

The purpose of our presentation is to

1. The Prevalence of Diabetes in Canada
2. Its impact on People, Healthcare and the economy in Ontario vs the other parts of Canada
3. The risk factors associated with Diabetes
4. Current measures taken by the federal, provincial and/or municipal governments and public health agencies to address the issue
5. Challenges in Ontario
6. Key stakeholders
7. Strategies to tackle this epidemic
8. Recommendations to address this public health issue

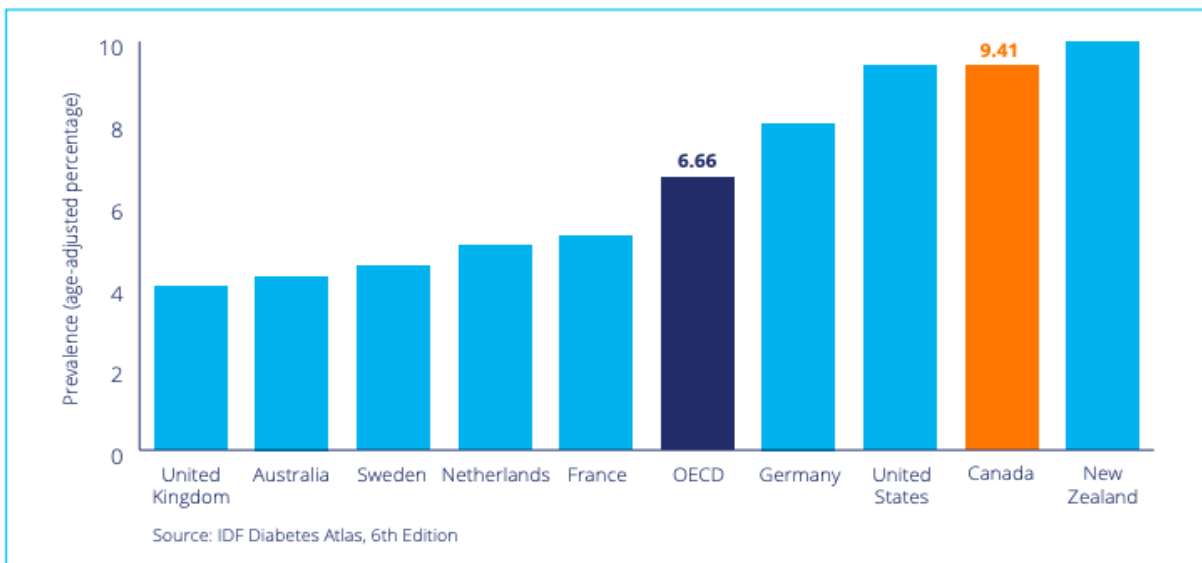
1. The Issue: The Prevalence of Diabetes in Canada

Diabetes is the most common chronic diseases affecting people and the rates are continuously rising around the world. It's a chronic metabolic disease characterized by high levels of glucose in the blood, and the onset can often be influenced by factors like genetics, obesity, lack of physical activity, and unhealthy diet. Three main types of diabetes are Type 1, Type 2 and gestational diabetes. Diabetes, particularly Type 2 Diabetes, poses a significant public health concern in Canada due to its growing prevalence and its associated health complications. The international Diabetes Federation has listed Canada as one of the worst OECD countries for Diabetes prevalence. One in every 3 Canadian has diabetes or prediabetes and one Canadian is diagnosed with diabetes every 3 minutes. As of 2022, about 11 million Canadians are estimated to be living with diabetes or prediabetes, a figure expected to rise in the coming years.

Below image

(<https://www.diabetes.ca/DiabetesCanadaWebsite/media/Advocacy-and-Policy/Diabetes-360-Recommendations.pdf>)

Diabetes (types 1 and 2) prevalence in Canada and OECD peer countries



Living with diabetes can drastically affect an individual's life. It's a leading cause of blindness, kidney failure, heart attacks, and lower limb amputation. Besides these severe health consequences, diabetes can also impact a person's mental health, contributing to conditions like depression and anxiety. It is estimated that the all-cause mortality rate among Canadians living with diabetes is twice as high as the all-cause mortality rate for those without diabetes. As such, diabetes is a significant concern that calls for immediate attention.

2. The Impact: in Ontario compared to other parts of Canada

The increasing prevalence of diabetes in Canada has profound implications, not only for those affected but also for the healthcare system and the broader economy. According to the Canadian Diabetes Association, diabetes cost the Canadian healthcare system about \$3.8 billion in 2020, a figure expected to rise due to increasing prevalence. These costs are tied to hospitalizations, medications, physician visits, and managing diabetes-related complications. A report by Diabetes Canada from 2022, indicated that majority of Canadians pay more than 3% of their income or over \$1,500 per year for prescribed medications, devices and supplies out-of-pocket. It's also worth noting that individuals living with diabetes often incur substantial out-of-pocket expenses related to medications, supplies, and other health services, which can impose a significant financial burden.

Estimated Prevalence and Cost of Diabetes

Prevalence (1)	2022	2032
Diabetes (type 1 + type 2 diagnosed + type 2 undiagnosed)	5,719,000 / 14%	7,277,000 / 17%
Diabetes (type 1 and type 2 diagnosed)	4,003,000 / 10%	5,094,000 / 12%
Diabetes (type 1)	5-10% of diabetes prevalence	
Diabetes (type 1 + type 2 diagnosed + type 2 undiagnosed) and prediabetes combined	11,704,000 / 30%	13,965,000 / 33%
Increase in diabetes (type 1 and type 2 diagnosed), 2022-2032	27%	
Out-of-pocket cost per year (2)		
Type 1 diabetes on multiple daily insulin injections	\$1,100-\$2,600	
Type 1 diabetes on insulin pump therapy	\$1,400-\$4,900	
Type 2 diabetes on oral medication	\$1,200-\$1,900	

(https://www.diabetes.ca/DiabetesCanadaWebsite/media/Advocacy-and-Policy/Backgrounder/2022_Backgrounder_Canada_English_1.pdf)

In addition to direct healthcare costs, there are considerable indirect costs associated with diabetes. Productivity loss due to absenteeism and work disability, early retirement, and premature mortality all contribute to the economic burden of diabetes. Moreover, the impact of diabetes extends beyond financial considerations. The disease can severely affect individuals' quality of life, limit their daily activities, and lead to emotional and psychological distress. Given the multifaceted impacts of diabetes, preventing its onset and managing its progression are crucial.

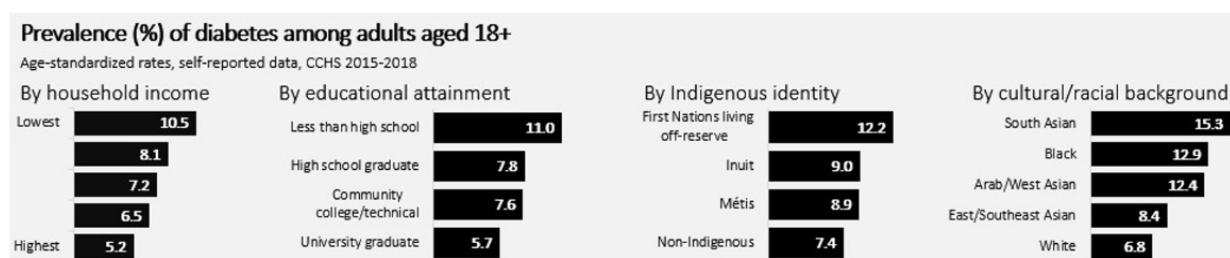
The direct cost of Diabetes to the health care system is the highest in Ontario compared to the other provinces in Canada, followed by British Columbia and Alberta. Ontario spends nearly \$1 billion annually for treatment of diabetes and its complications. The Direct cost to the health care system in Ontario was 1.7 billion for 2022, and it is expected to rise considering the anticipated rise in the number of people developing diabetes.

Prevalence -2022	Diabetes (Type 1+ Type 2 diagnosed+ Type 2 undiagnosed)	Diabetes (Type 1+ Type 2 diagnosed)	Diabetes (Type 1+ Type 2 diagnosed+ Type 2 undiagnosed) and prediabetes	Cost
BC	825,000 / 16%	577,000 / 11%	1,636,000 / 31%	\$565M
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MB	283,000 / 18%	151,000 / 10%	412,000 / 28%	\$152M
ON	2,346,000 / 15%	1,643,000 / 10%	4,713,000 / 30%	\$1.7B
NL	102,000 / 19%	72,000 / 13%	190,000 / 35%	\$70M
PE	25,000 / 15%	17,000 / 11%	50,000 / 31%	\$19M
NS	173,000 / 17%	121,000 / 12%	335,000 / 33%	\$114M
NB	152,000 / 19%	106,000 / 14%	274,000 / 35%	\$110M
Canada	5,719,000 / 14%	4,003,000 / 10%	11,704,000 / 30%	

(<https://www.diabetes.ca/media-room/press-releases/diabetes-rates-continue-to-climb-in-canada>)

The risk factors associated with Diabetes

Diabetes isn't evenly distributed across the population, with a pronouncedly higher incidence among Indigenous populations, seniors, lower-income individuals, and certain ethnic communities like South Asian, African, Arab, Hispanic, and Chinese. This disproportionate distribution can be traced back to socio-economic factors, cultural practices, and accessibility to healthcare services and healthy food options.



<https://www.canada.ca/en/public-health/services/publications/diseases-conditions/framework-diabetes-canada.html>

Challenges:

Ontario has more people living with diabetes than anywhere else in the country and has unique challenges in preventing Diabetes and meeting the needs patients living with diabetes

1. Non-modifiable risk factors

- a. The risk of developing type 2 diabetes increases with age : 16% of ontarians are above the age of 65
- b. Certain ethnic communities like South Asian, African, Arab, Hispanic, and Chinese have increased risk of developing diabetes: 32.2 % of ontarians are self-identified as South Asias, African. Arab, Asian, Hispanic
- c. 374,395 Indigenous people in Ontario face significant high risk of diabetes and related adverse health consequences than overall population
- d. Adult men are at increased risk of developing type 2 diabetes compared to adult women

2. Individual-level modifiable factors

- a. High rates of physical inactivity: 48.4% adults and 58.4% youth are physically inactive
- b. Obesity and overweight: 35.2% adults are living with overweight, 28.4% adults are living with obese, 21.7% youth living with obesity and overweight
- c. Not eating enough fruits and vegetables: 78% of adults not consuming enough fruits and vegetables
- d. Smoking; 11.6% adults use tonacco

3. Social determinants of health that influence Individual-level modifiable factors

- a. Increased financial constrains for people with low income and living with diabetes Ontario has highest prevalence of low income among all provinces(based on low-income cut-off after taxes)
- b. High out-of-pocket costs for Ontarians living with diabetes : especially for those not having coverage for medications and supplies through ontarios publicly funded programs or private plan or due to high public drug program deductibles, lack of public funding for devices, essential supplies or annual limits on coverage through private plans

(<https://www.diabetes.ca/advocacy---policies/advocacy-reports/national-and-provincial-backgrounders/diabetes-in-ontario>)

70 % of Ontarians living with diabetes have reported difficulty to pay for health care bills as most of them have to pay out of pocket

4 out of 10 report absentee from work due to diabetes related health conditions leading to overall economic loss

(<https://www.diabetes.ca/media-room/press-releases/new-data-shows-diabetes-rates-and-economic-burden-on-families-continue-to-rise-in-ontario->)

(<https://www.diabetes.ca/advocacy---policies/advocacy-reports/national-and-provincial-backgrounders/diabetes-in-ontario>)

3. Current Situation:

Currently, the Canadian government at various levels is taking measures to address diabetes.

At the Federal level:

1. As per Bill C-237, An act to establish a National Diabetes Framework - A framework for Diabetes in Canada was developed the Public health Agency of Canada by undertaking stakeholder consultation such as representatives from the provincial and territorial governments responsible for health, indigenous groups and relevant stakeholders- three Federal, provincial and territorial mechanisms (FPT)- FPT group on nutrition, sports physical activity and recreation and health support committee-

The framework of Diabetes in Canada is based on Cross-cutting principles and Framework components

Cross-cutting principles

Addressing health equity

Applying a person-centered approach

Differentiation between types of Diabetes

Supporting innovation

Promoting leadership, collaboration and information exchange

Framework components

Prevention

Management, treatment and care

Research

Surveillance and Data collection

Learning and knowledge sharing

Access to diabetes devices, medicines and financial support

2. Development of Diabetes 360 framework: A framework for diabetes strategy in Canada

3. Budget 2021: \$35 million over 5 years for diabetes research, surveillance, prevention and innovation. Also added enhanced disability Tax credit by expanding the list of permitted activities that can be counted towards the 14 hour per week eligibility criteria under life-sustaining therapy

4. At the federal level, the "Healthy Eating Strategy" launched by Health Canada aims to make the healthier choice the easier option. This strategy includes initiatives like improving food labeling, reducing the intake of processed foods high in sugar, sodium, and saturated fat, and banning industrial trans fats.

5. A parliamentary All-Party Diabetes caucus was convened to meet at least twice a year to advocate diabetes related issues in partnership with Diabetes Canada.

At the provincial level: At the provincial level, several programs are designed to manage and prevent diabetes.

1. In November 2021, the government expanded public funding for isCGM- intermittently-scanned Continuous Glucose Monitoring system to include Freestyle Libre 2 for all Ontario Drug Benefit clients who use insulin and have valid prescription from their physicians

2. In November 2017, the government announced \$8 million over three years and continues to fund offloading devices to help improve patient outcomes and reduce the risk of amputations
3. OHIP+ provides over 4,400 drug products at no cost for ontarians <24 years of age who are not covered by private plan
4. Seniors>65 years with high prescription drug costs relative to their income may receive coverage through Ontario drug benefit and Trillium Drug program, however deductibles and co-pay apply
5. The monitoring for health programs provides reimbursement for supplies such as strips for about \$ 920/ year for patients who use insulin or have gestational diabetes
6. Insulin syringes for seniors program provides \$170/year to help with the cost of syringes for seniors >65 years who use insulin
7. Ontario's Diabetes Prevention Program focuses on lifestyle interventions that promote healthy eating and physical activity.

At the municipal level, there are numerous community programs and events that promote physical activity and healthy eating.

Ontario Diabetes Initiatives in Progress

1. Northern Diabetes Health Network
Northern Ontario had the highest rates of diabetes-related death and hospitalization in Ontario. A network of 37 diabetes education programs in local and remote communities across northern Ontario was established to improve access to coordinated and comprehensive services. Innovative outreach initiatives include culturally appropriate programs for Aboriginal people, foot care services, and college certificate programs for diabetes education.
2. Southern Ontario Aboriginal Diabetes Initiative (SOADI)
In 1994, SOADI was created to develop and implement diabetes-related programs and services for Aboriginal people in southern Ontario. These programs and services focus on health promotion, disease prevention and diabetes management using both Western and traditional approaches such as traditional medicines, teachers and healers.
3. Seniors and Diabetes Initiative
In 1994, the Ministry of Health established a Seniors and Diabetes Committee to study diabetes as it affects seniors and to link seniors' issues to the overall diabetes strategy. The committee promotes a consistent, interdisciplinary clinical/management approach for seniors with type 2 diabetes who live in Long-Term Care Centres. Working groups are developing a step-by-step disease management approach and a diabetes management manual for front-line workers and now expanding to include seniors with type 2 diabetes living in the community.
4. Diabetes Complication Prevention Strategy
Four out of every 10 people with diabetes will develop debilitating and often life-threatening complications. In 1996, the Diabetes Complication Prevention Strategy was initiated to reduce and prevent diabetes-related complications such as eye, kidney and degenerative nerve disease by as much as 50 per cent by expanding diabetes

education programs in southern Ontario. Four regional adult and four regional pediatric networks work together as the Diabetes Complication Prevention Cooperative (DCPC).

5. Evaluation

The Ontario Diabetes Status Index consists of 10 indicators that measure the effect of diabetes on health and on health care services. Another set of data reflects the costs of diabetes care under major programs funded by the Ministry of Health and Long-Term Care. The Index and costing charts help in planning and evaluating diabetes services, determining if changes in services are improving people's health, and evaluating whether health care dollars are spent effectively to reduce the impact of diabetes.

6. Several other Governmental organizations and Non-Governmental Organizations

However, critics argue that these efforts are not enough, particularly considering the increasing prevalence of diabetes and the need for targeted interventions among high-risk populations.

4. Key Players:

Various key players are involved in the battle against diabetes in Canada. This includes patients living with Diabetes, care givers, healthcare providers, non-profit organizations, governmental agencies, indigenous groups, researchers and advocacy groups. Diabetes Canada is a key non-profit organization that not only provides support to individuals living with diabetes but also advocates for widespread screening, improved access to healthcare resources, and greater emphasis on diabetes research. Also, Public health Agency of Canada and representatives from the provincial and territorial governments responsible for health, indigenous groups and relevant stakeholders- three Federal, provincial and territorial mechanisms (FPT)- FPT group on nutrition, sports physical activity and recreation and health support committee- who were involved in the development of A framework for Diabetes in Canada.

However, implementing effective diabetes prevention strategies often faces resistance from certain sectors, particularly industries whose products contribute to the risk factors for developing diabetes. For instance, food and beverage industries may resist changes like stricter regulations on food labeling, advertising, and taxing sugary drinks, which could negatively affect their profits.

Local communities play a crucial role in diabetes prevention. Through grassroots initiatives, communities can promote healthier diets, increase physical activity, and raise awareness about diabetes. However, their effectiveness can be hindered by a lack of resources, funding, and the challenge of changing entrenched behaviors.

Moreover, public health agencies and healthcare providers are on the frontlines in managing and preventing diabetes. They provide critical services, including diabetes education, lifestyle modification support, medication management, and screening for diabetes and its complications. They also engage in research to understand the disease better and develop effective interventions.

5. What's Needed:

The experience of other countries provides valuable lessons. For instance, Finland's National Diabetes Prevention Program (FIN-D2D) has successfully reduced the incidence of diabetes by implementation of preventative approach. This initiative involved strategies like increased screening, treatment, lifestyle interventions through healthy diet and physical activity, awareness among the population and health care providers and intersectoral collaboration. A similar approach, adjusted for the specific context, could be beneficial in Ontario and other parts of Canada.

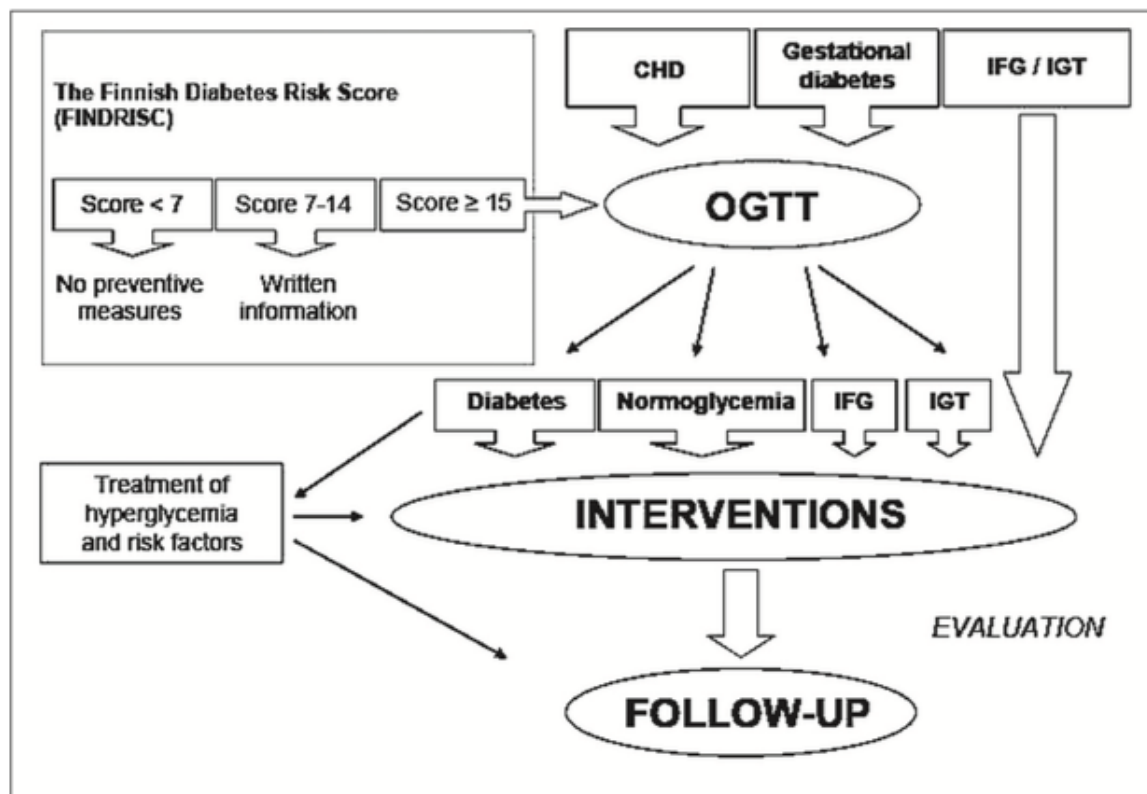


Figure 2. Flow chart of screening, diagnosis and intervention in the FIN-D2D project.

The aim of the program was to identify high risk subjects in the population by asking them to fill out the Finnish Diabetes Risk score which comprised of 8 scored question indicating the probability of developing Type 2 diabetes. This score could be completed at pharmacies, on the internet, at various public campaign events to get more people involved. And depending on their scores, they were followed up with written material or referral to life-style intervention programs. The programs were also tailored considering the patient centered approach. The strategies were evaluated to measure the effectiveness of the program. A similar Canada Diabetes Risk Questionnaire (CANRISK) has been developed. It is adapted from FINDRISC, after consulting The Public Health Agency of Canada (PHAC), group of clinical and academic experts and modifying it to accurately reflect the diabetes risk applicable to Canadians, by adding new

questions on ethnicity, education and gestational diabetes. A study published in 2022 to evaluate the implementation of the CANRISK tool, identified that the tool was used widely by allied health professionals, appealing and needed to assess the risk for developing Diabetes, however, there were certain barriers to implementation such as readability, confusing language and difficulty ascertaining body measurements. Improvement in the content, design and accessibility was recommended.

(<https://www.sciencedirect.com/science/article/pii/S1499267121001799>)

An peer reviewed article about health care cost in Canada indicated that population intervention (5% body weight reduction) and individual level risk reduction (10% reduction in the high risk groups) would save several million dollars in health care costs.

(<https://www.phac-aspc.gc.ca/publicat/hpcdp-pspmc/37-2/assets/pdf/ar-03-eng.pdf>)

In British Columbia, the Live 5-2-1-0 initiative encourages children to eat five servings of fruits and vegetables, have no more than two hours of screen time, engage in at least one hour of physical activity, and consume zero sugary drinks every day.

Similarly, coordinated and comprehensive efforts and rapid knowledge sharing are needed to address the complex issues around diabetes. The strategies should target specific outcomes against which progress can be measured to ensure efficacy and accountability. The strategies should be aligned with the principles of health equity and developed considering the requirements specific to the vulnerable communities and subgroups and should have a patient centered approach.

Based on available evidence, strategies focusing on prevention and early detection and treatment through lifestyle changes can significantly reduce the incidence of diabetes and diabetes related complications. Such interventions could involve multi-disciplinary but integrated programs promoting healthier eating, regular physical activity, and weight management. These interventions can be delivered through various settings, including schools, workplaces, and community centers. However, these interventions need to be adapted to the local context to be effective. With adequate knowledge and awareness, people will be able to appreciate the benefits of healthy lifestyle and good nutrition.

Screening for diabetes should be done every 3 years in individuals >40 years of age or at high risk using a risk calculator and even more frequently for people at very high risk using a risk calculator. The CANRISK questionnaire should be made easily available for people to access their risk. Knowing their risk will increase awareness and help people make healthy choices in order to reduce their risk or even prevent them from developing diabetes.

Mental health support should be provided to end stigma and help increase their sense of well-being.

Patients living with Diabetes should have improved access to treatment, medications, devices, life-style modification groups/ programs and regular follow-up to manage their diabetes.

Similarly, emphasis should be laid on choosing healthy diet (eating fruits and vegetables) and physical activity in children and youth. Improved care for students with Type 1 diabetes by reducing stigma, improved access to drugs, devices and technology and research

An essential aspect of preventing diabetes is addressing the social determinants of health, such as income, education, employment, and social support networks. Policies and programs aimed at improving these determinants can contribute significantly to preventing diabetes. For example, policies that support affordable housing and access to healthy food and restricting marketing of unhealthy foods and beverages can help reduce the risk of diabetes among low-income individuals.

Strategies should be developed considering unique concerns of indigenous people, prioritizing health, wellness and cultural safety, hence should be developed involving indigenous groups. These strategies should address disparities of health and determinants of health.

6. Conclusion/Recommendations:

Given the rising incidence of diabetes and its significant impact on individuals and society, it's crucial to prioritize diabetes prevention and management in Canada. The government at all levels should increase funding for public health interventions, such as community-based lifestyle modification programs and health education campaigns. In addition, stricter regulations on food labeling and advertising, along with taxes on sugary beverages, could help reduce the consumption of unhealthy food and drink.

However, there are potential challenges in implementing these strategies. These include resistance from industries affected by the changes and the inherent difficulty in changing lifestyle behaviors on a population-wide scale. Furthermore, the socioeconomic disparities in diabetes prevalence highlight the need to address the broader social determinants of health. Policies that reduce income inequality, improve education, and ensure access to health services and healthy food are crucial.

In conclusion, addressing the diabetes epidemic in Canada requires a comprehensive, multi-level approach that goes beyond healthcare. It involves health policies, social policies, community initiatives, and individual behavior change. Despite the challenges, such an approach can significantly improve the health and well-being of Canadians, reduce healthcare costs, and enhance societal productivity.

Slide 1: Introduction

Topic: Diabetes Prevention

Approach: Public Health

The purpose of our presentation is to understand the importance of diabetes prevention

- The Prevalence of Diabetes in Canada

- The risk factors associated with Diabetes
- Its impact on People, Healthcare and the economy in Ontario vs the other parts of Canada
- Current measures taken by the federal, provincial and/or municipal governments and public health agencies to address the issue
- Challenges in Ontario
- Key stakeholders
- Strategies to tackle this epidemic
- Recommendations to address this public health issue

Slide 2: Overview of Diabetes

Definition of diabetes.

Diabetes is a chronic condition characterized by the body's inability to effectively use the insulin it produces or an absolute deficiency in insulin, leading to high blood sugar levels.

There are three main types of diabetes: Type 1, Type 2, and gestational diabetes.

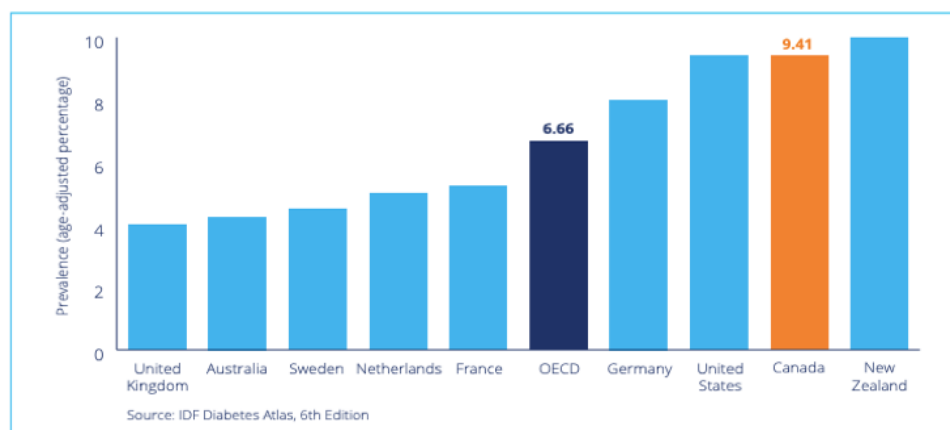
- Type 1 diabetes, often diagnosed in children and young adults, is an autoimmune condition where the body's immune system attacks and destroys the insulin-producing cells in the pancreas.
- Type 2 diabetes, the most prevalent form, affects about 90% of individuals with diabetes and is characterized by insulin resistance.
- Gestational diabetes is a temporary condition that occurs during pregnancy but increases the mother's risk of developing Type 2 diabetes later in life.

Slide 3: Brief statistics about diabetes in Canada compared to other OECD countries

The international Diabetes Federation has listed Canada as one of the worst OECD countries for Diabetes prevalence.

One in every 3 Canadian has diabetes or prediabetes and one Canadian is diagnosed with diabetes every 3 minutes.

Diabetes (types 1 and 2) prevalence in Canada and OECD peer countries



(<https://www.diabetes.ca/DiabetesCanadaWebsite/media/Advocacy-and-Policy/Diabetes-360-Recommendations.pdf>)

Slide 4: Brief statistics about diabetes in Canada and Growth trend over the years

As of 2022, about 11 million Canadians are estimated to be living with diabetes or prediabetes, a figure expected to rise in the coming years.

Estimated Prevalence and Cost of Diabetes

Prevalence (1)	2022	2032
Diabetes (type 1 + type 2 diagnosed + type 2 undiagnosed)	5,719,000 / 14%	7,277,000 / 17%
Diabetes (type 1 and type 2 diagnosed)	4,003,000 / 10%	5,094,000 / 12%
Diabetes (type 1)	5-10% of diabetes prevalence	
Diabetes (type 1 + type 2 diagnosed + type 2 undiagnosed) and prediabetes combined	11,704,000 / 30%	13,965,000 / 33%
Increase in diabetes (type 1 and type 2 diagnosed), 2022-2032	27%	
Out-of-pocket cost per year (2)		
Type 1 diabetes on multiple daily insulin injections	\$1,100-\$2,600	
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The increasing prevalence of diabetes in Canada has profound implications, not only for those affected but also for the healthcare system and the broader economy. It's also worth noting that individuals living with diabetes often incur substantial out-of-pocket expenses related to medications, supplies, and other health services, which can impose a significant financial burden. These expenses are tied to hospitalizations, medications, physician visits, and managing diabetes-related complications. A report by Diabetes Canada from 2022, indicated that majority of Canadians pay more than 3% of their income or over \$1,500 per year for prescribed medications, devices and supplies out-of-pocket.

Slide 5: Brief statistics about diabetes in Ontario compared to the rest of Canada

The direct cost of Diabetes to the health care system is the highest in Ontario compared to the other provinces in Canada, followed by British Columbia and Alberta.

Ontario spends nearly \$1 billion annually for treatment of diabetes and its complications. The Direct cost to the health care system in Ontario was 1.7 billion for 2022, and it is expected to rise considering the anticipated rise in the number of people developing diabetes.

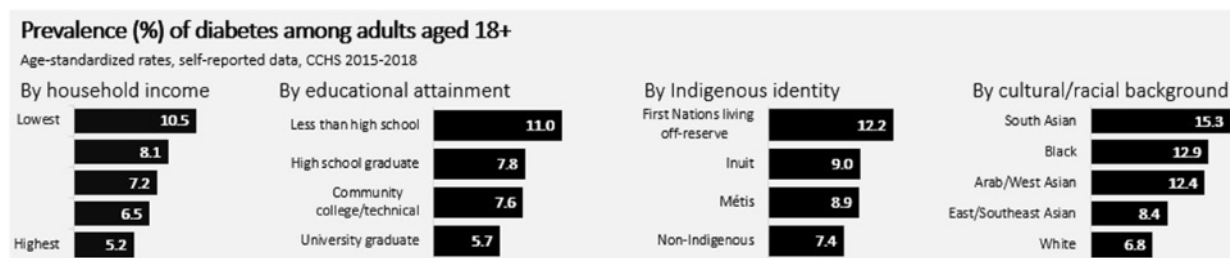
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(<https://www.diabetes.ca/media-room/press-releases/diabetes-rates-continue-to-climb-in-canada>)

Slide 6: Risk Factors

The risk factors for diabetes, particularly Type 2, include increasing age, family history of diabetes, overweight/obesity, lack of physical activity, and an unhealthy diet. Ethnicity also plays a significant role in diabetes prevalence in Canada. Indigenous populations, for instance, are 3 to 5 times more likely to develop diabetes.

- Age
- Family history
- Ethnicity
- Overweight/obesity
- Sedentary lifestyle
- Unhealthy diet
- Social determinants of health such as low socioeconomic status, education



(<https://www.canada.ca/en/public-health/services/publications/diseases-conditions/framework-k-diabetes-canada.html>)

Slide 7: Current Public Health Measures in Canada

A. At the Federal level:

1. As per Bill C-237, June 2021, an act was passed to establish a National Diabetes Framework. The engagement process included several stakeholder consultation along with the Public health Agency of Canada. These included representatives from the provincial and territorial governments responsible for health, indigenous groups and relevant stakeholders. The framework of Diabetes in Canada is based on Cross-cutting principles and Framework components

Cross-cutting principles	Framework components
Addressing health equity	Prevention
Applying a person-centered approach	Management, treatment, care
Differentiation between types of Diabetes	Research
Supporting innovation	Surveillance and Data collection
Promoting leadership, collaboration and information exchange	Learning and knowledge sharing
	Access to diabetes devices, medicines and financial support

2. Budget 2021: \$35 million over 5 years for diabetes research, surveillance, prevention and innovation. Also added enhanced disability Tax credit by expanding the list of permitted activities that can be counted towards the 14 hour per week eligibility criteria under life-sustaining therapy
3. In 2016 the "Healthy Eating Strategy" was launched by Health Canada which was aimed to make the healthier choice the easier option. This strategy includes initiatives like improving food labeling, reducing the intake of processed foods high in sugar, sodium, and saturated fat, and banning industrial trans fats, increasing availability of nutritious food through nutrition North Program and supporting healthy eating through revising Canada's food guide.
4. A parliamentary All-Party Diabetes caucus was convened to meet at least twice a year to advocate diabetes related issues in partnership with Diabetes Canada.

Slide 8: Current Public Health Measures in Canada

B. At the provincial level:

At the provincial level, several programs are designed to manage and prevent diabetes.

- In November 2017, the government announced \$8 million over three years to fund offloading devices to help improve patient outcomes and reduce the risk of amputations and continues to do even now.
- In nov 2021, the government expanded public funding for intermittently-scanned Continuous Glucose Monitoring system to include Freestyle Libre 2 for diabetes self-management for all ontario Drug Benefit clients who use insulin and have valid prescription from their physicians
- OHIP+ provides over 4,400 drug products at no cost for ontarians <24 years of age who are not covered by private plan
- Seniors>65 years with high prescription drug costs relative to their income may receive coverage through Ontario drug benefit and Trillium Drug program, however deductibles and co-pay apply
- The monitoring for health programs which is funded by the Ministry of Health and Long-Term Care and administered by Diabetes Canada, provides reimbursement for supplies such as strips for about \$ 920/ year for patients who use insulin or have geststional diabetes
- Insulin syringes for seniors program provides \$170/year to help with the cost of syringes for seniors >65 years who use insulin
- Ontario's Diabetes Prevention Program launched in 2011 by Ontario's Ministry of Health and Long-Term Care, focuses on lifestyle interventions that promote healthy eating and physical activity.

Slide 9. Current Public Health Measures in Canada

C. At the municipal level,

In 1992, the Ontario Ministry of Health announced diabetes reform as a strategic priority and established a Diabetes Advisory Committee. This committee developed a 10-year strategic plan for designing and implementing effective programs to prevent diabetes and its complications.

The plan focused on people and communities at greatest risk with these initiatives.

Some of Ontario Diabetes Initiatives in Progress are

1. Northern Diabetes Health Network
2. Southern Ontario Aboriginal Diabetes Initiative (SOADI)
3. Seniors and Diabetes Initiative
4. Diabetes Complication Prevention Strategy
5. Evaluation
6. Many Governmental and non-governmental public health agencies
7. In addition, Community health centers play a crucial role by providing programs and services through one-on-one and group interactions for diabetes management.

Slide 10: Effectiveness and gaps and Public health challenges in Ontario

Considering the increasing trend in diabetes prevalence, targeted interventions among high-risk populations are required. An article by Public health Ontario indicated gaps in 2 core areas, identification and development of core indicators to measure outcomes and data gap due to lack

of data sources.

(<https://www.publichealthontario.ca/-/media/documents/P/2016/public-health-indicator-gaps.pdf>)

Challenges

Ontario has unique challenges in preventing Diabetes and meeting the needs patients living with diabetes

1. Non-modifiable risk factors
 - age : 16% of ontarians are above the age of 65
 - Ethnicity: 32.2 % of ontarians are self-identified as South Asias, African. Arab, Asian, Hispanic
 - Indigenous people in Ontario face significant high risk of diabetes and related adverse health consequences than overall population
2. Individual-level modifiable factors
 - High rates of physical inactivity: 48.4% adults and 58.4% youth are physically inactive
 - Obesity and overweight: 35.2% adults are living with overweight, 28.4% adults are living with obese, 21.7% youth living with obesity and overweight
 - Inadequate consumption of fruits and vegetables: 78% of adults not consuming enough fruits and vegetables
 - Smoking; 11.6% adults use tonacco
3. Social determinants of health that influenceIndividual-level modifiable factors
 - financial constrains for people with low income and living with diabetes: Ontario has highest prevalence of low income among all provinces (based on low-income cut-off after taxes)
 - High out-of-pocket costs for Ontarians living with diabetes : especially for those not having coverage for medications and supplies through ontarios publicly funded programs or private plan or due to high public drug program deductibles, lack of public funding for devices, essential supplies or annual limits on coverage through private plans- 70 % of Ontarians living with diabetes have reported difficulty to pay for health care bills as most of them have to pay out of pocket
 - 4 out of 10 report absentee from work due to diabetes related health conditions leading to overall economic loss

(<https://www.diabetes.ca/advocacy---policies/advocacy-reports/national-and-provincial-backgrounders/diabetes-in-ontario>)

(<https://www.diabetes.ca/media-room/press-releases/new-data-shows-diabetes-rates-and-economic-burden-on-families-continue-to-rise-in-ontario->)

Slide 11. Key players

Various key players are involved in the battle against diabetes in Canada. This includes

- people living with diabetes
- health care providers and researchers
- diabetes education clinics/programs, family health teams and community health centres
- Indigenous health organizations
- mental health organizations

- public health units
- Local Health Integration Networks and Health Quality Ontario
- provincial and national professional associations
- digital health experts
- life sciences partners
- government (Public health Agency of Canada, Public health Ontario,
- diabetes organizations, other health charities and community-based groups (Diabetes Canada)

Some of the key agendas that these stakeholders are advocating for are

Health equity: advocating is addressing systematic barriers leading to health inequity and high rates for diabetes prevalence in certain sub-populations to achieve better health outcomes for all Ontarians

Engagement of patients in planning health services: patients should be engaged in all stages of planning and implantation of health services especially the vulnerable population, to understand their needs, identify barriers, ensure the services meet their values, preferences and needs

Collaboration: enhancing inter-professional collaboration and building well-coordinated teams to support enhanced data sharing and patient tracking, increasing linkage between and across health care sectors for better utilization of services

Improve data collection: improve data collection and sharing to inform policy development, clinical care standards, program planning and resource allocation and ensure ongoing monitoring and reporting to strengthen accountability and monitor effectiveness.

Providing Patient centered care: providing holistic care that considers the patient's physical, psychosocial and financial needs; creating "one stop shop" health hubs to make it easier for patients to access services which will take away the burden off the patient to navigate the system

Innovation: tailoring interventions to the needs of individual patients or groups and the need to develop predictive tools to better understand who should be targeted for specific interventions.

However, implementing effective diabetes prevention strategies often faces resistance from certain sectors, particularly industries whose products contribute to the risk factors for developing diabetes. For instance, food and beverage industries may resist changes like stricter regulations on food labeling, advertising, and taxing sugary drinks, which could negatively affect their profits.

Local communities play a crucial role in diabetes prevention. Through grassroots initiatives, communities can promote healthier diets, increase physical activity, and raise awareness about diabetes. However, their effectiveness can be hindered by a lack of resources, funding, and the challenge of changing entrenched behaviors.

Moreover, public health agencies and healthcare providers are on the frontlines in managing and preventing diabetes. They provide critical services, including diabetes education, lifestyle

modification support, medication management, and screening for diabetes and its complications. They also engage in research to understand the disease better and develop effective interventions.

Slide 12: whats needed: The Public Health Approach

(<https://www.sciencedirect.com/science/article/pii/S1751991821000425>)

A similar approach, adjusted for the specific context, could be beneficial in Ontario and other parts of Canada. A Canada Diabetes Risk Questionair (CANRISK) has been developed. It is adapted from FINDRISC, after consulting The Public Health Agency of Canada (PHAC), group of clinical and academic experts and modifying it to accurately reflect the diabetes risk applicable to Canadians, by adding new questions on ethnicity, education and gestational diabetes.

A study published in 2022 to evaluate the implementation of the CANRISK tool, identified that the tool was used widely by allied health professionals, appealing and needed to assess the risk for developing Diabetes, however, there were certain barriers to implementation such as readability, confusing language and difficulty ascertaining body measurements. Improvement in the content, design and accessibility was recommended.

(<https://www.sciencedirect.com/science/article/pii/S1499267121001799>)

An peer reviewed article about health care cost in Canada indicated that population intervention (5% body weight reduction) and individual level risk reduction (10% reduction in the high risk groups) would save several million dollars in health care costs.

(<https://www.phac-aspc.gc.ca/publicat/hpcdp-pspmc/37-2/assets/pdf/ar-03-eng.pdf>)

In British Columbia, the Live 5-2-1-0 initiative encourages children to eat five servings of fruits and vegetables, have no more than two hours of screen time, engage in at least one hour of physical activity, and consume zero sugary drinks every day.

Slide 13: what's needed: Key strategies

Similarly, coordinated and comprehensive efforts and rapid knowledge sharing are needed to address the complex issues around diabetes.

- The strategies should target specific outcomes against which progress can be measured to ensure efficacy and accountability.
- The strategies should be aligned with the principles of health equity
- developed considering the requirements specific to the vulnerable communities and subgroups
- should have a patient centered approach.

Slide 14: what's needed:Key strategies

1. Regular Screening

Reduce the risk of developing Diabetes- Based on available evidence, strategies focusing on prevention and early detection and treatment through lifestyle changes can significantly reduce the incidence of diabetes and diabetes related complications.

Increased awareness around regular screening guidelines for diabetes. Screening for diabetes should be done every 3 years in individuals >40 years of age or at high risk using a risk calculator and even more frequently for people at very high risk. The CANRISK questionnaire should be made easily available for people to access their risk. Knowing their risk will increase awareness and help people make healthy choices in order to reduce their risk or even prevent them from developing diabetes.

Measurable outcomes: ?

Slide 15: what's needed:Key strategies

2. Encouraging healthier lifestyles (including increased physical activity, healthier diet, healthy weight)

Healthy Eating

Role of diet in diabetes prevention

Suggestions for healthier eating

Community-based programs

Similarly, emphasis should be laid on choosing healthy diet (eating fruits and vegetables) and physical activity in children and youth.

Knowledge and access to Canadian food guide tailored to the patients needs

Healthy eating and physical activity are crucial components of diabetes prevention. A balanced diet rich in fruits, vegetables, lean proteins, and whole grains can help maintain a healthy weight and regulate blood sugar levels. Numerous community-based programs in Canada focus on promoting these lifestyle changes, including the "Food Skills for Families" program by the Canadian Diabetes Association.

Measured against?

Physical Activity

Importance of physical activity in prevention

Suggestions for physical activity

Community programs encouraging physical activity

regular physical activity can reduce the risk of developing Type 2 diabetes by aiding weight management and increasing the body's sensitivity to insulin.

Measured against?

Slide 16: what's needed:Key strategies

3. Accessible medical care and health services, Partnership with Healthcare Providers

Importance of healthcare providers in prevention

Ways of enhancing their roles

Interventions could involve multi-disciplinary but integrated programs promoting healthier eating, regular physical activity, and weight management. These interventions can be delivered through various settings, including clinics, schools, workplaces, and community centers. However, these

interventions need to be adapted to the local context to be effective. With adequate knowledge and awareness, people will be able to appreciate the benefits of healthy lifestyle and good nutrition.

Mental health support should be provided to end stigma and help increase their sense of well-being. Improved care for students with Type 1 diabetes by reducing stigma, improved access to drugs, devices and technology and research.

Patients living with Diabetes should have improved access to treatment, medications, devices, life-style modification groups/ programs and regular follow-up to manage their diabetes.

Slide 17: what's needed:Key strategies

4. Policies and programs considering Social determinants of health:

An essential aspect of preventing diabetes is addressing the social determinants of health, such as income, education, employment, and social support networks. Policies and programs aimed at improving these determinants can contribute significantly to preventing diabetes. For example, policies that support affordable housing and access to healthy food and restricting marketing of unhealthy foods and beverages can help reduce the risk of diabetes among low-income individuals.

Strategies should be developed considering unique concerns of indigenous people, prioritizing health, wellness and cultural safety, hence should be developed involving indigenous groups. These strategies should address disparities of health and determinants of health.

Slide 18: what's needed:Key strategies

5. Role of Public Health Education

Importance of education in prevention

Initiatives to provide diabetes education

Public health education plays a significant role in diabetes prevention. By promoting healthier diets, regular physical activity, and routine screenings, health education can contribute to a reduction in the risk factors associated with diabetes. Various initiatives in Canada aim to educate the public about diabetes, such as the Canadian Diabetes Association's "Just a Click Away" program, which provides online resources about diabetes.

Slide 19: Conclusion

Recap of key points

Call to action

Given the rising incidence of diabetes and its significant impact on individuals and society, it's crucial to prioritize diabetes prevention and management in Canada. The government at all levels should increase funding for public health interventions, such as community-based lifestyle modification programs and health education campaigns. In addition, stricter regulations on food labeling and advertising, along with taxes on sugary beverages, could help reduce the consumption of unhealthy food and drink.

However, there are potential challenges in implementing these strategies. These include resistance from industries affected by the changes and the inherent difficulty in changing lifestyle behaviors on a population-wide scale. Addressing these challenges and continuing to develop and implement effective public health strategies is crucial for the future of diabetes prevention in Canada. Furthermore, the socioeconomic disparities in diabetes prevalence highlight the need to address the broader social determinants of health. Policies that reduce income inequality, improve education, and ensure access to health services and healthy food are crucial.

In conclusion, addressing the diabetes epidemic in Canada requires a comprehensive, multi-level approach that goes beyond healthcare. It involves health policies, social policies, community initiatives, and individual behavior change. Despite the challenges, such an approach can significantly improve the health and well-being of Canadians, reduce healthcare costs, and enhance societal productivity.

The prevalence of diabetes is a significant health concern in Canada. As of 2023, over 3.6 million Canadians, roughly 9% of the population, are living with this chronic condition. This number continues to rise due to various factors, including an aging population, increasing obesity rates, and prevalent sedentary lifestyle habits. Therefore, it is vital to understand the public health approach to preventing diabetes, given its potential to reduce diabetes prevalence, lower healthcare costs, and improve the quality of life for Canadians.

Addressing these risk factors through a public health approach is essential in the prevention of diabetes. The cornerstone of this approach involves promoting healthy lifestyle choices within populations and communities. Current measures in place include public health campaigns promoting healthy eating and physical activity, routine screening programs, diabetes self-management education, and ensuring access to necessary healthcare services. Despite these measures, the prevalence of diabetes continues to rise, indicating the need for additional strategies and interventions.

Key public health strategies in diabetes prevention involve increasing public awareness, encouraging healthier lifestyles, advocating for regular screening, and ensuring accessible medical care. Greater awareness about diabetes and its risk factors can empower individuals to make informed decisions about their health. Encouraging healthier lifestyles can help reduce obesity rates, a significant risk factor for Type 2 diabetes. Regular screening allows for the early identification of prediabetes and subsequent intervention. Moreover, accessible medical care ensures that individuals have the resources necessary to manage their health effectively.

Although significant strides have been made in diabetes prevention, several challenges remain. Addressing these challenges and continuing to develop and implement effective public health strategies is crucial for the future of diabetes prevention in Canada. As the prevalence of diabetes continues to rise, further actions, including increased funding, enhanced health policies, and continued public education, are necessary for better prevention and management of this chronic condition.