Youth-onset Diabetes Prevention and Treatment

RDC Collective Capability Report – 2022

Dufferin, Grey, Muskoka, Simcoe

SFBLF Diabetes Issues Report #2022-06-30-SI

The SFBLF Diabetes Management and Education Centre (DMEC) is located in Alliston, Ontario, Canada at the Banting Homestead Heritage Park, birthplace of Sir Frederick Banting, co-discoverer of insulin and Canada's first Nobel Laureate.

P.O. Box 137, Station Main, Alliston, Ontario, Canada, L9R 1T9
www.bantinglegacy.ca info@bantinglegacy.ca

Charitable Reg. No. 80740 6145 RR0001

This report was made possible through financial support by Novo Nordisk Canada
The funders had no role in determining the focus or scope of the study, the preparation, review, or approval of the content or any decision regarding dissemination of the report.

Contents

Acknowledgements

The Board of Directors of the Sir Frederick Banting Legacy Foundation (SFBLF) gratefully acknowledge the contributors listed below.

Project Team

SFBLF Board:

* Amy Hess-Fischl, MS, RN, CDE, Teen Program, Kovler Diabetes Centre, University of Chicago, SFBLF Director: Research Support & Report Synthesis
* David Sadleir, PhD., PEng., SFBLF President: Project Lead & Intern Mentor

Research Interns:

* Kiara Leber, BSc. Hon., (year 3) Biomedical Sciences, Ryerson University
* Aastha Relan, BHSc. Hon., (year 3) Health Sciences, McMaster University
* Adam Belluzzo, BSc. Hon., (year 1) Kinesiology & Health Science, York University

Project Support:

* Kait Perez Diaz, BA, SFBLF Program Director

Graphics Design Support

* RDC Logo, Web Pages, Infographics: Paul Cormier and the ycommunicate.com team, Alliston, ON

Outreach Contacts

Explorations for this report included direct outreach within the RDC geography and beyond to:

* Elected officials and staff in Counties, Districts, Townships and Municipalities
* Leadership and staff in Public Health Units and School Boards
* Home and Community Care Centres and Ontario Health staff
* Paediatric Diabetes Education Teams and Family Health Teams
* Food Security Program Coordinators
* Novo Nordisk/University of Toronto Healthy Populations Research Network leadership
* Researchers, analysts and authors of key papers in Canada, Australia, USA

Not all responded but we thank all those who helped assemble key data and offered critique and advice.

Novo Nordisk Canada – financial support that made this report possible

The funders had no role in determining the focus or scope of the study, the preparation, review, or approval of the content or any decision regarding dissemination of the report.

About SFBLF

SFBLF Mission and Programs

Fight Diabetes and Preserve a Legacy.

* SFBLF Diabetes Programs are focused on youth and young adults and the enablers and resource allocation decision-makers who support them.
* Reducing the risks of youth-onset type 2 diabetes and diabetes-related complications in type 1 and type 2 diabetes; helping to mitigate the in-school challenges faced by youth with diabetes; and their often daunting 'transition' from paediatric to adult healthcare are key priorities.
* Programs are delivered via classroom activities and events at the historic birthplace of Sir Frederick Banting; and online through Interactive Webinars, e-Learning Courses, Quizzes, Tutorials and Risk Assessment tools.

SFBLF Governance

* A registered Canadian charitable organization [2006] federally incorporated as an NFP [2005].
* An all-volunteer Board supported by a Program Director, Advisory Board, Diabetes Outreach team, collaborative partners nationally and internationally, other volunteers and donors.

SFBLF Diabetes Management and Education Centre (DMEC)

* The SFBLF DMEC is located in Alliston, Ontario, Canada at the 107-acre Banting Homestead Heritage Park (BHHP), birthplace of Sir Frederick Banting, co-discoverer of insulin and Canada's first Nobel Laureate.
* SFBLF has raised and invested over $2 million, to restore and enhance the historic buildings and site infrastructure at the BHHP, create informative exhibits, educational resources, develop and deliver programs in support of our Mission.
* The Town of New Tecumseth invested an additional $1 million to acquire the property (2008) and provide initial basic infrastructure upgrades (2010). The Town Parks Department provides on-going support for property and building maintenance.
* The result is a unique Canadian venue for the enjoyment of our communities, all Canadians and visitors worldwide.
* Since opening the venue to the public in mid-2014, over 15,000 visitors have participated on-site from 10 provinces/territories, 26 US states and over 40 countries. As at end of 2019, pre-COVID impact, total Program Participation Hours exceed 42,000. In addition, the SFBLF web site has been accessed by over 26,000 visitors from 163 countries.

Genesis and Purpose of the RDC

Genesis of the RDC

The idea for a **Rural Diabetes Coalition** emerged from a September 2021 review of documents describing an international initiative called, "Cities Changing Diabetes" (CCD) led by Novo Nordisk A/S (Copenhagen), Steno Diabetes Center (Copenhagen) and University College (London). Over the years, that initiative has resulted in Urban Diabetes Coalitions in 40 major cities on 5 continents. [1] Mississauga, Ontario, joined that international group on November 10, 2021 as the 40th and first Canadian partner city. [2]

Novo Nordisk A/S and the University of Toronto have invested C$40-million ($20 million each) to establish the Novo Nordisk Network for Healthy Populations with the hub located at the U of T Mississauga campus. The City of Mississauga provides an ideal research focus. [3]

In September, 2021, SFBLF reached out to the lead partners of the CCD program to propose they consider broadening the scope of their program to include a 'Rural' dimension. That led to an immediate response from the Novo Nordisk A/S Vice President and Head of Global Prevention & Health Promotion. He connected SFBLF with key representatives in Novo Nordisk Canada and encouraged an exploration in search of a collaboration. That resulted in funding support in December, 2021 from Novo Nordisk Canada for which SFBLF is very grateful.

SFBLF had begun the area outreach to create a Rural Diabetes Coalition in October, 2021. The Novo Nordisk funding made it possible for SFBLF to engage three undergraduate Interns, as part of our Annual Intern Research Program, to help assemble the data to support creation of this *Collective Capability Report*. It also supported development of various information resources for use by the Rural Diabetes Coalition and other related SFBLF initiatives.

Why is an RDC Necessary?

The scale of the youth-onset diabetes pandemic and the complexity of required responses to help stem that tide create a challenge that no single entity can solve alone. Hence, the need for collaborative responses and the opportunity for the **Rural Diabetes Coalition** to make a difference.

Expected Outcomes

* Strengthened and expanded youth-onset diabetes awareness and prevention actions
* Enhanced visibility and access for existing diabetes-related prevention and treatment programs
* Advocacy to help resolve persistent youth-onset diabetes issues

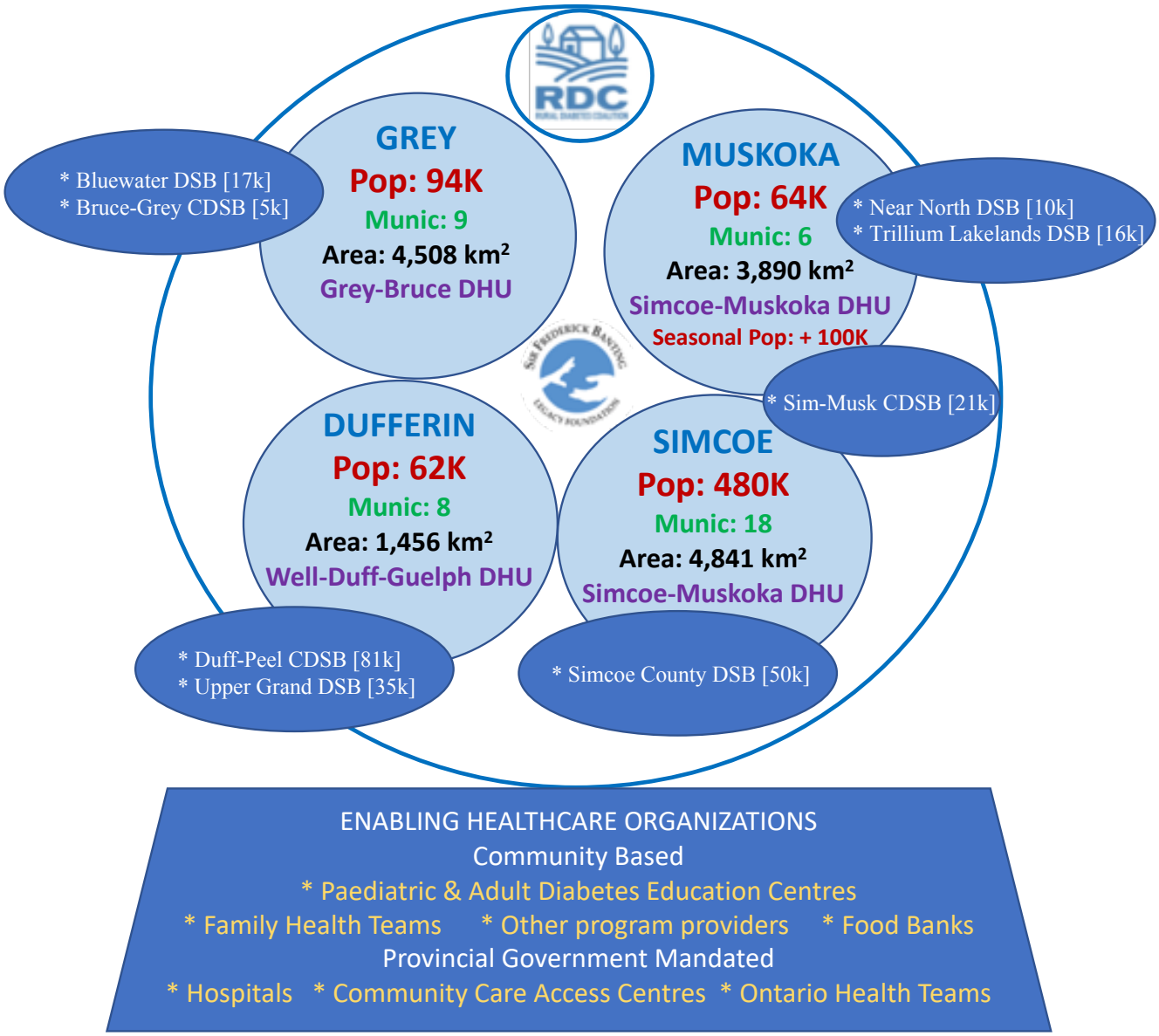
RDC Collective Capability Report

This report includes:

* an inventory of organizations and programs that together set an example for concerted rural community engagement and help for the prevention and treatment of youth-onset diabetes.
* descriptions of context factors that affect the needs and opportunities for action
* identification of opportunities for enhancing the collective capability

Raising awareness and proactive prevention matter.
Collaborative, coordinated responses are required.

RDC Geography & Stakeholders



Other than Simcoe County DSB and Simcoe-Muskoka Catholic DSB, all school boards also operate schools outside of the RDC geography.

Two of the 3 Public Health Units, Grey-Bruce and Wellington-Dufferin-Guelph, also provide support outside of the RDC geography.

There are hundreds of public and private sector employers throughout the region and many have workplace wellness programs. All can make a difference in the fight against diabetes.

The common ability to drive change puts all of these organizations in a prime position to meet the challenge and bend the diabetes curve through cooperative, innovative and sustainable solutions. Rural communities must share the responsibility. No single entity can solve the challenge alone.

Research – Scope and Approach

Scope

As a first step toward creating a Rural Diabetes Coalition, SFBLF chose to focus on prevention and treatment actions for youth diabetes (age 0 - 19). Included are the areas immediately adjacent to our Diabetes Management and Education Centre (DMEC) at the birthplace of Sir Frederick Banting in Alliston, Ontario; specifically, Dufferin, Grey, Simcoe counties, the District of Muskoka and their 41 municipalities.

There are 3 public health units and 8 school boards operating in whole or in part within that geography. Together, the 8 school boards have approximately 90,000 students within the RDC region and at least another 148,000 students in schools outside the RDC.

Many of the organizations included in this study are public sector employers and some appear in the list of 'top 100 employers'. Attempting to identify and characterize the number and types of private sector employers in the RDC area was beyond the capacity of the research team.

Helping all students and their families in the RDC to reduce their diabetes risk is a primary objective.

Approach - Data Sources

The data search (November 2021 - May 2022) included review of all available web sites hosted by county, municipal, school board and district health units within the RDC; and as many healthcare enabling organization as could be identified; e.g., Paediatric Diabetes Education teams, Family Health Teams, Home and Community Care Teams, and many other community organizations.

The new (2021) Novo Nordisk/U of T Healthy Populations Research Network leadership, other university departments, researchers, analysts and selected authors of key papers were also consulted.

Aspects of this Report draw on earlier SFBLF Diabetes Issues Research; specifically: [4]

* *Mental Health & Diabetes in Youth* - eLearning Course for healthcare providers & teachers (2016)
* *Youth Living with Diabetes and Comorbidities - Available Surveillance Data*, (2017-09-01)
  [including global perspectives and comparisons with Canada, Australia, UK and USA]
* *In-School Support for Students Living with Diabetes,* (2018-09-17)
  [including comparisons with Canada, Australia, United Kingdom and United States]
* *Youth-onset Diabetes in Indigenous Peoples: Canada and Australia* (2020-08-31)

The above Issues Research has identified needs for, and supported development of, SFBLF risk assessment tools, e-Learning courses, online quizzes and specific content for our on-site programs, online interactive webinars and the dozens of indoor and outdoor information exhibits at our DMEC.

In addition to requests for data confirmations from RDC entities, segments of this Report were shared with diabetes expert colleagues in Canada, Australia and the USA for review and critique.

Approach – Questions to be Answered

Basic Framework Questions

Where are we now?
Where do we need to be?
How can we get 'there' from 'here'?

This Report is a partial contribution to answering those three questions.

One cannot get to 'there' from 'here', if 'here' and 'there' are undefined; and one cannot manage and allocate resources cost-effectively to solve a 'problem' that is unmeasured.

The approach to finding and analyzing the supporting data was driven by 5 questions:

Research Questions

1. What action is required to prevent youth-onset Type 2 diabetes?
   [Type 1 is not preventable]
   * by youth and their families? * by healthcare and community enablers?
2. What support is required for youth living with diabetes?
3. What is the nature, extent, capacity of, and accessibility for, resources within the RDC to meet the prevention and support requirements?
4. How effective and complete is the current capability?
5. What are the opportunities to strengthen and enhance the RDC collective capability?

Answers for Q1 and Q2 are well established in published literature.

Answers for Q3, Q4, and Q5 are specific to the RDC.

Selection of content included in this Report is the sole responsibility of SFBLF.

Data Search and Quality

A number of practical realities impeded the search for data, the ease of interpretation and the overall data quality and completeness. All quantified data for number of organizations and number of programs, included in this Report, should be read as meaning 'at least'. The following examples illustrate why that is necessary:

Search Impediments

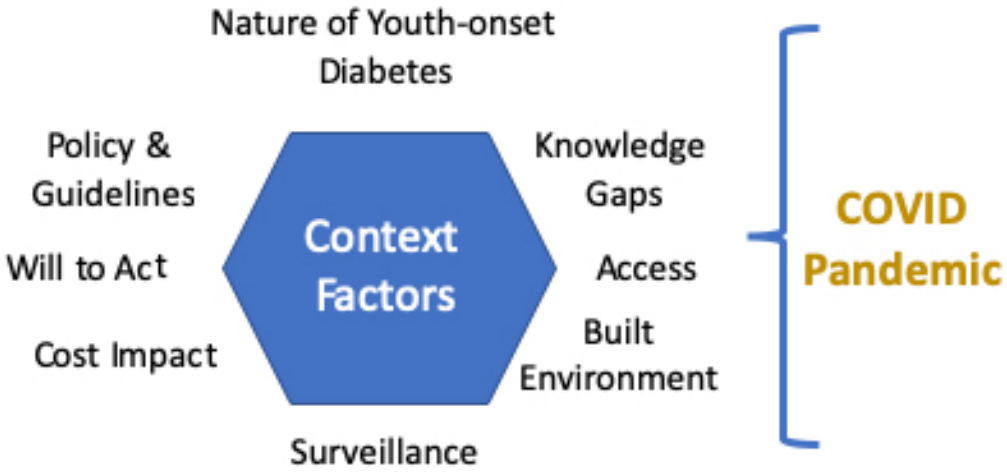
1. Contacting organizations by email
   All organizations identified have web sites; many do not provide an email address. Some do provide an email 'form' which does not permit attachments and hence, makes introductory messages difficult. As well, not one of the several tests of such forms resulted in a response.
2. Physical locations
   Some organizations, especially those involving multiple groups, do not provide a physical address and/or central means of contact by email. Early attempts to make connections by telephone also proved problematic resulting in voice mail, for which no response was received; or staff who were unable to provide contact details without seeking 'permissions'. The research team did not have the capacity to continue with a telephone approach.
3. Cross-boundary services
   There are organizations within the RDC that provide services to more than one RDC county. There are organizations with main offices physically outside the RDC that also provide services within the RDC. For the most part, the latter were included if a 'local' office was also evident. Some organizations share a physical venue; e.g., in a hospital or community health centre.

Data Quality and Completeness

1. Similarities in some organization names make it difficult to distinguish unique entities.
2. Distinctions between Ontario Health Teams and Family Health Teams are not always clear.
3. For organizations providing their programs in multiple locations, the 'main office' location within the RDC was used in 'counting' organizations by RDC area. Their program menu may not be exactly the same in all locations.
4. Many program descriptions do not identify the applicable age range and/or the access protocol; i.e., self-referral or HCP referral. As a result, for other than diabetes-specific programs, no attempt was made to segregate by youth or adult program.
5. Age ranges used in reporting demographic and health-related data are highly inconsistent both in groupings and definitions of ‘child’, ‘adolescent’, ‘youth’. In this report, ‘Youth” means 0 -19.
6. There are examples of collaborative approaches to program delivery across municipalities and/or among other enabling organizations. In general, each entity was 'counted' but their collaborative program was counted only once.
7. Municipal recreation centres were counted in the 'physical exercise' program group but no attempt was made to count the specific programs being offered within a recreation centre. Likewise, organized sports teams and commercial facilities were not included.
8. Access to parks and trails may require a fee. Some healthcare programs, e.g., therapy sessions, may require a fee for service. No attempt was made to report that data.
9. Characterizing the total number of public and private sector employers was not attempted.
10. Given the complexity, it is virtually certain that some target organizations and programs were ‘missed’.

Context Matters

Defining a problem and understanding the context in which the problem exists are essential insights for determining practical, cost-effective solutions. The nature of diabetes, and youth-onset diabetes in particular, in concert with mandated healthcare-related policies and guidelines are key factors that determine the prevention needs and responses.

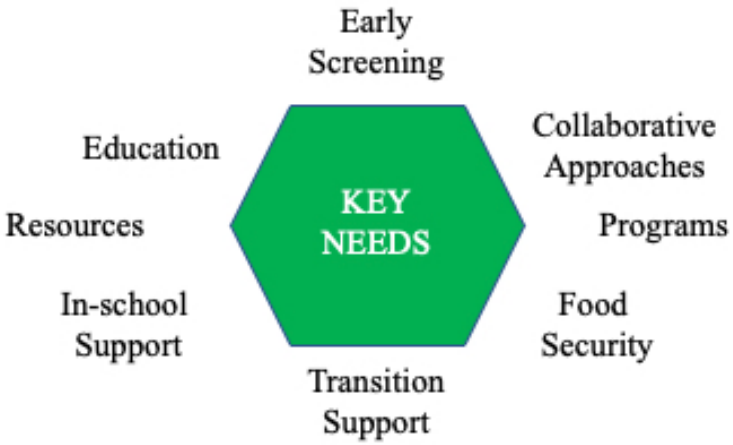


Unexpected Context: Unintended Harm [16]

A global survey involving 47 countries and different levels of healthcare physicians from primary care to hospitals, found that during the COVID-19 pandemic, diabetes was the condition reported to be most impacted by the reduction in health-care resources. … there is still concern over a hidden backlog of patients who require care but have either not yet presented or have had referrals cancelled.

Determined Responses are Needed

Practical responses are facilitated or impeded by the state of public diabetes literacy, professional medical provider knowledge, available resources, the costs to provide the responses, and the will and degree of commitment of solution enablers to act.



Effective responses are impeded also by shortfalls in Canadian healthcare systems and processes. Fortunately, these gaps are being addressed as briefly described below.

Diabetes Support Needs - Closing the Gaps

Diabetes Knowledge Imbalance

The global rise in youth-onset type 2 diabetes is a relatively 'new' phenomenon. As a result, there are relative gaps in knowledge across a wide spectrum compared to type 1; e.g., surveillance, screening, diagnosis, treatment and continuity of care require greater attention.

Surveillance

The 'surveillance gap' is a special challenge. One cannot manage effectively what is not being measured. Canada has among the largest number of health surveillance systems with a youth component but is unable to routinely track and report the number of youth living with diabetes. [17)

Fortunately, Bill C-237, A National Framework for Diabetes, enacted on June 29, 2021, is expected to change that. The Public Health Agency Canada (PHAC) have a series of stakeholder surveys in progress. PHAC are required to report progress to Parliament on or about June 29, 2022. [18]

SFBLF have provided input to PHAC to help further the evolution of this much needed capability. [4]

Screening and Diagnosis

Diabetes screening Guidelines for youth exist but 'universal' screening is seen as too expensive and potentially risky regarding the potential for 'mis-diagnosis' and 'missed diagnosis'. As a result, screening recommendations focus on 'high risk' cohorts. Guidelines for screening of complications are broader. There is no publicly available data regarding the extent to which screening guidelines are actually being followed.

In-school Support

School age youth with diabetes may spend 30 hours per week or more in school and in transit to school. They need special accommodations to help manage their diabetes, be safe at school, avoid bullying and enjoy a full learning experience. [19]

The 2018 Ontario policy for in-school support for students with prevalent medical conditions (including diabetes) is a welcome initiative. [20] While it is likely that all Ontario schools now have adopted that policy, there is no published evidence to identify how many schools have actually implemented the policy

Continuity of Care - Transition

Ensuring continuity of care can be difficult. Youth with diabetes, and their families, need early help to prepare for transition to adult healthcare. If comorbid conditions exist, the challenge is greater, usually requiring a multi-disciplined team; not an easy requirement for rural and remote communities compared to large urban centres.

Family physicians receiving these youth after their paediatric years may not be ready for that outcome. Limited consultation time and ineffective communication between healthcare professionals add to the challenge. [7]

Need for culturally- and age-appropriate interventions add further complexity; as does the required array of language support for diverse, multi-cultural communities. [11, 12, 13, 14, 15]

A new Quality Standard for transition support was published by Ontario Health in 2022. [21]

Food Security

Having access to good quality food is essential for wellbeing and reduction of risk for many chronic health conditions, including diabetes.

Healthy eating, in concert with active living, can improve health outcomes for all Canadians.

Community Food Security vs Household Food Insecurity

Community food security and household food insecurity are related but different.

Household food insecurity is a function of poor or unstable access to food due to financial constraints. [22] Basically, at the end of the day, people do not have enough money to purchase food.

Community food security is a matter of availability and access to healthy food. Capability to achieve this includes access to grocery stores, local farming capacity and output, farmer's markets, community gardens, cooking programs and emergency food services, like food banks and meal programs.

"Access to affordable healthy food is unfortunately not equitable amongst all members of our communities. In fact, 1 in 8 Simcoe-Muskoka households are food insecure". [26, 27, 28]

"Food Banks were meant to be temporary and 50 years later we still have them because as a society, dealing with poverty and the lack of affordable and safe housing really is not popular." [29]

Access to Emergency Food

Food may be available for 'free' at a Food Bank but it comes with a 'dent in dignity'. Evidence suggests only 1 out of 5 food insecure people will visit a food bank [24, 28]. There are many reasons for that outcome including supply limitations, access realities arising from limited operating hours and lack of transportation to get to a food bank. The experience of accessing food charity undermines people's dignity despite the best intentions of volunteers and staff. [25]

Impact on Diabetes Prevention and Treatment

Household food insecurity (lack of sufficient income for food) makes it difficult for individuals to manage existing chronic health problems, such as diabetes, and can lead to worsening conditions. Food insecure individuals may struggle to adhere to therapeutic diets or forego necessary medication because of the expense [23]

It can be embarrassing for youth and their families to discuss food insecurity with healthcare providers. Parents may fear attracting attention from social services regarding their ability to 'provide for their family' and young people may just find it too awkward to raise. SFBLF has developed a free, anonymous, online questionnaire designed to ease the dialogue between patient and care provider. It can be completed on a mobile device while waiting for an appointment and can be easily shared. Clinicians tell us this works and it saves time in initial meetings. [30]

RDC Responses

The RDC collective responses in support of easing the food insecurity challenge throughout the area are aggressive, creative and together are making a very positive difference. There are over 70 locations providing access to Food Banks and Community Meals. Sustained and increased effort is required. Understanding and supporting the existing capability across the region is a very important focus for all healthcare and community enablers.

Policy Context

Policies that mandate actions to prevent, treat and provide on-going support for youth-onset diabetes exist at most government levels. Healthcare guidelines are augmented by recommendations from national bodies such as Diabetes Canada, Juvenile Diabetes Research Foundation, the Canadian Paediatric Society, Ontario Medical Association.

There can be significant differences between existence of policies and guidelines and their actual implementation. The existence of a formal policy or guideline does not guarantee action.

The following Tables include selected examples only.

Table 1: Policies - Federal and Provincial

Policy	Source	Enacted Effective	Comment	Ref
1. National Diabetes Framework	Federal Bill C-237	June 29, 2021	in progress	[18]
2. Community Safety & Well-Being	Prov of Ontario	March 2019	must be adopted by every municipality in Ontario by July 2021	[31]
3. Assistive Devices Program - Diabetes support	Prov of Ontario	3a. various 3b. Nov 30/21 3c. Mar 14/22	3a. Insulin pumps & diabetes supplies [T1] 3b. Flash Glucose monitors [T1, T2] 3c. Continuous glucose monitors [T1, T2]	[32a] [32b] [32c]
4. Children & Students with Prevalent Medical Conditions	Ontario Ministry of Education PPM 161	Sept 1 2018	In-school support policy	[20]

Table 2: Guidelines & Recommendations - National and Provincial

Guideline	Source	Enacted Effective	Comment	Ref
1. Prevention & Screening for T2	Diabetes Canada	2018	Ages 0 - 18	[33]
2. Treatment & Support for T1	Diabetes Canada	2018	Ages 0 - 18	[34]
3. Prediabetes & T2 Care Quality Standard	Health Quality Ontario	2022	All ages	[35]
4. Transition from Youth to Adult Care	Health Quality Ontario	Feb 2022	Ages 15 - 24	[36]
5. Canada Food Guide	Gov't of Canada	Jun 2022 u/d	All ages	[37]

Table 3: RDC Municipal Frameworks

Framework	Source	Enacted Effective	Comment	Ref
1. Nottawasaga Community Safety & Well-being Plan	Adj-Tos, Essa, New Tec	June 2021	Collaborative response to Ontario policy	[38]
2. Simcoe County Food Security Framework	Simcoe County	2019	Basis for creation of the Simcoe County Food Council	[39]
3. Healthy School Toolkit	Grey Bruce HU	Sept 2017	Aligns with Min of Educ G/L	[40]

Rural vs Urban Differences Affecting Healthcare Access and Delivery

A discussion of differences between 'rural' and 'urban' might reasonably begin with, "What is the definition of each group?".

The answer to that depends on which context and for what purpose the question is being asked. Statistics Canada uses a set of definitions driven by Census needs. The Government of Ontario uses different definitions for purposes such as determining healthcare needs and available capacity.

Whatever the context, there are 'degrees of rurality'. For example, in the RDC area, Barrie has a population in excess of 147,000 compared to East Garafraxa with a population of approximately 3,000.

Access to healthcare is determined by many factors including number and location of hospitals and paediatric diabetes education centres, number and types of healthcare professionals and travel distances. Limited public transit is a significant comparative disadvantage for rural communities.

In very broad terms relative to 'urban', rural areas face greater difficulties in terms of recruiting and retaining healthcare professionals, securing funding to maintain, upgrade or replace aging hospital infrastructure and diagnostic equipment.

The practical implications of this are many and varied. Finding a family physician, providing multi-disciplined care teams to cope with chronic diseases in the presence of comorbidities, having air ambulance services to move serious trauma cases to the nearest specialty medical centre are just a few examples. The absence of sufficient family physicians can lead to significant increases in hospital ER visits as being the only available option.

Tele-health services can and do mitigate some aspects but only where patients also have access, at home or nearby, to facilities with sufficient bandwidth. The latter condition is far from universal in rural communities.

All of this reinforces why collaborative and coordinated responses are essential to optimize collective capability for rural healthcare delivery.

Nature of Youth-onset Diabetes

Nature of Youth-onset type 2 diabetes [7, 8, 9, 10]

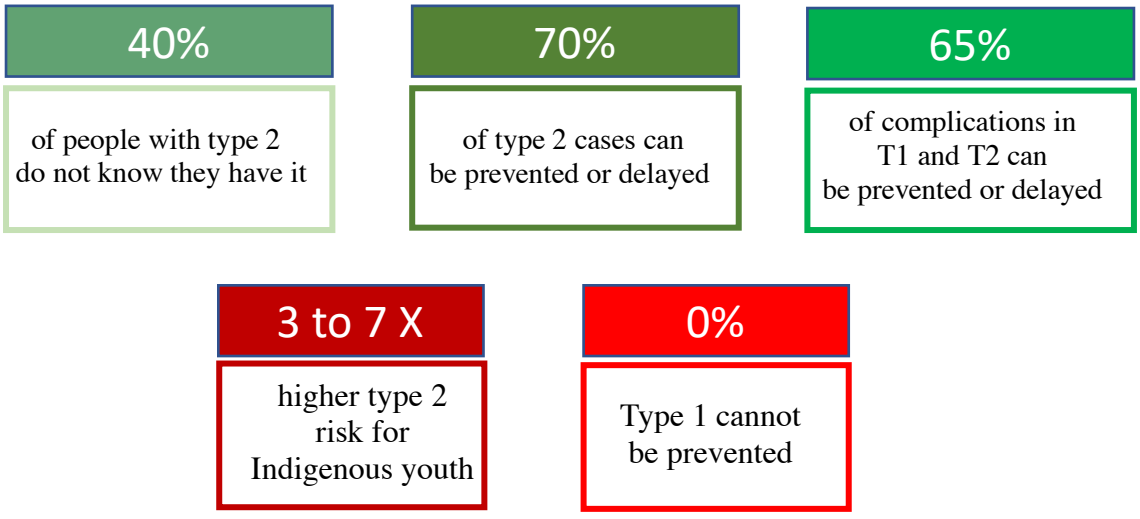
For all youth

* is initially invisible and progressive; cell damage can be in progress at time of diagnosis
* is potentially more severe than youth-onset T1 and more severe than adult-onset T2
* is occurring at ever-younger ages
* can be accompanied by comorbidities such as obesity, hypertension and mental disorders; bi-directional causal relationships can exist between/among these conditions
* increasingly is proving unresponsive to diet, exercise and oral medication and may also require insulin.

Additional factors affecting indigenous youth [11, 12, 13, 14, 15]

Indigenous peoples in Canada; Aboriginal and Torres Strait Islanders in Australia; African Americans, Native Americans, Latinos, Asian Americans in the USA have higher risk of type 2.

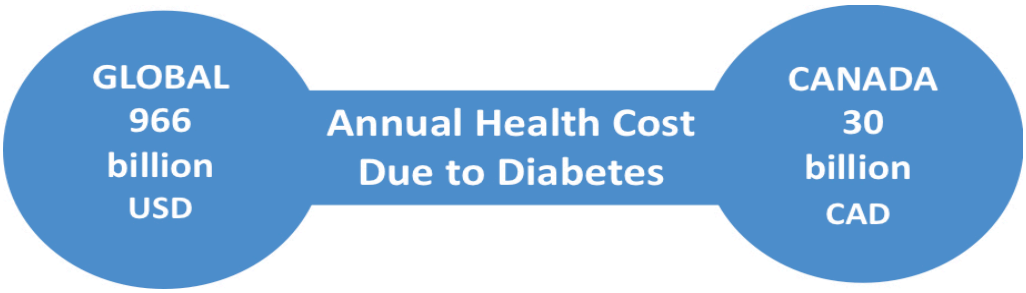
* Historic colonialism, geographic remoteness and a broader view of 'health and wellness' have combined to:
  - increase diabetes risk
  - produce much higher diabetes prevalence - 3 to 7 times or higher
  - add complexity for healthcare delivery
* Age of onset for type 2 is even younger in Indigenous youth than for non-Indigenous
* The growing Indigenous youth cohort means increasing numbers 'at risk' for type 2 diabetes
* The negative impact of youth-onset diabetes is much greater, both in scale and intensity, for Indigenous youth compared to non-Indigenous.



Diabetes Impact

The burden of diabetes affects not only youth and their families but also school and healthcare systems, employers and workplace productivity, demands on healthcare providers, medical education curricula and national economies.

Diabetes Economic Burden - 2021



Diabetes is a major and growing economic burden for all nations, jurisdictions and health systems. The complications that arise as a result of poorly managed diabetes add to that economic burden and the combination is one of the major causes of death in most countries. [5]

Approximately 6.7 million adults (20-79) died from diabetes in 2021; one death every 5 seconds. By contrast, the total deaths worldwide from Coronavirus over more than 2 years is approximately 6.3 million

Diabetes results in increased use of health services and contributes to reduced workforce productivity and increased disability.

IDF estimate, using complex modeling, that 9% of global health expenditure is spent on diabetes and related complications. The 10th World IDF Diabetes Atlas (Nov 2021) estimated annual diabetes healthcare expenditure worldwide to treat diabetes and prevent complications (adults 20 – 79) had grown to USD 966 billion. In Canada, the comparable number is estimated to be USD 30 billion. [5]

Diabetes Impact on Healthcare Professionals and Systems

The increasing prevalence of diabetes in all ages presents an ever-growing demand for professional caregivers of many types, for example, pediatricians, family physicians, endocrinologists, registered nurses, dieticians, diabetes educators, psychologists, physiotherapists and psychiatrists.

The varying combinations, or ‘comorbidities’, of diabetes, obesity and mental health difficulties add to the diagnostic and treatment challenges.

These demands bring new considerations for health policymakers, add complexity to resource allocation decisions and require adjustments in medical education curricula.

The range of required training, expertise and practical experience necessary to provide effective healthcare delivery in response is very wide and dictates much more effort required by governments. Team-based approaches to health care delivery in support of youth living with diabetes and comorbid conditions plus support for continuing professional development require more funding.

Diabetes Self-Management Challenge for Patients and Families

A family with a youth newly diagnosed with diabetes can face new and on-going costs ranging from $1,000 to $15,000 per year or higher depending on diabetes type, severity and co-morbidities.

Being diagnosed with diabetes can be a shock for the individual as well as the family. It is not uncommon for youth to feel depressed and discouraged by such a diagnosis. Diabetes presents one with a very steep learning curve. Examples are provided in Table 4 below.

Both types require immediate changes in diet and general life style and families face a new set of needs when it comes to grocery shopping and meal preparation.

Normal routines are disrupted by the need to schedule regular visits to supporting medical professionals. Taking a trip or playing team sports, for example, require new pre-planning considerations.

An Individual Care Plan needs to be created, filed with the school and kept up-to-date.

The collective demands can be overwhelming and not surprisingly, the period of adjustment can be protracted and discouraging.

Difficulty in adjusting can trigger anxiety and various eating disorders.

Depression is noted by some to be the most common mental disorder occurring in youth living with diabetes. A related, but different, condition called Diabetes Stress or 'burnout' can arise as a result of the endless demand for management of diabetes.

Managing diabetes requires constant 24/7 vigilance, day-in and day-out. It is an essential survival skill. Everyone with diabetes faces a very steep learning curve.

Table 4: Diabetes Self-Management Education

Main Learning Goal	Specific Knowledge
How to eat healthy	* recognize healthy foods; know how to 'count carbs'
How to exercise and manage weight	* understand how exercise affects glucose levels * how to avoid 'sugar lows'
When/why to take meds and/or insulin	* how and when to check glucose levels * know the effects of meds and insulin types * how to use supporting technology devices
How to cope with emotions	* share your stress with loved ones * don't overcommit your time * join peer networks
Realities that amplify the Self-Management challenge	
Lack of access to * essential diabetes education * transportation to get to clinics **Limited financial resources for** * diabetes supplies * healthy food	**Presence of parallel conditions, e.g.** * obesity * mental health issues **Age and learning ability** * more difficult for young children * need for 24/7 adult support

Research Questions Answered - Actions Required

Research Question and Answer	Key Enablers
1. What is required to prevent youth-onset Type 2 diabetes? [Type 1 diabetes is not preventable] **Actions by youth and their families:** * understand diabetes basics, risk factors and how to reduce risk * know where to access diabetes risk assessment tools and professional screening * a healthy lifestyle including diet, daily exercise and not smoking **Actions by enablers and supporters:** * early screening for youth with family history of diabetes * ensuring equitable access to diabetes-related health support for all youth * collaborative, coordinated, multi-sector community approach to providing sustainable health solutions * recognition that social and cultural determinants shape opportunities for healthy living	**Family** **Government** - Counties/Districts - Municipalities - Public Health Units - Community Health Centres - Ontario Health Teams **Healthcare Professionals** - Diabetes Educators - Dietitians - Nutritionists - Nurses - Social Workers - Physiotherapists - Endocrinologists - Pediatricians - Physicians - Family Health Teams - Hospitals - Researchers **Communities** - Diabetes & Related Support Programs - Diabetes Advocacy Groups - Food Banks & Related - Peer Networks - Employers **School Boards** - Schools - Teachers - Student Peers
2. What support is required for youth living with diabetes? * access to appropriate therapy including medications, insulin, technology devices and on-going professional care * diabetes self-management education and support by a certified diabetes educator and dietitian * regular screening for diabetes complications including comorbidities * help to sustain a healthy lifestyle * 'in-school' accommodations to support self-management and reduce risk * early planning and implementation help for transition to adult healthcare	

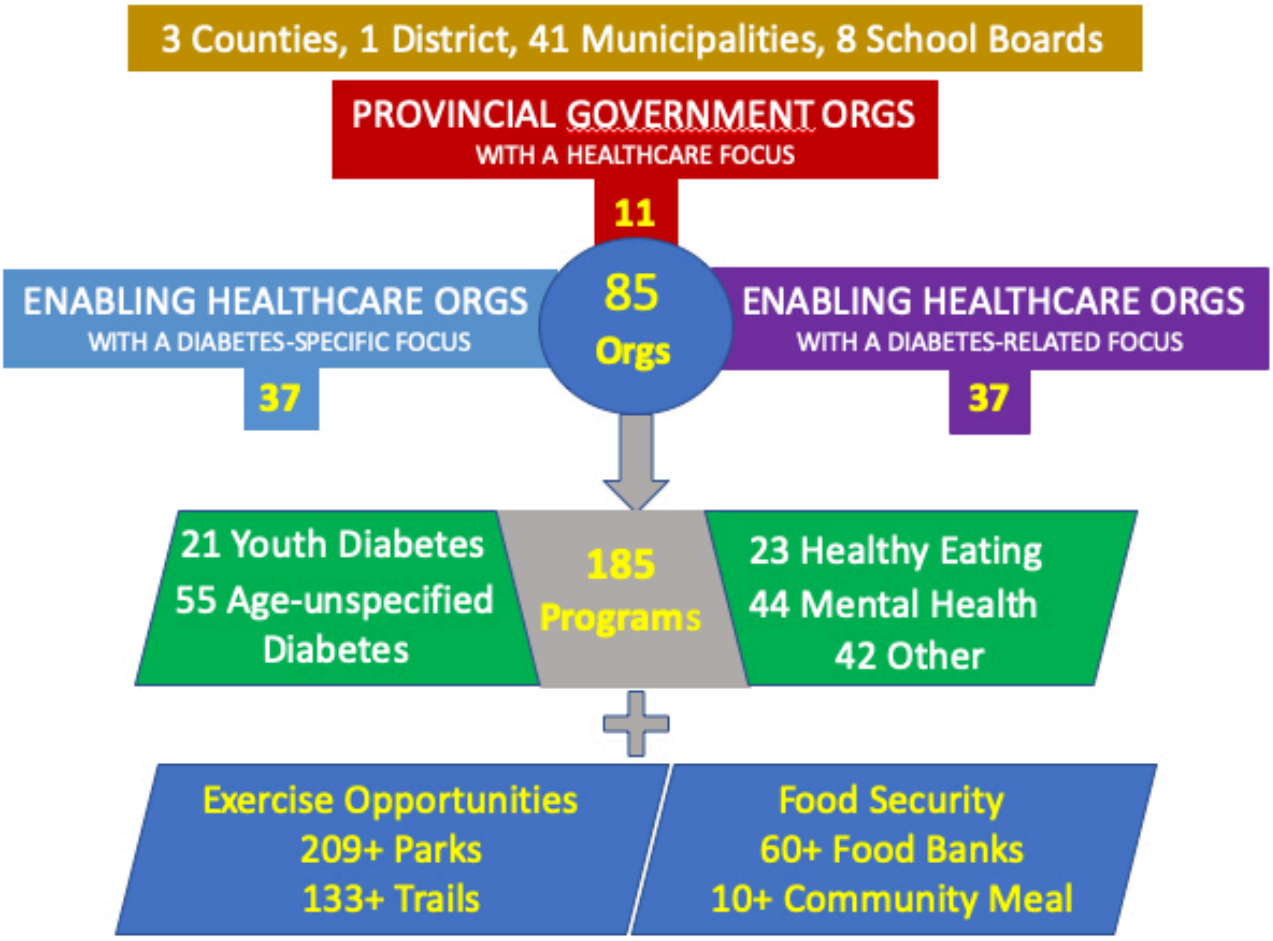
RDC Collective Capability Questions

3. **What is the nature, extent, capacity of, and accessibility for, resources within the RDC to meet the prevention and support requirements?**
4. **How effective and complete is the current capability?**
5. **What are the opportunities to strengthen and enhance the current RDC collective capability?**

RDC by the Numbers

The RDC geography encompasses a very impressive array of diabetes healthcare enabling organizations and related programs augmented with an equally impressive collection of built-environment facilities and food security support.

More Needs to be Done



There are 12 Hospitals within the RDC of which 6 have a Paediatric or Adult Diabetes Education Centre and are included in the above count. There are other hospitals nearby that provide service to the RDC, e.g., Southampton (GBHS), Wiarton (GBHS), Brampton (William Osler HS)

Note: Private sector employers have been omitted; and given the complexity of the data collection task, some target organizations and programs have been missed.

RDC Scorecard and Summary Stats

RDC Collective Capability Scorecard - Summary

Propensity to Collaborate	Very Good
Program Support for Modifiable Diabetes Risk Factors	Very Good
Existing Policy Support	Very Good
Youth Access to Programs	Fair
Programs for Youth Diabetes Prevention, Treatment, Support	Poor to Very Good
Support from or for Schools	Poor to Very Good
Public Awareness of the Youth-onset Diabetes Challenge	Uncertain
Knowledge Base re Youth-onset Diabetes prevalence & trends	Poor

[see Table 20 for category details]

Table 5: RDC Enabling Organizations

Provincial Government Mandated [DHUs 3; CCACs 3; OHTs 5]	11
Municipal Government [Counties 3; Districts 1; Municipalities 41]	45
School Boards	8
Government Mandated s/Total	**64**
Diabetes Healthcare Provider	37
Diabetes-related Provider [e.g., mental health, healthy eating]	37
Healthcare s/Total	**74**
TOTAL ORGANIZATIONS	**137**

Table 6: RDC Programs provided by Enabling Organizations

Diabetes - Youth	21
Diabetes - Adult or age unspecified	55
Healthy Eating, Nutrition, Weight Management	23
Mental Health	44
Addiction & Smoking Cessation	5
All other - direct healthcare	37
Direct Healthcare s/Total	**185**
Built Environment [Parks & Trails]	342+
Food Security [Food Banks and Community Meals]	78+
Well-being s/Total	**420+**
TOTAL PROGRAMS	**605+**

Opportunities and Actions

Strategic Focus

There are 5 strategic areas requiring action. Two are 'national' action areas shared across Canada and require help from Federal & Provincial Governments. Three are specific to the RDC.

All 5 can be influenced or advanced by the RDC with a collective will to act. Despite 2022 being a Municipal election year, a start could be made on actions requiring area coordination and all healthcare enabling organizations can move forward with many of the required actions individually.

Strategic Action requiring help from Federal and Provincial Governments

1. Improve the Youth-onset Diabetes knowledge base
2. Raise the public visibility of the Youth-onset Diabetes challenge

Strategic Action specific to the RDC

3. Simplify program locating and access processes for youth and their families
4. Close key gaps in enabling healthcare programs and delivery
5. Share and emulate program successes

Table 7: The Opportunity Space - Summary

1. Improve the Youth-onset Diabetes knowledge base and share all data publicly
Canada does not have a national diabetes registry for youth. Key data are unreported; e.g., number of pre-onset type 2 screenings completed annually; number of youth who have diabetes; number of schools with an in-school support process for students with diabetes.
2. Raise Youth-onset Diabetes public visibility
Youth-onset Diabetes does not have a 'natural', routine position on the public radar screen as compared with, for example, Mental Health. Provincial policy documents, e.g., Community Safety and Wellbeing Plans contain no mention of diabetes. National diabetes advocacy groups under-emphasize youth-onset T2. The majority of RDC enabler organizations have no diabetes information on their web site.
3. Simplify locating and accessing Youth-onset Diabetes programs
Despite a strong effort by some local RDC enablers, a typical Internet search query can produce a very confusing result regarding which 'link' to follow. Many 'landing pages' add more difficulty due to the absence of essential information such as age-range served, referral protocols, email contact.
4. Close key gaps in prevention and treatment programs and delivery
No evidence could be found within the RDC for pre-onset type 2 screening services; help for preparation of Individual Care Plans; coordinating focus for transition to adult healthcare.
5. Share and emulate program successes
There are many examples of effective collaboration at all levels throughout the RDC but specifics and the collective capability are not widely shared or easily found for convenient reference.

Table 8: RDC Actions Grouped by Strategic Focus

1. Improve the Youth-onset Diabetes knowledge base and share all data publicly

Advocate with:

* Public Health Agency Canada for priority implementation of a national youth diabetes registry;
* Ontario Minister of Health to publish the number of type 2 screenings and results annually;
* Ontario Minister of Education and RDC School Boards to publish the number of schools with an in-school support process for students with diabetes;
* Ontario Minister of Education and RDC School Boards to publish the number of students registered as living with type 1 and type 2 by age, gender, ethnicity, location;
* PDECs, DECs and FHTs to share qualitative trend data; e.g.,
  - number of youth diabetes cases seen are rising, decreasing, steady
  - number of youth type 2 cases also requiring insulin are rising, decreasing, steady

2. Raise Youth-onset Diabetes public visibility

* All RDC enabler organizations to:
  - include a Diabetes Prevention Information segment on their web sites along with links to relevant education and support resources;
  - use their public-access venues, e.g., admin offices, recreation centres, libraries, museums, patient waiting rooms, food banks for display of appropriate Youth Diabetes Infographics and take-away Rack Cards;
* Municipal Community Safety and Well-being plans and frameworks to add a youth diabetes focus;
* All Programs providing support for Modifiable Diabetes Risk factors to explicitly identify their connection to diabetes prevention;
* Community outreach newsletters such as '211 Simcoe County' reinforce the Youth-onset Diabetes awareness and prevention need.

3. Simplify locating and accessing Youth-onset Diabetes programs

* Conduct an 'ease of access' and 'information quality' audit of existing Internet approach;
* All program descriptions to include clearly visible identification of applicable age ranges, referral protocol and email contact address;
* Create an RDC-area "Where to Find Diabetes Help" Infographic for use by all enabler organizations on their web sites and as a 'take-away' available in their public venues.
* Existing free transportation services, such as CT Link, to clearly indicate their availability for youth with diabetes and their families needing transportation to medical appointments.

4. Close key gaps in enabling healthcare programs and delivery

* Create a collaboration of enabler organizations who will provide pre-onset type 2 screening for youth and publicize locations;
* Create a coordinating focus where parents can secure help to prepare an Individual Care Plan;
* Create a coordinating focus where youth and parents can obtain planning and implementation help for transition to adult healthcare.

5. Share and emulate program successes

* Create a central listing of support resources e.g., toolkits, peer networks, risk assessment tools, tools to help with food security dialogue, e-Learning courses, diabetes knowledge quizzes
* Promote RDC resources and programs in local print and online media

Table 9: RDC Actions Grouped by Recommended Implementation Leadership

County, District and Municipal Elected Officials

* Advocate with:
  - Public Health Agency Canada for priority implementation of a national youth diabetes registry;
  - Ontario Minister of Health to publish the number of type 2 screenings and results annually;
  - Ontario Minister of Education and RDC School Boards to publish the number of schools with an in-school support process for students with diabetes;
  - Ontario Minister of Education and RDC School Boards to publish the number of students registered as living with type 1 and type 2 by age, gender, ethnicity, location;
* Enhance Municipal Community Safety and Well-being plans and frameworks to add a youth diabetes focus
* Conduct an 'ease of access' and 'information quality' audit of existing Internet approach available to youth and families in search of diabetes program support
* Use community outreach newsletters such as '211 Simcoe County' to reinforce the Youth-onset Diabetes awareness and prevention need.
* Ensure free transportation services, such as CT Link, clearly indicate their availability for youth with diabetes and their families needing transportation to medical appointments
* Create a central listing of support resources e.g., toolkits, peer networks, risk assessment tools, tools to help with food security dialogue, e-Learning courses, diabetes knowledge quizzes
* Create an RDC-wide "Where to Find Diabetes Help" Infographic for use by all enabler organizations on their web sites and as a 'take-away available in their public venues
* Promote RDC resources and programs in local print and online media

Public Health Units

* Provide support to elected officials for Advocacy actions, Resource listings and 'audit' of diabetes program search process described above
* Create a collaboration of enabler organizations who will provide pre-onset type 2 screening for youth and publicize locations
* Create a coordinating focus where parents can secure help to prepare an Individual Care Plan
* Create a coordinating focus where youth and parents can obtain planning and implementation help for transition to adult healthcare

PDECs, DECs, FHTs and other Diabetes-related Program Enablers

* PDECs, DECs and FHTs to share qualitative trend data; e.g.,
  - number of youth diabetes cases seen are rising, decreasing, steady
  - number of youth type 2 cases also requiring insulin are rising, decreasing, steady
* All Programs providing support for Modifiable Diabetes Risk factors to explicitly identify their connection to diabetes prevention
* All program descriptions to include clearly visible identification of applicable age ranges, referral protocol and email contact address

Action for All RDC Enabler Organizations including above Groups

* Include a Diabetes Prevention Information segment on their web sites along with links to relevant education and support resources
* Use their public-access venues, e.g., admin offices, recreation centres, libraries, museums, patient waiting rooms, food banks for display of appropriate Youth Diabetes Infographics and take-away Rack Cards

Table 10: Action Opportunities for Employers

Workplace Wellness Programs

Many companies and organizations have well established workplace wellness programs for their employees and their families. In addition to an employee benefit plan, programs might include a special focus on safety training and perhaps, participation in programs that place an emphasis on aspects such as mental health in the workplace.

Such programs address two fundamental objectives, helping employees to live a quality life with increased productivity and helping the organization to reduce or avoid cost demands on health benefit plans and general operations.

Do you have a Diabetes Awareness and Prevention program?

Do you know how many of your employees are living with diabetes or pre-diabetes or have immediate family members living with the condition? If you do not have a focus on diabetes in your current workplace wellness program, it is in your organization's interest to consider developing and implementing such a plan.

Why is such a plan important?

Diabetes impact on productivity and health benefit plan costs

* Diabetes costs for a family living with diabetes can reach $15,000 per year and more and bring on increased stress and depression as a result
* Increased disability claims due to diabetes complications such as heart disease and depression
* Increased drug costs due to diabetes medication
* Higher rates of absenteeism resulting from the realities of living with diabetes

How you can help Fight Diabetes

Type 1 diabetes cannot be prevented. The starting focus for prevention needs to be on type 2 diabetes in youth but with equal attention to preventing diabetes-related complications for youth living with either type of diabetes.

1. Raise awareness through education and employee engagement and encourage employees to share the 'message' with their families.
2. Encouraging use of online risk assessment tools followed by early screening for type 2 diabetes if results indicate; especially for youthful family members.
3. Enhance your Workplace Wellness Program by including a focus on diabetes.

Table 11: Action Opportunities for Schools

1. Implement an in-school support process for students with type 1 and type 2 if not already done.
2. Continue to reinforce the importance of healthy eating and regular exercise.
3. Hold an Annual Diabetes Awareness Day event
4. Encourage students to:
   - complete the SFBLF online *Type 2 Risk Self-Assessment* [ages 8 -18] quiz.
   - take the free SFBLF self-paced, narrated SFBLF e-Learning course, *Understanding Diabetes*
5. Schedule a free, 1-hour SFBLF Interactive Webinar [4 diabetes-related topics available]
6. Schedule a School Tour to the Banting Homestead [transportation subsidies available]
7. Post SFBLF diabetes Infographics designed for schools.

The following are examples of in-school challenges identified by winners of the SFBLF Annual Education Award for Grade 12 students with diabetes

"The biggest struggle I had to face was the misunderstanding from teachers and classmates. I do not like to draw attention to myself. The only problem is, when you're having a low in the middle of a lesson, it is hard to not become the centre of attention when you must check your blood sugar and eat some snacks. I would sometimes become a distraction which would upset teachers and led to a lot of questions being asked of me such as, "ewww why won't your finger stop bleeding?" and, "I hate blood, can't you go to the washroom and do that?" .... which made me beyond uncomfortable".

- T1 diagnosed at age 13

Diabetes Basics - Prevalence

"Diabetes is a pandemic of unprecedented magnitude. Earlier this year, the World Health Organization launched the Global Diabetes Compact and United Nations Member States adopted a Resolution that calls for urgent coordinated global action to tackle diabetes. These are significant milestones, but words must be turned into action now, and ***if not now, when?"***

– Prof. Andrew Boulton, President, IDF, (Nov, 2021) [5]

Diabetes is also a worldwide pandemic among adults and the numbers continue to increase. At the end of 2021, 537 million adults (20-79) worldwide were living with diabetes.

That number is approximately equal to the number of worldwide Coronavirus cases as at June 2022. A fundamental difference being, diabetes is a life-long condition.

Over 1.1 million youth (0-19) worldwide were living with type 1 diabetes in 2021. The total number of youth living with type 2 is unknown, unfortunately, but the numbers are escalating.

There are also bi-directional relationships among diabetes, obesity and mental health difficulties.

There is a strong correlation between inactivity, obesity and the rise of type 2 diabetes in youth. Similarly, there are interactions between mental disorders in youth and diabetes. These conditions also are appearing increasingly in various combinations in youth.

Diabetes, mental disorders and obesity in youth have significant common characteristics:

* increasing prevalence and earlier onset
* systemic barriers to access for healthcare
* highly variable quality of support for transition from pediatric to adult healthcare

All three conditions require broader awareness of the risks and early interventions. Together, they represent a 'perfect storm' for our youth.

In Canada, based on selected studies, there is a dichotomy emerging in terms of the ages at which youth-onset diabetes appears. Type 2 is appearing more frequently in the late teens and type 1 is appearing at ever-younger ages; some as young as 8 years or even younger.

"The greatest burden of youth-onset type 2 diabetes is in older youth aged 15 to 19 years who likely access primary, rather than paediatric care." [6]

A 'real life' example

Every class that has attended the SFBLF on-site School Tours program at the Banting Homestead and now, our new Interactive Webinar series, are asked 2 questions at the outset:

1. Are you living with diabetes?
2. Do you have family members living with diabetes?

Since the mid-2014 launch of our School Tours program, almost 5,000 students [grades 6 - 12], including teachers and the occasional parent escort, have participated from across the province in this 3-hour outing. The response to Q1 is typically zero to maybe 3 or 4 [impacted by the unwillingness to self-identify we suspect].

However, the response to Q2 ranges from a minimum of 25% to 75%.

The scale of the answers emerging from our Webinars so far is less dramatic with 18% of the students answering 'yes' to Q2.

If those youth are referencing parents or other blood relatives, they are all at greater risk of type 2.

40% of those living with type 2 diabetes do not know they have the condition.

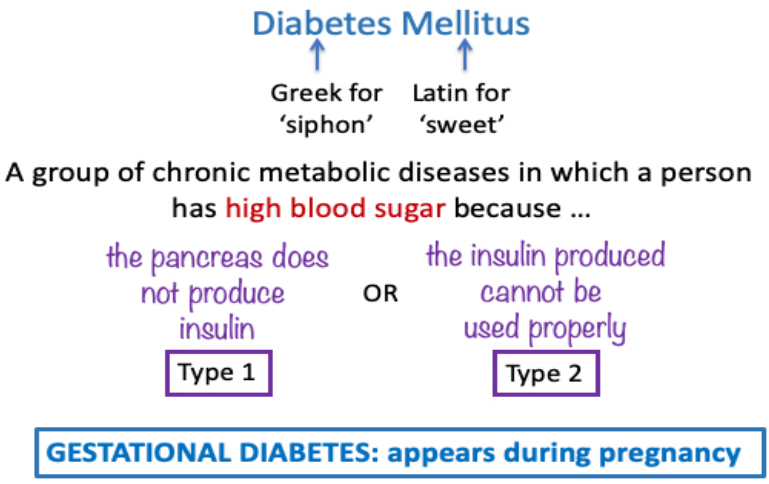
Diabetes Basics - Types and Risks

Types and risk factors

The exact causes of type 1 and type 2 diabetes are not known with certainty.

Risk factors for type 1 include family history, genetics, infections and various environmental influences.

Type 2 diabetes risk is affected by many factors including gender and age, diet, physical activity levels, body weight, blood glucose levels, blood pressure, cholesterol levels, and family history of diabetes.

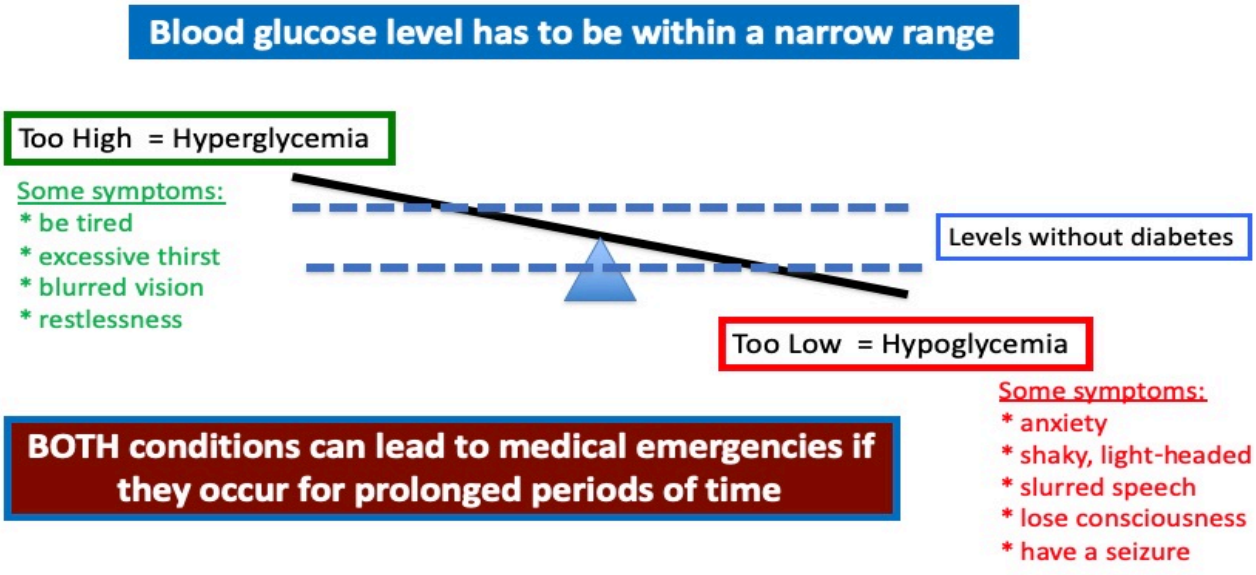


Gestational diabetes increases the risk of type 2 onset later in life for both mother and child.

Certain ethnicities such as Indigenous in Canada, Aboriginal and Torres Strait Islanders in Australia and African Americans, Native Americans, Latinos and Asian Americans in the United States are at higher risk of developing type 2 although the reasons are not clear.

Mental disorders can lead indirectly to developing type 2 as a result of related life-style behaviour such as undue weight gain or persistent inactivity.

There are bi-directional causal relationships among diabetes, overweight, obesity and mental health.



The greatest risk for a student with diabetes is the rapid onset of a 'sugar low' which requires Immediate assistance to avoid a lapse into a coma

Insulin is the essential 'key' to unlock cells to take in glucose.

Repeated or persistent glucose imbalance = permanent cell damage

Cell damage sets the stage for diabetes-related complications

* heart disease
* kidney disease
* blindness
* nerve damage

and possibly
* lower limb amputation

MENTAL HEALTH DIFFICULTIES CAN ALSO ADD 'COMPLICATIONS'

All types of diabetes can lead to serious health complications if not managed properly

What can be prevented or at least delayed ?

Type 1 Diabetes	**100% NO**
Type 2 Diabetes	**70% YES**
Diabetes complications In either Type	**65% YES**
Comorbid mental problems, disorders, relapses	**Some**

Education Resources and Tools

Table 12: SFBLF - Youth-onset Diabetes Education Resources
for Students, Teachers, Families and Healthcare Enablers

Education Resource	Find at bantinglegacy.ca
Online Prevention Resources, Tools, Action Programs	
* *Type 2 Diabetes Risk Self-Assessment for Youth (8 – 18)*	/survey/
* *Understanding Diabetes* eLearning [self-paced, narrated, 3 mods]	/education//understanding-diabetes/
* *Food & You* Quiz [for easy sharing with HCPs]	/diabetes-and-food-survey/
* Self-Management s/w apps links for youth living with T1 or T2	/prevention/sm-apps/
* Peer Support Networks links for youth living with T1 or T2	/prevention/peer-support-networks/
* Rural Diabetes Coalition	/prevention/
* Prevention Actions and Infographics	/prevention/action/
* 3D, self-paced Virtual Tour of the BHHP Exhibits & Buildings with self- scoring quizzes and post-tour student projects	/virtual-tour/
Interactive Webinars Grades 6 -12 [via Teams, GMeets, Zoom]	
#1 Understanding Diabetes #2 Living with Diabetes & the Impact #3 Discovery of Insulin & the Worldwide Impact #4 About Banting All with optional team-based, associated competitive Quizzes	/programs/webinars/ Adult Group Versions are available
SFBLF DMEC - Banting Homestead Heritage Park	
* School Tours - onsite at the BHHP	/programs/school-tours/
* Group Tours (Teachers and Staff) - onsite at the BHHP	/programs/group-tours/
* Summer Day Camp Field Trips - onsite at the BHHP	/programs/day-camp-field-trips/
* Individual, Family, General Public Access - onsite at the BHHP	/visit/
School-related Award Program Descriptions	
* Education Awards (Ontario Gr 12 students with T1 or T2)	/programs/annual-awards/
* National Recognition Award for Schools with an in-school support program for students with diabetes	/programs/national-recognition-program/
For Teachers, Parents and Healthcare Providers	
* *Mental Health & Diabetes in Youth* eLearning [self-paced, narrated, 5 modules with quizzes]	/education/mental-health-diabetes-in-youth/
* Diabetes 'Issues' Research reports: - Youth-onset Diabetes Surveillance Data Availability (2017) - In-School Support for Students with Diabetes (2018) - Youth-onset Diabetes in Indigenous Peoples (2020) * and related Research Internship program for undergrads	/education/research/ [All papers feature comparisons with Australia, USA and/or UK] /programs/research-internship/
* Annual Symposium for HCPs & Teachers	/programs/annual-symposium/
Short Tutorials online: Diabetes, Banting, Insulin Discovery & Discovery Team	
* Diabetes & Risk	/prevention/diabetes-risk/
* Diabetes Basics	/prevention/diabetes-basics/
* Diabetes Impact	/prevention/diabetes-impact/
* Insulin Discovery & Mass Production * Medical Heroes * Banting the artist and soldier * Interactive Timelines: - Banting Key Dates; Homestead Evolution	/banting-insulin/
* Nobel Prize and Canada	/banting-insulin/nobel-prize-canada/

Table 13: RDC Education Resources - Program Enabler Examples

This selected list illustrates the diversity of collaborative initiatives undertaken by RDC stakeholders.

Dufferin County	
* Headwaters Food Charter and Action Plan [HFF]	http://headwatersfoodandfarming.ca/food-charter-food-policy/
* Headwaters Farm to School Initiative [HFF]	http://headwatersfoodandfarming.ca/farm-to-school/
* Bridges Out of Poverty Program [WDGPU]	http://circlesgw.ca/contact/
* DC Moves [HCIA]	https://headwaterscommunities.org/old-home/dc-moves/
* Find a Ride [HCIA]	http://headwaterscommunities.org/2013/08/projects/rural-transportation/listing-of-dufferin-countys-current-transportation-options/
* Addressing Social Determinants of Health in WDG [WDGPU]	https://wdgpublichealth.ca/reports/addressing-social-determinants-health-wellington-dufferin-guelph-public-health-perspective
Grey County	
* Community Food Toolkit [GBHU]	https://www.publichealthgreybruce.on.ca/Portals/0/Topics/Eating%20Well/Final%20Food%20Bank%20Toolkit.pdf
* Food Donation Guidelines [GBHU]	https://www.publichealthgreybruce.on.ca/Portals/0/Topics/Eating%20Well/Food-Donations-2.pdf
* Bruce Grey Food Charter [GBHU]	https://www.publichealthgreybruce.on.ca/Portals/0/Topics/Eating%20Well/GB%20Food%20Charter.pdf
* Food Security in Bruce Grey [United Way GB]	https://unitedwayofbrucegrey.com/services-offered/food-security/
* Healthy Schools Toolkit [GBHU]	https://www.publichealthgreybruce.on.ca/Portals/0/Topics/HealthySchools/GBHU%20Healthy%20School%20Toolkit.pdf?ver=2019-01-02-133740-013
* Healthy Schools PHNS [GBHU]	https://www.publichealthgreybruce.on.ca/Portals/0/Topics/HealthySchools/Healthy%20School%20Public%20Health%20Nurses.pdf?ver=2019-08-28-134134-010
Simcoe-Muskoka	
* Tobacco Cessation Workshops [SMDHU]	https://www.simcoemuskokahealth.org/HealthUnit/Services/ClassesTraining/SmokingCessationCounselling.aspx
* Nottawasaga Community Safety & Well-being Plan [Essa, Adj-Tos, New Tec]	https://www.newtecumseth.ca/en/living-in-our-community/community-safety-well-being-plan.aspx
* Simcoe County Early Intervention Services	https://www.simcoe.ca/dpt/ccs/early/about
* Muskoka Health Link	https://www.muskoka.on.ca/en/health-and-emergency-services/muskoka-health-link.aspx
* Simcoe County Food Security Framework	https://www.simcoe.ca/ChildrenandCommunityServices/Documents/Simcoe%20County%20Food%20Security%20Framework.pdf
* Simcoe County Food Council	https://www.simcoe.ca/dpt/ccs/community#ui-id-7

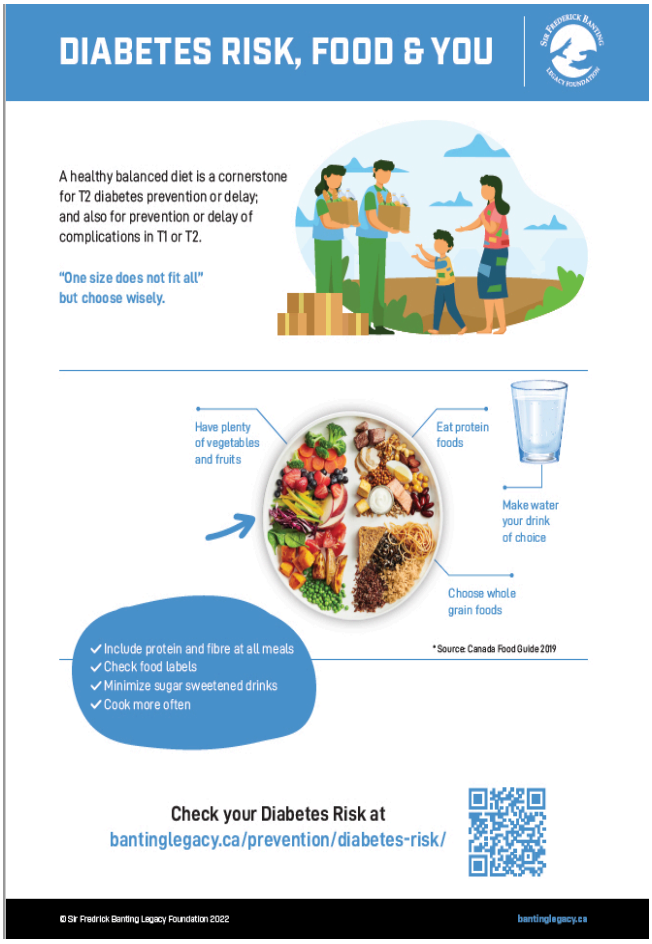
Infographics

Infographics for Food Banks

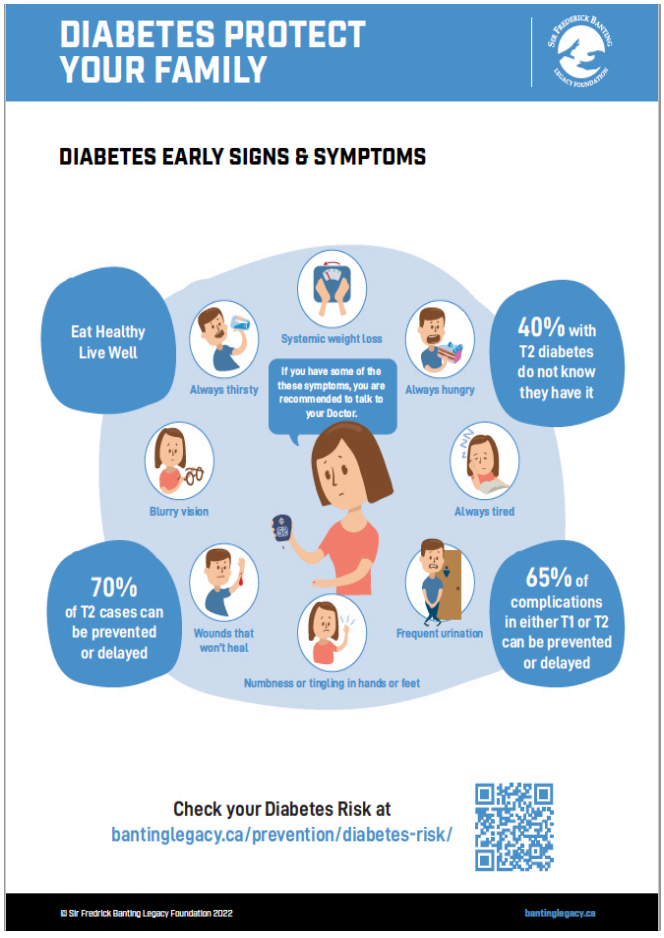
Two Infographics [11" x 14"] for display and a 'take-away' Rack Card [3.5" x 8.5"] have been designed by SFBLF for use by Food Banks. The designs were developed in consultation with the Simcoe Food Council and the Grey Bruce United Way Food Bank Coordinator.

These information resources will be provided by SFBLF at no cost to all RDC Food Banks.

Infographic #1



Infographic #2



Rack Card - Front

PROTECT YOUR FAMILY; UNDERSTAND DIABETES RISK

Youth-onset T2 diabetes
> is escalating worldwide
> can be invisible for a long time

Know your risk today

Find information resources from SFBLF at bantinglegacy.ca

- Risk assessment for Youth (8 – 18) /survey/
- Free e-learning course /education/understanding-diabetes/
- Food and You assessment /diabetes-and-food-survey/
- Protection actions for the family /protection/action/

Check your Diabetes Risk at bantinglegacy.ca/prevention/diabetes-risk/

Find more help on the SFBLF website or at info@bantinglegacy.ca

Rack Card - Back

EAT HEALTHY LIVE WELL

- Build healthy meals with simple ingredients
- Cook more often
- Include protein, fat, fibre, and colour at meals

eggs + toast and PB + canned fruit

canned salmon + bread + veg slices

tuna + cooked pasta + onion + mixed veg + oil

canned tomatoes + 2 cans of beans + ground meat + onions + spices

Find recipes in the Canada Food Guide

Breakfast Examples
- Egg and Veggie Scramble
- Strawberry pancakes

Snack Examples
- Creamy smoothie
- Creamy dreamy hummus

Lunch/Dinner Examples
- Chicken Fried Rice
- Easy peasy fish tacos
- Lunch box tuna salad wrap
- Mac & cheese with a veggie twist
- Beef and bean burger

For all of these and many more see food-guide.canada.ca/en/

Find more help on the SFBLF website or at info@bantinglegacy.ca

Infographics for Schools

The following set of Infographics were developed by SFBLF to support diabetes awareness and prevention actions within schools and to emphasize the importance of in-school support programs for students with diabetes. They can be downloaded from the SFBLF website at banting/legacy.ca/prevention/

1. My Diabetes Support Devices

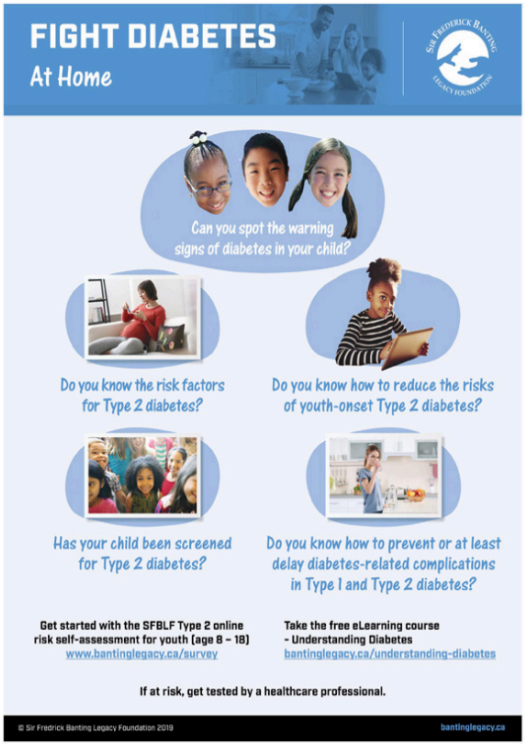
2. Day in the Life of a student with diabetes

3. In-school 'Issues' identified in essays submitted by Gr 12 winners of SFBLF Education Awards

4. Fight Diabetes at School

Infographics for Public Spaces

The following set of Infographics were developed by SFBLF to support diabetes awareness and prevention actions and for use in public spaces such as municipal admin offices, waiting rooms, libraries, recreation centres. They can be downloaded from the SFBLF website at banting/legacy.ca/prevention/



RDC - Additional Details

Statistics with Notes

Table 14: RDC Municipalities and School Boards

Entity	Dufferin	Grey	Muskoka	Simcoe	Total
Municipalities	8	9	6	18	41
School Boards [1]	2	2	2	2	8
* Elementary Schools [Total]	187	52	68	137	438
* High Schools [Total]	37	11	14	23	85
Total Schools [RDC & Outside RDC]	224	63	82	160	523
Total Students [RDC & Outside RDC]	128,600	22,000	26,000	71,000	237,600
RDC youth age 5 - 19 [2]	8,000	15,400	8,600	60,000	92,000
RDC youth age 19 and under [2]	15,600	20,000	10,600	110,000	156,200

NOTES:

1. Of the 8 School Boards, only Simcoe County DSB operates in one County only.
   Of the 8 School Boards, all but SCDSB and SMCDSB also operate outside the RDC geography.
2. Data are largely based on the 2016 Census but adjusted by local reports where available.
   No attempt was made to analyze the 523 school listings to refine the student count within the RDC.

Table 15: Enabler Organizations by County [excluding Food Banks & Related - Table 17]

Enabler	Dufferin	Grey	Muskoka	Simcoe	S-M	Total
Provincial Government Mandated Organizations with a general health focus						
* Public Health Unit	1	1			1	**3**
* Home & Community Care Access Centre [former LHINs]	1	1			1	**3**
* Ontario Health Team	1	1			3	**5**
s/total	**3**	**3**			**5**	**11**
PDECs, DECs, FHTs, Pharmacies, Hospitals that include a diabetes-specific focus						
* PDEC or DEC	1	3			3	**7**
* Indigenous-specific		1			5	**6**
* Family Health Team	1	2	2	5	1	**11**
* Pharmacy	1			1		**2**
* Hospital [other than PDEC/DEC]			2	3		**5**
* Community Health Hub		1	2	2	1	**6**
s/total	**3**	**7**	**6**	**11**	**10**	**37**
Organizations with a diabetes-related focus						
*** All other**	6	9	5	16	1	**37**
TOTAL DIABETES & RELATED	**9**	**16**	**11**	**27**	**11**	**74**
TOTAL	**12**	**19**	**11**	**27**	**16**	**85**

NOTES:

1. Organizations in both Dufferin & Grey may also serve adjacent areas (i.e., Wellington and Bruce Counties) and RDC areas may receive services from adjacent areas outside the RDC geography.
2. In Simcoe-Muskoka there are organizations serving one or the other and some serving both.
3. Some organizations operate in more than one physical location within the RDC.
4. Organizations have been counted by main office location in the RDC.

Table 16: Programs by Health Focus [excluding Food Banks & Related - see Table 17]

Element [1,2]	Dufferin	Grey	Muskoka	Simcoe	S-M	Total
Programs delivered by Healthcare and related professionals						
* Youth-specific Diabetes Prevention and/or Treatment	6	1		1	13	**21**
* Adult or age-unspecified Diabetes Prevention and/or Treatment	1	12	8	21	13	**55**
* Healthy Eating - may include Nutrition and/or Weight focus [3]	2	4	1	8	8	**23**
* Mental Health [3]	5	14	3	17	5	**44**
* Addiction & Smoking Cessation	2		1	1	1	**5**
* All other [4]	4	12	4	14	3	**37**
Total	**20**	**43**	**17**	**62**	**43**	**185**
Built Environment - Self-guided and/or guided exercise opportunities						
* Municipal Parks/Parkettes [5]	25	6	13	145		**189**
* Provincial Parks [5]	4		2	4		**10**
* Trails [5]	8	12	20	93		**133**
* Conservation Areas [5]	1	1		8		**10**
Total	**38**	**19**	**35**	**250**		**342**

NOTES:

Programs

1. Some organizations have multiple programs supporting the main 'Health Focus'.

2. Some organizations provide services at more than one physical location but their program agenda may not be 'universal' for all locations.

3. For these 2 categories, no attempt was made to separate youth from adult programs although it is likely the majority focus on youth.

4. Including general health and well-being, other chronic conditions, autism, personal safety supports.

5. Parks & trails

> Many trail 'types': loop. Linear, waterfront, rail/train
> Many park 'types': greenspace, with playgrounds, with sports fields
> Most parks have barrier-free access; most trails do not
> Many trails and some parks are 'seasonal' only
> Some facilities include municipal recreation centres
> Some facilities may require an access fee
> Several 'walking clubs' not counted; including a few in-door

Table 17: Food Banks, Good Food Box & 'Soup Kitchen' Programs

Program	Dufferin	Grey	Muskoka	Simcoe	Total
* Food Bank	8	14	13	26	**61**
* Good Food Box		8		1	**9**
* Community Meal Program	1	5	1	1	**8**
Total	**9**	**20**	**14**	**28**	**78**

NOTES:

1. Food Banks operate on a limited, highly variable schedule; e.g. selected days of the week and times of day
2. Food Banks are free; require registration; for a specific area; support walk-in service; limit access frequency
3. Food Box programs require pre-payment fee that may be offset by community charities
4. Meal Programs are free, walk-in with no limits on use; may include breakfast, lunch, supper; may offer lunch, supper also as takeout hot or frozen

Table 18: Government Healthcare Enablers Operating in the RDC

Dufferin	Grey Bruce	Simcoe-Muskoka
* WDG Public Health Unit	* Grey Bruce Public Health Unit	* Simcoe-Muskoka DHU
* Hills of Headwaters Collaborative - Ontario Health Team	* Grey Bruce Ontario Health Team [a group of 25+ orgs]	* Muskoka & Area OHT * Barrie & Area OHT * North Simcoe OHT
* Home and Community Care Access Centre [formerly Central West LHIN]	* SW Community Care Access Centre [formerly SW LHIN] [includes Grey, Bruce, Huron, Perth, London Middlesex, Oxford, Elgin, Norfolk]	* North Simcoe Muskoka Community Care Access Centre [formerly NSM LHIN]

Table 19: Hospitals in the RDC

Hospital	Location	PDEC or DEC
Headwaters Health Care Centre	Orangeville	√
Markdale Hospital [GBHS]	Markdale	√
Meaford General Hospital [GBHS]	Meaford	√
Owen Sound Hospital [GBHS]	Owen Sound	√
Royal Victoria Regional Health Centre	Barrie	√
Soldiers' Memorial Hospital	Orillia	√
Also serving the RDC * Southampton Hospital [GBHS] * Wiarton Hospital [GBHS] * Brampton [William Osler HS]		 √ √ √
General & Marine Hospital	Collingwood	
Georgian Bay General Hospital	Midland	
Hanover & District Hospital	Hanover	
Huntsville District Memorial Hospital	Huntsville	
South Muskoka Memorial Hospital	Bracebridge	
Stevenson Memorial Hospital	Alliston	

Table 20: RDC Collective Capability - Scorecard Details

Requirement	Response
Key Knowledge Base	
1. RDC Youth-onset diabetes data by age, gender and diabetes type	**poor to none**
2. RDC Trends in the prevalence of youth-onset T1, T2 & insulin-dependent T2	**none**
Propensity to use collaborative approaches	**very good**
Healthcare Access	
1. Clarity in age-range applicability of programs	**fair**
2. Finding required programs and services	**can be difficult**
3. Ease and responsiveness of email connections to healthcare providers	**poor**
Diabetes Awareness, Prevention, Treatment, On-going Support	
1. Promoting awareness of the youth-onset diabetes challenge	**poor**
2. Promoting access to diabetes online learning and assessment tools	**poor**
3. Direct youth-onset diabetes prevention programs	**poor to fair**
4. Direct T1 youth-onset diabetes treatment programs	**very good**
5. Direct T2 youth-onset diabetes treatment programs	**uncertain**
6. Youth diabetes pre-onset screening programs	**none found**
7. Screening for diabetes complications in youth with T1 diabetes	**very good**
8. Screening for diabetes complications in youth with T2 diabetes	**uncertain**
9. Coordinating support for transition from paediatric to adult healthcare	**none found**
10. Program support for Indigenous Youth	**good**
Support from and for Schools	
1. In-School support for students with T1 diabetes - policy support	**very good**
2. In-School support for students with T2 diabetes - policy support	**poor**
3. Number of schools who have implemented the policy	**not available**
4. schools with on-going diabetes awareness education programs	**none found**
5. Public Health Unit general health programs support	**good**
Support for Modifiable Diabetes Risk Factors	
1. Healthy Eating - educating youth and families	**good**
2. Healthy Eating - affordable access to healthy food [Food Banks & Related]	**good**
3. Mental Health - direct treatment support programs	**very good**
4. Exercise - educating youth and families	**good**
5. Exercise - easily accessed parks and trails	**very good**
6. Municipal policy support for well-being and safety	**good**

References

1. Novo Nordisk A/S**,** *Cities Changing Diabetes,* https://www.citieschangingdiabetes.com/about-us/partnerships.html, accessed, June 22, 2022
2. *Mississauga joins as 40th city* (Nov 12, 2021), https://www.citieschangingdiabetes.com/news-and-events/mississauga-in-canada-joins-as-40th-city-in-the-network.html, accessed, June 22, 2022
3. Novo Nordisk and the University of Toronto announce .. (Feb 2021), https://www.utoronto.ca/news/novo-nordisk-and-university-toronto-announce-combined-c40-million-investment-address-diabetes, accessed, June 22, 2022
4. SFBLF - Diabetes Issues Research Reports (2017 to 2022), find links for all at https://bantinglegacy.ca/education/research/
5. 10th World Diabetes Atlas (November 2021), International Diabetes Federation (IDF), https://diabetesatlas.org, accessed June 22, 2022
6. Amed S, Islam N, Sutherland J, Reimer K., *Incidence and prevalence trends of youth-onset type 2 diabetes in a cohort of Canadian youth: 2002-2013*, Pediatric Diabetes. 2017, Dec 27 https://www.ncbi.nlm.nih.gov/pubmed/29280255, Accessed Aug 31, 2021
7. Wong, J., Constantino M., Yue, D. K., Morbidity *and Mortality in Young-Onset Type 2 Diabetes in Comparison to Type 1 Diabetes: Where Are We Now?* , Curr Diab Rep (2015) 1:566; pub online, Nov 2014, https://link.springer.com/content/pdf/10.1007/s11892-014-0566-1.pdf; accessed Aug 31, 2021
8. TODAY Study Group, *Long-Term Complications in Youth-Onset Type 2 Diabetes*, N Engl J Med 2021; 385:416-426, July 29, 2021, https://www.nejm.org/doi/full/10.1056/NEJMoa2100165, Accessed Aug 31, 2021
9. AIHW 2014 *Type 2 diabetes in Australia's children and young people: a working paper. Diabetes* Series no. 21. Cat. no. CVD 64. Canberra https://www.aihw.gov.au/getmedia/bc5d50e5-8ca0-474d-be77-f96234d9a532/15203.pdf.aspx?inline=true access check Sept 7 2020
10. Peria, Curran et al, *Screening, assessment and management of type 2 diabetes mellitus in children and adolescents:* Australasian Paediatric Endocrine Group guidelines, MJA 213 (1); 6 July 2020; https://onlinelibrary.wiley.com/doi/full/10.5694/mja2.50666, Accessed, Aug 31, 2021
11. Leung, Lawrence, *Diabetes mellitus and the Aboriginal diabetic initiative in Canada: An update review*, J Family Med Prim Care 2016 Apr-Jun; 5(2): 259-265
12. Institute of Health Economics. *Diabetes care and management in Indigenous populations in Canada: Summary report of a pan-Canadian policy roundtable Nov 1, 2017,* Edmonton (AB): Institute of Health Economics; 2018. https://www.ihe.ca/advanced-search/diabetes-care-and-management-in-indigenous-populations-in-canada-summary-report-of-a-pan-canadian-policy-roundtable, Accessed Aug 31, 2021
13. First Nations Information Governance Centre, *National Report of the First Nations Regional Health Survey Phase 3: Volume One*, (Ottawa: 2018). Revised edition, July 2018.
14. Halseth, Regine, *The Prevalence of Type 2 Diabetes Among First Nations and Considerations for Prevention,* Feb 2019, National Collaborating Centre for Aboriginal Health, Prince George, BC.
15. Titmuss, A., Maple-Brown, L., et al, *Emerging diabetes and metabolic conditions among Aboriginal and Torres Strait Islander young people*, MJA 210 (3), Feb 2019, https://pubmed.ncbi.nlm.nih.gov/30656687/, Accessed Aug 31, 2021
16. Prioritising COVID-19 over everything: the unintended harm, www.thelancet.com/diabetes-endocrinology Published online June 8, 2022 https://doi.org/10.1016/S2213-8587(21)00147-9
17. Persaud, S., Sadleir, D., Venier, E., *Youth Living with Diabetes and Comorbidities – Available Surveillance Data – A Status Assessment* (2017) https://bantinglegacy.ca/count-the-children, accessed Aug 31/2021
18. Government of Canada, Bill c-237, National Framework for Diabetes https://www.parl.ca/DocumentViewer/en/43-2/bill/C-237/royal-assent

19. Lawrence, S.E., Cummings, E.A., et al, *Managing type 1 diabetes in school: Recommendations for policy and practice*, Position Statement, Paediatric Child Health 2015;20(1):35-39 https://www.cps.ca/en/documents/position/type-1-diabetes-in-school, Accessed Aug 31, 2021

20. Ontario Ministry of Education, PPM 161: Children and Students with Prevalent Medical Conditions, (2018), https://www.ontario.ca/document/education-ontario-policy-and-program-direction/policyprogram-memorandum-161?_ga=2.59368301.150148067.1654979846-146180288.1654979846

21. Health Quality Ontario, Quality Standards for Transition, https://www.hqontario.ca/Evidence-to-Improve-Care/Quality-Standards/View-all-Quality-Standards/Transitions-From-Youth-to-Adult-Health-Care-Services/About

22 Tarasuk V, Mitchell A. (2020) Household food insecurity in Canada, 2017-18. Toronto: Research to identify policy options to reduce food insecurity (PROOF). [https://proof.utoronto.ca/wp-content/uploads/2020/03/Household-Food-Insecurity-in-Canada-2017-2018-Full-Reportpdf.pdf

23 Chan J, DeMelo M, Gingras J, Gucciardi E. (2015) Challenges of diabetes self-management in adults affected by food insecurity in a large urban centre of Ontario, Canada. Int J Endocrinol. https://www.hindawi.com/journals/ije/2015/903468/

24. Tarasuk V, Fafard St-Germain AA, Loopstra R. (2019) The relationship between food banks and food insecurity: insights from Canada. Voluntas 2019 https://proof.utoronto.ca/publication-the-relationship-between-food-banks-and-food-insecurity-insights-from-canada/

25. Loopstra, R, and V. Tarasuk. (2012) "The relationship between food banks and household food 553 insecurity among low-income Toronto families." Canadian Public Policy 38 (4):497- 554 514 https://www.utpjournals.press/doi/epdf/10.3138/CPP.38.4.497

26. Simcoe County Food Security Framework (2019), https://www.simcoe.ca/ChildrenandCommunityServices/Documents/Simcoe%20County%20Food%20Security%20Framework.pdf, accessed, June 22, 2022

27. Simcoe County District Health Unit (2020) https://www.simcoemuskokahealth.org/centsless, accessed, June 22, 2022

28. Ontario Dietitians in Public Health (2020), https://www.odph.ca/centsless, accessed, June 22, 2022

29. BG United Way Food Security Coordinator, Paul Wagenaar, (email June 2022); and *Food Security in Bruce Grey* (2021), https://unitedwayofbrucegrey.com/services-offered/food-security/, accessed, June 22, 2022

30. SFBLF *Food & You* Quiz (2018), https://www.bantinglegacy.ca/diabetes-and-food-survey/

31. https://www.ontario.ca/document/community-safety-and-well-being-planning-framework-booklet-3-shared-commitment-ontario

32a. https://www.ontario.ca/page/insulin-pumps-and-diabetes-supplies

32b. https://news.ontario.ca/en/release/1001234/ontario-providing-access-to-innovative-technology-for-diabetes-care

32c. https://news.ontario.ca/en/release/1001696/ontario-providing-access-to-the-latest-technology-for-diabetes-care

33. https://guidelines.diabetes.ca/cpg/chapter35

34. https://guidelines.diabetes.ca/cpg/chapter34

35. https://www.hqontario.ca/Portals/0/documents/evidence/quality-standards/qs-prediabetes-and-type-2diabetes-quality-standard-en.pdf

36. https://www.hqontario.ca/Evidence-to-Improve-Care/Quality-Standards/View-all-Quality-Standards/Transitions-From-Youth-to-Adult-Health-Care-Services/About

37. https://food-guide.canada.ca/en/

38. https://www.adjtos.ca/en/news/community-safety-and-well-being-plan-2025.aspx

39. https://www.simcoe.ca/ChildrenandCommunityServices/Documents/Simcoe%20County%20Food%20Security%20Framework.pdf

40. https://www.publichealthgreybruce.on.ca/Portals/0/Topics/HealthySchools/HealthySchools ToolkitGrey%20Bruce.pdf