

Diabetes Education & Screening in Youth at Onion Lake Cree Nation



Report 2024

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Executive Summary

Type 2 diabetes poses significant health risks for Saskatchewan First Nations youth and early detection can lead to improved health outcomes. However, testing is often challenging to access for at-risk populations, particularly those living in rural and remote areas, delaying diagnosis and treatment.

Given this, the Pediatric Diabetes Team at the University of Saskatchewan led a study to provide education and test a new screening method for type 2 diabetes in at-risk First Nations youth. The study was a collaborative effort between the research team and the Onion Lake community and Health Care Team, involving primarily grade 8 students from Eagleview Middle School, taking place over two days in October 2023. The education day featured interactive learning activities aimed at health promotion and diabetes prevention. The screening day, for those who consented, involved dried bloodspot hemoglobin A1c testing to screen for diabetes and health surveys, gathering valuable information on risk factors based on personal and family history.





The study found that of the 23 students screened, nearly 22% or 1 in 5 students screened positive for diabetes or pre-diabetes. Although those who screened positive were more likely to have a family history of type 2 diabetes, there were no clear features that distinguished these students from those who screened negative.

These results highlight the important role of screening for type 2 diabetes in at-risk youth. Even youth who screened negative will benefit from ongoing screening to detect diabetes as early as possible as they continue to be a risk. This presents an opportunity to intervene to reduce the risk of long-term health complications and keep the community and future generations healthy.

ONION LAKE DIABETES EDUCATION & SCREENING GRADE 8

TYPE 2 DIABETES IN YOUTH IS CONCERNING


- ↑ More youth being diagnosed
- ↑ More health complications when diagnosed young

RISK FACTORS THAT MAKE IT MORE LIKELY THAT FIRST NATIONS YOUTH MAY HAVE TYPE 2 DIABETES

- First Nations/Indigenous ethnicity
- Relative with type 2 diabetes
- Mother had diabetes during pregnancy
- Higher body weight
- High blood pressure, high cholesterol, dark patchy skin in neck/groin

WHO WAS INVOLVED IN THE PROJECT?




Onion Lake Health Team
USask Study Team
Eagleview Middle School

All grade 8 students participated in an education day.

If consent was received, they were screened for prediabetes/diabetes.


ONION LAKE DIABETES EDUCATION & SCREENING GRADE 8

EDUCATION DAY








Students learned about diabetes, risk factors, healthy eating, activity

SCREENING DAY



23 students were screened using dried blood spot test for HbA1c

ONION LAKE RESULTS











1 in 5 positive for diabetes OR prediabetes

Diabetes = HgA1c 6.5% or higher
Pre-Diabetes = HgA1c 5.0 to 5.9%
No diabetes = Under 5%

NEXT STEPS

- ✓ Screen youth and refer them for follow-up
- ✓ Education to increase awareness of risk factors
- ✓ Programs/policies for healthy weight in children/youth (healthy eating, active living initiatives) (prenatal screening, healthy weight gain in pregnancy, breastfeeding)

Visual summary of the Diabetes Education & Screening in Youth held in Onion Lake Cree Nation, October 2023.

Why is youth onset diabetes type 2 concerning?

Type 2 diabetes is a condition in which the body cannot make enough insulin (a hormone that helps control the amount of glucose or sugar in your blood), and/or does not properly use the insulin it makes. Type 2 diabetes is caused by several risk factors and accounts for 90% of diabetes cases in Canada.

Type 2 diabetes rates are increasing in youth, particularly youth of high-risk ethnic groups which includes people of First Nations ancestry. Unfortunately, people who are diagnosed with type 2 diabetes in youth are at especially high risk of future health problems from diabetes, such as kidney, eye and nerve damage as well as heart problems. Even if blood sugars are higher than normal but not high enough for diabetes to be diagnosed, a condition known as prediabetes, this also increases the risk of future health problems (see next section “Screening for Diabetes and Prediabetes”). As well, prediabetes can progress to diabetes.

However, early detection of both diabetes and prediabetes can allow changes and interventions that will decrease long-term health risks and keep individuals healthy and well.



More youth are being diagnosed with type 2 diabetes (T2D):

Canada: 1.53 per 100,000 children per year
Manitoba: 12.45 per 100,000 children per year

Amed et al. 2010



People who develop T2D in youth are at high risk of future diabetes complications:

Kidney disease
Eye damage
Nerve damage
High blood pressure

Screening for Diabetes and Prediabetes

Who is at risk?

Higher body weight

High-risk ethnic group: First Nations

Parent or sibling with Type 2 Diabetes

Mother had diabetes during pregnancy (Gestational Diabetes)

High blood pressure, high cholesterol, velvety darkening of the skin in the neck & groin (acanthosis nigricans)

What are the recommendations for screening?



[Diabetes Canada Guidelines](#) recommend screening for diabetes every 2 years starting at 8 years of age if:

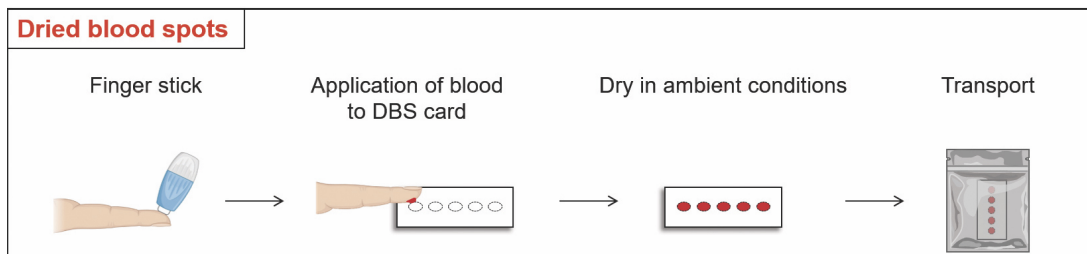
- ✓ 3 or more risk factors before puberty
- ✓ 2 or more risk factors during/after puberty

How is Screening Performed?

The hemoglobin A1c (HbA1c) is a test to both screen for and monitor diabetes. It is a blood test that measures average blood sugar levels over the last 2-3 months. Normally this test is done by drawing blood from a vein into a needle at a laboratory.

However, in this study, the dried blood spot method was used to collect a blood sample to measure Hb A1c. This method is done by pricking a finger and placing several drops of blood on a special paper, which is then sent to the lab for analysis.

If you know someone with diabetes, this is like a “finger poke” to check blood sugar levels. Since the sample does not need to be collected at a lab and it can be mailed out, this makes it easier for people to get tested.



At what Hemoglobin A1c levels are pre-diabetes and diabetes diagnosed?

	Hemoglobin A1c	Average Blood Sugar
Diabetes	6.5% or greater	7.8 mmol/L or higher
Pre-Diabetes	6.0 to 6.4 %	7.0 to 7.6 mmol/L
No diabetes	Under 6%	Under 7 mmol/L

Building Relationships

Given the risk type 2 diabetes poses for Saskatchewan First Nations youth and the challenge in laboratory access particularly those living in rural and remote areas, the Pediatric Diabetes Team at the University of Saskatchewan became interested in exploring the use of dried bloodspot testing to screen for type 2 diabetes in at-risk First Nations youth.



Building on previous work by Pediatric Endocrinologist and colleague Dr. Mark Inman which showed the dried bloodspot is an accurate way to measure hemoglobin A1c in children with diabetes, Dr. Daphne Yau, Pediatric Endocrinologist at the University of Saskatchewan proposed using this method to screen for type 2 diabetes

in at-risk youth. She brought together a study team that included Linda Gilmour Kessler (Study Coordinator), Tova Dyvbig (Pediatrics Department Research Facilitator), Cameron Jack (Research Assistant), Magdalena Koziak (3rd year Pediatric Resident) and Piranavi Jeyagaran (2nd year Pediatrics Resident).

The initiative gained support from the Onion Lake Cree Nation Health Board, leading to the establishment of a Memorandum of Agreement between the research team and the community. The academic team was introduced to Fred Dillon, Director of Education, resulting in an invitation to the school orientation in August 2023. During these two days, the team met with Onion Lake Health Board members, including Health Director Albert Jimmy. Eugene Lewis provided an extensive tour of the Onion Lake Health Centre and Onion Lake community. This period allowed for crucial knowledge exchange, clarifying expectations, and aligning community needs with the project's goals.

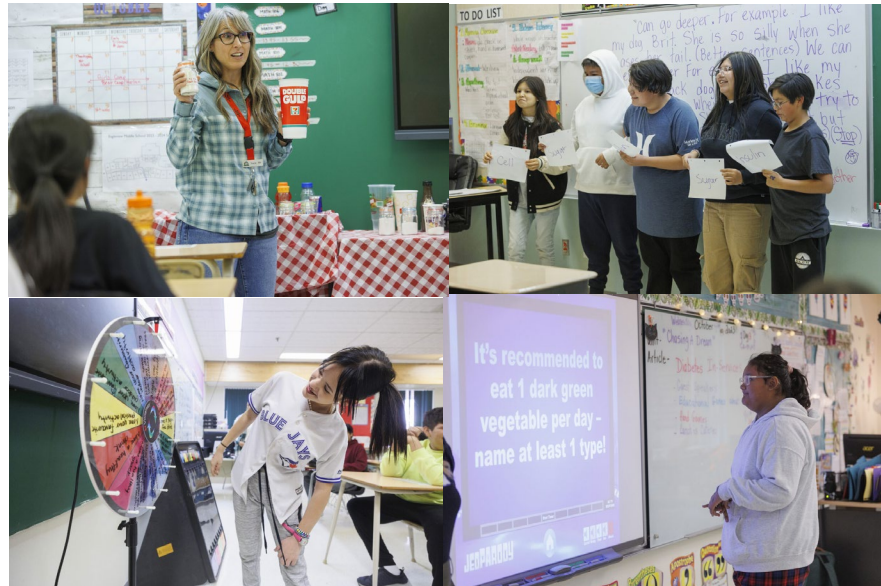
The study was a collaborative effort between the research team and the Onion Lake community and Health Care Team. Onion Lake Health Team members Alicia Oliver (Dietitian), Tanya Conacher (Diabetes Nurse Educator), Reanna Chief (School Nurse)

and Ashley DeBusschere (Dietitian) were key in engaging community stakeholders, including the Eagleview Middle School principal, Deb Ramsay, Eagleview Middle School teachers, and Community Health Representatives.

Their efforts and enthusiasm in engaging the school and community led to the planning of an education day aimed at health promotion and diabetes prevention, and a second screening day to provide an opportunity for primarily grade 8 students at Eagleview Middle School to be screened for type 2 diabetes. Information sheets and consent forms were distributed by the Community Health Representatives, Lynette Chief, Maxine Chief, Lori Lewis, and their efforts played a crucial role in the success of the study.

Health Education Day

The education event was held on October 4, 2023, at Eagleview Middle School and about 100 grade 8 students participated. The goal of this day was to introduce the study and build on students' knowledge of health-promoting activities and type 2 diabetes.



Elder Howard Whitstone started off the day with an opening prayer. Afterwards, a variety of activities helped us explore students' understanding and answer their questions – through interactive educational games (Jeopardy, Plinko/Spin the Wheel, an “Ask Me Anything” session, and by actively working on healthy habits by meal-prepping a jar of soup. The activities were facilitated by the members of the Onion Lake Health Care Team (Dietitians, Diabetes Nurse, School Health Nurse and Community Health Nurses) as well as members of the Saskatoon Pediatric Diabetes Team.



Lunch was provided to the students and staff, catered by a local organization. Elder Howard gave a closing prayer, and we were grateful for Principal Deb Ramsay and the Eagleview Middle School staff who were instrumental in the day running smoothly.

We extended an invitation to photographer, Dave Stobbe, who captured uplifting images of the Onion Lake community. The inclusion of photography was aimed at emphasizing the community's and the students' strength, resilience, vitality, hope and wellness.

The day was a success thanks to the students – who eagerly participated in the sessions, shared their knowledge and experiences, and engaged us and each other with their questions.



Diabetes Screening Day

The screening day was held on October 11, 2023, at Eagleview Middle School. Twenty-three students, whose families had consented to their involvement in the screening, participated. A video was created by the research team to educate students and staff about the dried bloodspot testing to answer questions and allay any concerns (available by scanning the QR code below):



Elder Arlene Lewis gave an opening prayer to start the day. Students were then accompanied by their teachers in groups to the school library to participate in the screening. They rotated through a series of stations, manned by the members of the Onion Lake Health Team including Dietitians, School Nurse, Community Health Nurses Tracie McNab and

Tracey Zeleny, Community Health Representatives, the Onion Lake Dental Team as well as the members of the Saskatoon Pediatric Diabetes Team. These stations included:



- 1) Check in and confirmation of consent and student willingness to participate
- 2) Dried bloodspot collection for hemoglobin A1c screening
- 3) Completion of health survey questions with assistance from members of the research team as well as Elder Arlene
- 4) Height and weight measurements.

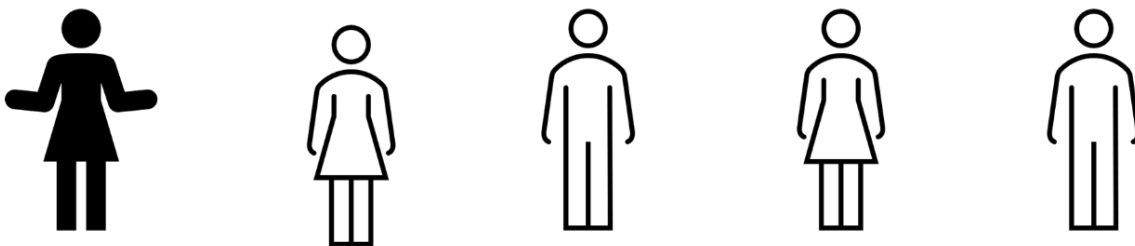
After students visited each station, they ended the day by making their own healthy smoothie at the final “Rock the Bike” station.

Several youths whose families had provided consent were absent the day of the screening. Considerable follow up was done to see if the youth were still interested in participating and if so, to collect the dried bloodspot sample, health survey information and measure height and weight. School health nurse Reanna Chief and dietitian Ashley DeBusschere were pivotal to ensuring this part of the study was complete.

The bloodspot samples were sent to the Provincial Lab in Regina and the Saskatoon team informed the families of the youth and the Onion Lake Health team of their results.

Results & Next Steps

1 in 5 students screened
positive for diabetes or
prediabetes



22% or more than 1 in 5 students in grade 8 screened positive for diabetes or pre-diabetes. Although those who screened positive were more likely to have a family history of type 2 diabetes, there were no clear features that distinguished these students from those who screened negative.

A clear process to screen youth for diabetes will identify individuals earlier and aim to reduce their future risk of health complications from diabetes. Even youth who screened negative would benefit from ongoing screening to detect diabetes as early as possible.

Focusing on preventative measures will also help keep the community healthy. Putting measures into place at a community level to address risk factors, like higher body weight, will help prevent or delay the onset of diabetes. For example, providing ways for youth and their families to eat healthy and be more active.

Finally, Onion Lake Cree Nation's participation in this study can be an example to other communities that would benefit from easier access to screening.