

# Evidence *in* Context

Issue: Prevention & Screening  
for Type 2 Diabetes in NL  
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Health research – synthesized and contextualized for use in Newfoundland & Labrador

## Prevention and Screening for Type 2 Diabetes *in* Newfoundland & Labrador

Health system decision makers in NL recognize the burden that Type 2 Diabetes (T2D) places on both the individual and on the healthcare system. By focusing on prevention, they hope to improve population health in the province and to reduce the costs required to manage this chronic disease.

In an effort to help decision makers develop prevention strategies based on reliable evidence, the Contextualized Health Research Synthesis Program (CHRSP) identified and reviewed the best available scientific and economic evidence on the clinical and cost effectiveness of approaches that aim to reduce T2D incidence.

CHRSP personnel assembled a project team that included health system decision makers from the provincial government and the four regional health authorities, representatives of the Canadian Diabetes Association in NL, local physicians, and academic research partners. Dr. Laura Rosella, Assistant Professor at the Dalla Lana School of Public Health, served as Subject Expert for the project. Dr. Michel Grignon, Director of the Centre for Health Economics and Policy Analysis at McMaster University was the project's Health Economist, and Rosemary Goodyear, CEO of Central Health was the Health System Leader.



At its initial meeting, the project team decided to focus this report on two main areas of inquiry— namely, the clinical and cost effectiveness of:

- interventions to prevent diabetes in at-risk, asymptomatic adults; and
- screening for early T2D detection in adults in an effort to prevent further medical complications from the disease.

The project team developed a research question that was broad enough to encompass both areas of study. Because

there is such a large body of evidence on this topic, the team further narrowed its focus by placing limits on the population, interventions, and outcomes to be studied.

With the project parameters in place, Dr. Rosella and the CHRSP staff identified the relevant research literature, critically appraised and synthesized the evidence, and – with input from the project team – provided additional analysis and contextualization of the research findings for Newfoundland and Labrador.

This document provides a brief summary of the interventions studied in this CHRSP research synthesis; it outlines relevant local contextual considerations; and it concludes with implications of the research findings for the province's health system decision makers.

***“What interventions are likely to be effective in reducing the incidence of Type 2 Diabetes and its medical complications in the adult population of Newfoundland and Labrador?”***

**The Research Question:**

**Disclaimer:** This document is an executive summary of a larger report that contains fully referenced material. We have omitted references from this summary for the sake of brevity, but readers who wish to inspect these references can refer to the full report which is available at <http://www.nlcahr.mun.ca/CHRSP/> together with a companion document that details the project methodology.

Newfoundland & Labrador Centre for  
**APPLIED  
HEALTH  
RESEARCH**  
[www.nlcahr.mun.ca](http://www.nlcahr.mun.ca)

Read the full report here: <http://www.nlcahr.mun.ca/CHRSP/>

## The Evidence

The CHRSP project team searched for evidence on the clinical and cost effectiveness of T2D prevention and screening in reducing T2D incidence and medical complications from T2D. Evidence from **systematic reviews of clinical effectiveness** enables our researchers to comment on a body of literature based on rigorous methods that have been developed to assess various primary studies together. In contrast, the **evidence from economic studies** is much more difficult to combine: economic studies vary along a number of economic parameters and assumptions. To recognize the distinct methodologies of these two types of research, we assessed them separately.

We synthesized high-level **clinical evidence**: systematic reviews, meta-analyses, health technology assessments, as well as very recent high-quality primary research not captured in the review literature. Our Health Economist provided a narrative description of the economic evidence and a **cost-effectiveness analysis** of relevant clinical interventions, where possible.



## Key Findings from the Research Evidence

**1.** At present, there is insufficient evidence on the long-term clinical benefits and/or potential harms of screening for T2D. The limited evidence that is available does not indicate improved mortality rates through screening for T2D, either in the general population or in high-risk populations after 10 years of follow-up.

**2.** Overall, more robust evidence is needed to confidently evaluate the cost-effectiveness of screening interventions for T2D. In the limited studies available, there was some evidence to suggest that targeted opportunistic screening to detect and manage diabetes among high-risk patients (i.e., patients with obesity and/or with high blood pressure) may be either cost-saving or may cost less than \$6,000 USD per quality-adjusted life year (QALY) gained. However, it should be noted that there was disagreement between studies on the range of cost.

**3.** Universal population screening of all adults aged  $\geq 45$  years, when compared with no screening at all, was not cost-effective. This intervention had a predicted incremental cost-effectiveness ratio (ICER) of close to \$200,000 CAD.

**4.** Evidence shows that some oral anti-diabetic drug classes and some other drug classes can effectively prevent the onset of T2D in specific at-risk populations. The authors describe these populations differently: as hypertensive, as high risk, as pre-diabetic, as having at least one cardiovascular disease or as having one cardiovascular disease risk. Other drug classes had no significant preventive effect. Additionally, some drug classes are more effective for promoting regression to normoglycemia than for reducing T2D incidence, depending on the individual's risk profile.

**5.** Good quality evidence shows that many effective lifestyle interventions (that promote modest weight loss through improved diet and/or increased physical activity) can decrease the incidence of T2D in both the short and the long term. Improvements in blood pressure, triglycerides, weight, BMI and waist circumference were also commonly reported. A key factor in the success of combination lifestyle interventions is adherence to lifestyle changes.

**6.** Most preventive interventions (i.e., non-screening interventions) are considered cost-effective, with an ICER of less than \$20,000 USD per QALY.

**7.** A number of mixed interventions involving, alone or in combination, diet, exercise, drug interventions and/or other interventions, can prevent T2D. The effectiveness of these interventions appears to depend on age, weight loss, and an individual's risk profile, among other factors. There is insufficient evidence to comment on the effectiveness of mixed interventions on cardiovascular outcomes or on all-cause morbidity and mortality.



## T2D Prevention and Screening: The Newfoundland and Labrador Context

### Patient-Level Factors

Overall, we identified a number of key patient-related factors present in the NL context that are likely to impact the effectiveness of the lifestyle changes recommended in the literature. Although there are some factors we cannot change (aging population, geography and climate, genetics), there is significant room for the improvement of the modifiable risk factors below:

- Overall population health status in NL,
- T2D risk in NL,
- Health literacy,
- Lifestyle factors and adherence to healthy lifestyle choices,
- Support for healthy options,
- The social determinants of health,
- Tradition and lifestyle in NL, and
- Food security and access.

As they work towards optimizing the effectiveness of lifestyle interventions in Newfoundland and Labrador, decision makers may wish to carefully consider how future initiatives and programming will be optimally matched to these factors.

### Service Landscape Factors

The service landscape in NL includes a range of prevention and health promotion programs/initiatives related to making healthier lifestyle choices. The Canadian Diabetes Association offers the most targeted programming for the prevention of T2D. The provincial government has adopted a broader approach to health and wellness promotion at the population level through its chronic disease prevention and management framework. Lacking within this framework are specific programs that target T2D *prevention* in adults; rather, available programs for adults tend to address the management of *existing* T2D. Our subject expert suggested that it may be more effective to target specific risk factors for T2D early on, before people become overweight or pre-diabetic. A targeted approach may have greater impact than a high-risk prevention approach alone.

### Economic Factors

Making a healthy lifestyle economically accessible to all in NL is a great challenge. Prevention efforts for T2D, whether through programming or promotion of healthy lifestyle, will be constrained by the province's available infrastructure as well as by the ability to recruit and retain the health professionals required to oversee such initiatives.



## Implications for Decision Makers

1. At present, there is insufficient high-quality evidence on the clinical benefits or potential harms of screening for T2D. The limited available evidence shows no indication that screening improves mortality from T2D in the general population or even in high-risk populations after a 10-year follow-up.
2. The strongest evidence for clinical and cost-effectiveness converged on the effectiveness of lifestyle interventions for preventing T2D in adults. The biggest challenge to these interventions is sustained adherence to lifestyle changes. Adherence can be optimized through the use of clearly defined goals/objectives and the provision of sufficient resources and supports for participants.
3. The province does not currently have a program that specifically targets T2D prevention. Although the province has implemented health and wellness promotion strategies and has created a Chronic Disease Framework, T2D rates continue to rise. This situation might improve with a provincial T2D prevention strategy that focuses on mitigating the risk factors for diabetes in adults. A strategy that includes appropriate implementation of initiatives aimed to improve diet, increase physical activity, and prevent weight gain/reduce weight could help lower T2D levels in NL while also helping to prevent other chronic diseases.
4. A combination of non-modifiable and modifiable factors are associated with T2D risk in Newfoundland and Labrador. The success of future initiatives to lower T2D incidence will depend on careful consideration of how these modifiable and non-modifiable characteristics are distributed in the population and how best to match programs and initiatives to these characteristics. In particular, the province has an opportunity to develop prevention programs that target modifiable risk factors to help curb progression to pre-diabetes or T2D.
5. Some T2D risk factors are especially significant in certain adult populations/age groups in NL. Reliable and comprehensive data collection on diabetes incidence and diabetes risk-factor indicators will be required to guide the development of appropriate programs/prevention efforts in different geographical regions and among different population groups. Through access to reliable data, decision makers and community groups can more effectively direct resources and evaluate prevention and management outcomes. The minimum data set required for this purpose would include: anthropometric measures (body weight and height for BMI calculations, waist circumference), low-density lipoprotein (LDL), high-density lipoprotein (HDL), systolic blood pressure/ diastolic blood pressure (SBP/DBP), glycated haemoglobin (HbA1c) values, fasting blood sugar (FBS) values and total cholesterol (TC) values.
6. Literacy levels in general, and health literacy in particular, will affect the uptake of T2D prevention messages in the province. A concerted effort should be made to ensure that all T2D prevention information is available in formats that are accessible to all people in the province, regardless of literacy levels.
7. Physical and economic access to infrastructure, programming, professional expertise, and healthy foods are major challenges in Newfoundland and Labrador, particularly for those who live in rural areas. Investment in these areas will be important in helping adults in the province make and maintain required lifestyle changes to lower their T2D risk.

For the complete CHRSP report, including details on the evidence reviewed by the project team, and for more information about the CHRSP process, please visit the NLCAHR website: <http://www.nlcahr.mun.ca/CHRSP/>