumption is supported by our comparison of obesity-related annual excess physician visits (including generalist and specialist visits) and hospital days estimated between MEPS and CCHS data (Supplementary Table S2).

Indirect costs were primarily derived from CCHS productivity-related variables, supplemented by data from peer-reviewed journals and published reports.

Obesity prevalence data from CCHS and MEPS was not transformed to account for self-report height and weight bias when using BMI to identify obesity status.

Direct medical cost estimation

Direct medical costs of obesity were estimated using healthcare service utilization data from CCHS (2011–2016, $n = 362{,}051$) and MEPS (2015, 2016, 2018, 2020; $n = 79{,}989$). Adults with obesity were 1:1 matched to those with healthy weight based on propensity scores calculated from factors including age group (18–34, 35–49, 50–64, 65 and over), gender, racial background, marital status, and year of data collection [14]. (See Supplementary for additional technical details on the matching process). Excess service use attributed to obesity was multiplied by average spending to estimate per capita medical costs (see Supplementary Table S3). Costs for long-term care (LTC)—defined as 24-hour nursing care, personal care and other therapeutic and support services designed to meet the needs of individuals who are unable to perform basic activities of daily living independently—were estimated using data from Yang et al., applying a 19.5% increased probability of LTC entry for women with obesity and 11.5% for men with severe obesity [15, 16]. We estimated the number of seniors with obesity admitted to LTC facilities in Canada and calculated the total excess cost using an average of $63,000 per capita, representing the additional cost of living in a LTC facility compared to the non-institutionalized civilian population [17, 18].

Indirect cost estimation

We used data from the CCHS (2011–2016, $n = 200{,}571$) to estimate obesity-related absenteeism among employed workers. Absenteeism was analyzed using Poisson regression (Supplementary Table S4), with economic losses calculated by multiplying additional missed workdays due to obesity by the average daily wage of Canadian employees in 2023 (stratified by age and gender). It has been suggested the true value of productivity costs to employers is significantly higher than the cost of wages [19, 20], and indirect cost of absenteeism and presenteeism include diminished team productivity, lower service or product quality due to understaffing, along with work environment–related problems [21, 22]. When a team member is unwell, it often falls to healthier employees to absorb the workload, leading to increased stress and potential burnout. This additional strain can reduce their own productivity and job satisfaction, further perpetuating a cycle of declining morale and efficiency. Employers also face financial repercussions, as they may need to invest in temporary staffing, overtime pay, or increased healthcare costs. Therefore, we applied a mean absenteeism wage multiplier of 1.97 to reflect the true costs of productivity loss for employers [20]. Predictive variables used in the model were age group, gender, racial background, marital status, and year of data collection.

Presenteeism was estimated based on CCHS (2011–2014, $n = 138{,}401$) data utilizing responses about reduced work activity due to long-term physical or mental conditions. Responses "sometimes" and "often" were used as proxies for presenteeism and converted into model parameters, with productivity loss extrapolated from the literature. "Sometimes" indicated productivity reductions of 5%, 10%, and 15%; "often" indicated reductions of 15%, 23%, and 30% for a low, medium, and high range. A multivariate ordinal logistic regression model analyzed the impact of presenteeism for employees with obesity versus healthy weight (Supplementary Table S5). The cost was calculated by multiplying additional presenteeism days by the average wage of Canadian employees, stratified by age group and gender [23], with a wage multiplier of 1.54 to reflect true productivity loss [20].

Excess benefit payments for obesity-related disability were estimated by comparing CCHS (2011–2016, $n = 362{,}051$) records of adults with obesity to a matched healthy weight cohort. Our analysis found that 45% of adults with obesity and disability did not work in the prior 12 months, and 6% did not work in the prior week. Assuming these individuals received Canada Pension Plan (CPP) disability benefits, with an average monthly payment of $1,177 ($583 post-retirement) [24], we calculated the additional disability pension cost as the total period unable to work due to obesity-related disability multiplied by the CPP payment.

Premature mortality costs were estimated by applying population attributable fractions (PAFs) calculated utilizing estimates of relative risk of obesity related comorbidities (Supplementary Table S6) for leading causes of death to Canada's mortality data, by age group and gender, to estimate deaths attributed to obesity. We then calculated how many individuals who died prematurely in the past decade would have been in the workforce in 2023, based on labor force participation rates by demographic, and their expected earnings (Supplementary Table S7).

Income impacts were modeled using CCHS data (2013–2018, $n = 302{,}658$) on self-reported annual income, categorized into six groups - no income, less

than $20,000, $20,000 to $39,999, $40,000 to $59,999, $60,000 to $79,999, and $80,000 or more. For modelling, we used the medians within each income category ($0, $10,000, $30,000, $50,000, $70,000) and $90,000 for the top category as proxies in the multivariate generalized regression model. We analyzed the impact of obesity on individual income among men and women, as well as tax implications (federal and provincial), using regression and published mean effective tax rates (Supplementary Tables S8 and S9).

Workforce participation rates were derived from CCHS (2013–2018, $n = 302,658$) responses about employment among adults over the past year. We compared participation rates between individuals with obesity and healthy weight and estimated the number of individuals who would otherwise be employed based on applying the non-obesity employment rate to the number of individuals with obesity. Estimated incremental costs from reduced participation was then calculated by applying the number of individuals who would otherwise be employed and average earnings by age group and gender, and associated tax implications based on average earnings when employed [23]. Supplementary Table S10 summarizes differences in indirect cost outcomes by obesity status and gender.

Sensitivity analysis

To account for uncertainty in the study sample and model inputs derived from various sources, we conducted a deterministic sensitivity analysis to test the robustness of our findings. To calculate a high and low range, we varied key input variables within their 95% confidence intervals and adjusted key assumptions to their upper and lower ranges, which include variation on obesity-related medical service utilization, per capita cost of LTC facility, proportion of adults with obesity-related disability, PAF of modeled medical conditions, proportion of employees affected by presenteeism and absenteeism as well as the reduced income due to reduced workforce participation (Supplementary Table S11).

Results

The total cost of inaction in treatment of obesity in Canada in 2023 is estimated at $27.6 billion. This includes $5.9 billion in direct healthcare costs (Table 1) and nearly $21.7 billion in indirect costs due to increased absenteeism and presenteeism, additional disability pension payments, reduced productivity, lower workforce participation, and premature death (Table 2). Additionally, federal, and provincial governments could gain nearly $5.1 billion in additional tax revenue in the absence of obesity.

Table 1 presents the breakdown of healthcare resource utilization and associated medical costs attributed to obesity. Individuals with obesity showed higher rates of medical visits compared to those with healthy weight (matched based on demographic variables). Specifically, obesity is associated with 1.7 more visits to general practitioner offices, 0.5 more visits to specialist offices, 0.2 more visits to emergency departments, 0.2 more days of hospital stays, 0.2 more home health visits, and 16.4 more prescription drug refills annually. Consequently, the incremental annual costs due to obesity were $75, $50, $27, $147, $23, $26, and $245 for generalist office visits, specialist office visits, emergency department services, hospital stays, home health visits, and prescription drug refills, respectively. The total incremental annual medical costs per person with obesity sum to $572, totaling nearly $5.4 billion nation-wide. Additionally, obesity-related complications are estimated to result in an additional 10,150 admissions to long-term care (LTC) facilities in 2023, costing $639 million.

Obesity leads to reduced economic output from absenteeism, presenteeism, disability, and premature mortality, and also raises worker compensation costs [25]. We estimate a 1% higher rate of disability among adults associated with obesity, resulting in 43,000 individuals unable to work due to obesity-related causes (Table 2) and $268 million in excess pension costs. Additionally, about 45,200 annual deaths attributable to obesity result in $2.0 billion in lost wages (Table 2).

Obesity disproportionately impacts women's workforce participation. Although overall employment rates differ among men and women, women with obesity are 5.3% less likely to be employed than women with healthy weight, while for men obesity reduces the likelihood of employment by 0.3% (Supplementary Table S10). Applying these percentages to the workforce in 2023, we estimated that about 130,300 more adults (approximately 37,400 men and 92,900 women) with obesity would be employed if they were in the healthy weight category, resulting in nearly $8.2 billion in lost wages with nearly $1.2 billion less in associated federal and provincial income taxes (Table 2). Additionally, women with obesity earned, on average, $1,461 (4%) less annually than women with healthy-weight (Supplementary Table S10), resulting in nearly $3.8 billion in lost income and $807 million less in tax revenues nationally. Obesity appears to have no impact on earnings for men.

Furthermore, after adjusting for age, race, and marital status, we found that among female employees, those with obesity are 2.2% more likely to report missing workdays due to chronic conditions and 0.8% more likely to report missing workdays due to workplace injuries compared to their healthy-weight peers (Supplementary Table S10). In contrast, among male employees, obesity is associated with a 0.4% and 0.2% higher likelihood of

Table 1 Annual healthcare resource utilization and direct medical cost of obesity

	Age Group												
	18–34			35–49			50–64			65 and above			All
	Healthy Weight	Obesity	Obesity Impact	Healthy Weight	Obesity	Obesity Impact	Healthy Weight	Obesity	Obesity Impact	Healthy Weight	Obesity	Obesity Impact	Obesity Impact
Per capita healthcare utilization													
Generalist office visits [a]	3.7	5.0	1.3	3.8	5.8	2.1	4.7	6.5	1.8	5.5	7.0	1.5	1.7
Specialist office visits [a]	1.9	2.3	0.4	1.8	2.4	0.6	2.0	2.5	0.6	1.9	2.4	0.5	0.5
Hospital days [a]	0.5	0.7	0.2	0.5	0.6	0.1	0.6	0.9	0.3	1.5	1.8	0.3	0.2
Emergency visits [b]	0.3	0.5	0.2	0.3	0.5	0.2	0.3	0.5	0.2	0.6	0.7	0.1	0.2
Home health visits [b]	1.2	1.7	0.5	1.3	2.5	1.2	5.1	5	-0.1	21.2	20.3	-0.9	0.2
Prescription refills [b]	6.4	12.6	6.2	11.6	26.1	14.6	26.2	48.5	22.3	41.1	61.8	20.8	16.4
Per capita healthcare cost attributed to obesity													
Generalist office visits			$57			$91			$80			$67	$75
Specialist office visits			$35			$57			$48			$59	$50
Hospital days			$138			$71			$192			$192	$147
Emergency visits			$15			$36			$28			$17	$27
Home health visits			$14			$35			$48			$0	$26
Prescription refills			$94			$216			$332			$314	$245
Sum of per capita cost of obesity			**$366**			**$506**			**$728**			**$650**	**$572**
Adults with obesity			1,969,900			2,555,500			2,605,100			2,117,900	9,248,400
LTC cost of obesity													
Admitted to LTC due to obesity-related cause												10,147	10,147
Aggregate LTC cost of obesity ($ million)												$639	$639
Total healthcare cost of obesity ($ million)			$721			$1,293			$1,895			$1,377	$5,925

Data sources: [a] Derived from the Canadian Community Health Survey (2011–2016); [b] Derived from the Medical Expenditure Panel Survey (2015, 2016, 2018, 2020)

Table 2 Estimated productivity and income-related indirect cost of obesity

	# Adults	Per capita excess cost of obesity ($)	National Estimate ($ million)
Total indirect costs of obesity			**$21,664**
Higher pension costs from obesity-related disability	43,000	$3,150	$268
Lost productivity from excess mortality	45,200	$43,780	$1,979
Absenteeism			$682
From obesity-related chronic conditions	5,335,000	$567	$463
From obesity-related injuries	2,315,000	$95	$219
Presenteeism	5,335,000	$1,274	$6,798
Reduced work force participation	130,300	$62,584	$8,152
Lower personal income associated with obesity among working women	2,591,000	$1,461	$3,785
Total federal and provincial tax implication of obesity			**$5,133**
Income tax revenue loss from reduced work force participation	130,300	$8,905	$1,160
Income tax revenue loss from lower earnings	2,591,000	$311	$807
Sales and corporate tax revenue loss from reduced economic activity			$3,166

missing workdays due to chronic conditions and injuries, respectively, compared to their healthy-weight peers.

Obesity-related presenteeism was estimated based on the CCHS (2011–2014) question of whether a long-term physical condition or mental condition or health problem reduce the amount or the kind of activity of the person. Three answer options to the question are "sometimes", "often" and "never" and we used sum of the first two answers as the proxy to indicate implication of presenteeism. Among female employees, obesity is associated with a 8.4% increase in people responding "sometimes" and 3.6% increase in people responding "often" compared to responses for women with healthy-weight (Supplementary Table S10). Among male employees, obesity is associated with a 4.3% increase in responding "sometimes" and a 2.3% increase in responding "often". We estimated the total cost of absenteeism due to obesity at $682 million and presenteeism at nearly $6.8 billion (Table 2).

The federal and provincial governments reported nearly $202.8 billion in consumption/sales tax revenues and $116.8 billion in business tax revenues in 2022 [26]. Since our estimated total indirect cost of obesity is about 1.0% of Canada's $2.2 trillion gross domestic product (GDP), we assume that sales and business activities would also be about 1.0% higher in the absence of obesity. This would result in approximately $2.0 billion more in consumption/sales tax revenues and nearly $1.2 billion more in business tax revenues (Supplementary Table S12). Combining this with the lost income tax revenue due to premature death, reduced labor force participation, and lower individual income, we estimate that obesity resulted in $5.1 billion in lost income, sales, and business tax revenues.

Our sensitivity analysis suggests that the estimated total attributable cost of not treating obesity ranges from $21.1 billion to $35.1 billion, depending on variations in key model input variables (Table 3). The range for direct medical costs is $3.7 billion to $8.9 billion, and the range for productivity-related indirect costs is $17.4 billion to $26.2 billion.

Discussion

Our $27.6 billion estimate, including $5.9 billion in higher healthcare costs and $21.7 billion in reduced productivity, reveals a substantial economic burden of obesity in Canada, underscoring the critical need for effective chronic disease management and treatment strategies to address existing obesity. Our estimates align with other economic models of obesity disease in Canada. For instance, Kotsopolous et al. estimated the fiscal burden of obesity in Canada at $23 billion in 2021 ($25.3 billion in 2023$), with close to $8.0 billion in healthcare costs [9]. Another study from 2015 reported $23.3 billion ($27.7 billion in 2023$) in annual obesity-related costs [27]. These estimates align with the base case presented here, and fall within sensitivity analyses ranges, with differences reflecting the use of more recent data and multiple input sources in the current model. While the total economic costs are similar, there are differences in the value of the components of total cost. Given the strong link between obesity and related conditions like type 2 diabetes, the direct and indirect costs associated with obesity also highlight the economic burden of various comorbidities. This underscores the need for comprehensive prevention and management strategies that address both obesity and its related conditions.

Study findings indicate that obesity affects women more significantly than men in terms of higher rates of absenteeism and presenteeism, lower workforce participation, and reduced income levels compared to their healthy-weight peers. These findings are consistent with published studies that obesity decreases the probability of employment and wages more for women than for men. For example, it was shown among young American

Table 3 Summary of direct and indirect costs of inaction in obesity

	Estimated cost	*Estimated cost (lower limit)	*Estimated cost (upper limit)
Direct medical cost, $ billion	**$5.9**	**$3.7**	**$8.9**
Person level estimate (office visit, inpatient, emergency department, Rx, home health), $ million	$5,286	$3,132	$8,230
Long term care facility, $ million	$639	$580	$699
Pension and productivity related cost, $ billion	**$21.7**	**$17.4**	**$26.2**
Higher pension cost due to obesity-related disability, $ million	$268	$233	$304
Lost productivity due to excess mortality, $ million	$1,979	$1,951	$2,023
Absenteeism, $ million	$682	$493	$871
Due to obesity-related chronic conditions, $ million	$463	$347	$579
Due to obesity-related injuries, $ million	$219	$146	$292
Presenteeism, $ million	$6,798	$4,085	$9,804
Less income due to reduced work force participation, $ million	$8,152	$7,948	$8,355
Less personal income associated with obesity, $ million	$3,785	$2,663	$4,826
Grand total (direct + indirect cost), $ billion	**$27.6**	**$21.1**	**$35.1**

*Upper and lower cost estimates are based on sensitivity analyses

workers, women with obesity have longer unemployment duration than men [28]. Another study reported obesity class II and III increased the probability of taking an early retirement by 1.5% for men and by 2.5% for women among workers nearing retirement [29]. It was reported that absenteeism rates are almost three times higher among women with obesity than their male counterparts, and the weight status of male workers is not associated with absenteeism [30]. These obesity-related gender disparities exacerbate other economic disparities such as increased hiring discrimination, pay gaps, higher healthcare costs, and limited access to professional development.

The economic implications of obesity extend to government revenues, with an estimated $5.1 billion lost in income, sales, and business tax revenues. These estimates might be conservative, as they do not fully account for the economic multiplier effect. In addition, the $5.9 billion in higher healthcare costs, largely paid by public ministries of health, highlights the significant cost of obesity to government budgets.

We calculated the cost of obesity-related mortality based on the demographics of people who died in the prior decade who likely would have been in the workforce in 2023 (45,200 adults), with a total cost valued at $2.0 billion based on expected earnings (average $43,780). The recommendation for valuing a statistical life for Canadian government studies is $6.5 million in 2007$ ($8.5 million in 2023$) [31]. Applying this $8.5 million number to the estimated 39,200 adults with obesity-attributed deaths in 2023 would value their deaths at $333 billion.

Our study has several limitations. First, the healthcare service utilization data was derived from the CCHS and MEPS surveys, both of which rely on self-reported information. As a result, the direct medical cost estimates may be subject to underreporting and potential bias. While we utilized Canadian-based data where available, some estimates were derived from U.S. or other countries (e.g., comorbidity risk ratios, LTC utilization, and wage multipliers for absenteeism and presenteeism). The CCHS income data were grouped and converted to median income for modeling, possibly underestimating the economic impact of obesity. The percentage decrease in earnings due to obesity in our study is about half of what other countries report [32, 33]. Additionally, the CCHS did not ask explicitly about obesity's impact on work limitations, which may affect the accuracy of presenteeism cost estimates. We calculated national outcomes, but future research might use provincial data to capture regional variations and provide more targeted insights. We also did not include cost implications for children, although these costs might be minimal [34]. Moreover, we lacked data on employer-provided services like short- or long-term disability benefits, likely exceeding our CPP-based estimates.

Furthermore, our analysis may have been affected by unmeasured confounding factors that could influence the strength of the relationship between obesity and the outcomes. Factors such as lifestyle factors (e.g., physical activity, dietary habits) and access to healthcare services were not comprehensively controlled for, potentially leading to either an over- or underestimation of the economic costs attributed to obesity. Finally, we did not quantify humanistic costs, such as emotional well-being and family impacts, which are crucial for a holistic prevention and treatment strategy.

Conclusion

This study provides a comprehensive and updated estimate of the economic burden of obesity in Canada. In 2023, the total cost of inaction in the treatment of obesity among adults in Canada is estimated to be $27.6 billion, including $5.9 billion in higher healthcare costs and $21.7 billion in reduced productivity. These findings underscore the urgent need for effective public health strategies to manage obesity effectively, which could yield substantial economic benefits alongside improved health outcomes.

Abbreviations

BMI	Body Mass Index
CCHS	Canadian Community Health Survey
MEPS	Medical Expenditure Panel Survey
LTC	Long Term Care
CPP	Canadian Pension Plan
PAF	Population Attributable Fractions
GDP	Gross Domestic Product

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-21905-2.

Supplementary Material 1

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Not applicable.

Author contributions

FC designed the study, acquired, analysed, and interpreted the data, and drafted the manuscript. TS led the literature review, acquired, analysed and interpreted the data, and drafted the manuscript. ZN contributed to the literature review and drafting of the manuscript. TMD conceived and designed the study, drafted, and revised the manuscript. IP and SS critically revised the manuscript for important intellectual content.

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Data availability

Data used for analysis available at: https://meps.ahrq.gov/mepsweb/data_stats/download_data_files.jsphttps://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey%26;Id=1531795 Code for the model available upon request.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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