

# Chapter Organization- Type 2 Diabetes in Children & Adolescents

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**Diabetes is a piece of you, but it's not the whole picture!**





## **Type 2 Diabetes in Children and Adolescents**

### **2018 Clinical Practice Guidelines Summary**

#### **Key Messages**

- Guidance regarding healthy eating, physical activity, limiting screen time, and for kids to get enough sleep are the primary recommendations to prevent type 2 diabetes from developing
- Regular screening is recommended
- Children with type 2 diabetes should see a diabetes care team with supports from multiple health disciplines
- Early screening and intervention for children diagnosed is very important to limit the amount and severity of complications

#### **Key Messages for people with children and adolescents with type 2 diabetes (T2DM)**

- There is a lot you can do as a parent or guardian of a child with T2DM. Cook healthy meals at home, limit availability of sugary drinks (fruit juice, pop, energy drinks), make sure they get plenty of physical activity and enough sleep at night. Limiting the amount of time they spend on computer, TV, and cellphone screens may also be very helpful
- Many children with T2DM will require oral glucose lowering medication and/or insulin for treatment

#### **More information**

- Rate of T2DM in children have gone up quite a bit in the past twenty years, especially in high risk ethnic groups
- The highest rates of childhood T2DM are seen in Manitoba, 44% of these children are from Aboriginal groups

- T2DM is common in families, 90% of children with the condition are living with a parent that also has T2DM, many of which are also living below the poverty line

#### **Prevention**

Breastfeeding, prevention of childhood obesity, adequate sleep, lots of physical activity, low screen times, and healthy eating habits are all associated with decreased risk of childhood T2DM. The most effective healthy behaviour intervention plans involve the whole family eating well and moving often.

#### **Screening and Diagnosis**

Usually the sooner diabetes is diagnosed and glucose controlling precautions are taken the more effectively risks for complications can be reduced.

There are a few risk factors that increase a child's likelihood of developing type 2 diabetes which includes;

- Having a close relative living with T2DM
- Obesity
- Being a member of a high risk ethnic minority group (Indigenous, Arab, Hispanic or South Asian decent)
- Being exposed to diabetes in utero (mom with pre-existing or gestational diabetes)
- Insulin resistance

Children living with these risk factors should be screened for T2DM earlier in life and more frequently.

#### **Management**

It is important that children living with T2DM are supported by an inter-professional health care team. This includes a pediatric endocrinologist, dietitian, diabetes nurse educator, and a mental

health professional. Family and home life are also a very important part of a child's treatment. Healthy eating and physical activity will be essential to managing T2DM well; this will be easier and more successful for the child if the whole family participates. 60 minutes of moderate to intense activity is recommended for all children each day, including children with T2DM. It is also recommended that children spend no more than 2 hours of time on a screen per day.

For teens that may become pregnant, birth control is important as tight glucose control and treatment planning need to be done before a baby should arrive. Without tight glucose control, babies of mothers living with T2DM are at greater risk for birthing babies with abnormalities.

**Complications associated with diabetes** develop over time. The sooner children receive treatment and begin managing T2DM the sooner risks for complications can be controlled and reduced.

Microvascular and cardiovascular diseases are examples of complications higher in children with T2DM compared to children living with type 1.

**Renal diseases** are also common complications associated with long term mismanaged diabetes. Aboriginal youth in Canada are at a higher risk for developing kidney diseases compared to the general population. This means screening for kidney disease needs to be conducted. Persistent albuminuria, protein in the urine, is a sign that the kidneys may be failing.

**Cardiovascular complications** are also higher in children living with diabetes compared to the general population. Earlier onset of diabetes increases one's risk of

cardiovascular disease, ischemic heart disease, stroke, and death.

**Comorbid conditions** that are more common in children living with T2DM include obesity, (which 95% of children with T2DM have), insulin resistance, polycystic ovarian syndrome, non-fatty liver disease, and obstructive sleep apnea. One study, the TODAY study, also states that 14.8% of their participants with T2DM were experiencing depressive symptoms, that 6% were clinical binge eaters, and 24% were subclinical binge eating (less than 4 binge episodes per month). With this in mind it is recommended that a mental health professional is part of a child with T2DM's health care team.

## Recommendations

1. All children should receive guidance about healthy eating, limiting sugar sweetened beverage intake, limiting screen time, sleep quality and quantity, decreased sitting, and physical activity.
2. Children with obesity should receive intensive healthy behaviour interventions that include family oriented counselling and behaviour therapy to reduce risks of T2DM.
3. Screening for children should be done at least every 2 years if they show any risk factors:
  - Obesity, member of a high risk ethnic group, close relative living with T2DM, signs of insulin resistance
  - Use of atypical antipsychotics
  - Polycystic ovary syndrome
  - Impaired fasting glucose or impaired glucose tolerance
4. When diagnosed children with T2DM should be set up with a health

- care team including a mental health professional, pediatric endocrinologist, and a diabetes educator
5. Regular physical activity, 60 minutes per day at minimum of moderate to vigorous activity should be recommended to all children with T2DM.
  6. Children with T2DM should be screened for neuropathy, retinopathy, and chronic kidney disease when diagnosed and every year afterwards
  7. Fasting blood lipids should be measured when diagnosed and every year after as well
  8. Children should be screened for hypertension when diagnosed and at every diabetes related medical appointment afterwards
  9. Children with T2DM should also be screened for comorbid conditions upon diagnosis and every year after (polycystic ovarian syndrome, non-fatty liver disease, and obstructive sleep apnea, insulin resistance).
  10. Children should also be screened for depression and disordered eating, particularly binge eating, and every diabetes medical encounter







# Recommendations for parents of children with prediabetes or type 2 Diabetes

Adapted from the 2018 Clinical Practice Guidelines



## Risk Factors

- being overweight, obese, or inactive
- having a close family member with type 2 diabetes
- is a member of a high risk ethnic group (Indigenous, African, Arab, South Asian, Hispanic)
- has signs of insulin resistance
- has PCOS (polycystic ovarian syndrome)
- is born to a mother who had diabetes during pregnancy
- has dark patches of skin on the neck and underarms (this is called acanthosis nigricans)



1. Promote Healthy eating, limit sugar sweetened beverages & screen time, get a good sleep, decrease time spent sitting, move more!

2. For children living with obesity it is important that the whole family adopts healthy behaviours to reduce the risk of developing diabetes & the risk of diabetes complications

3. Screening should be done every 2 years in children with any 3 risk factors before puberty or any 2 risk factors during puberty

4. If available, when diagnosed with type 2 diabetes children should see an interprofessional care team (diabetes educator, counsellor, endocrinologist, paediatrician)

5. Engage in at least 60 minutes of moderate-intense physical activity per day

6. Children with type 2 diabetes should be screened for a number of health concerns every year by health care professionals:

- neuropathy
- retinopathy
- chronic kidney disease
- hypertension
- conditions associated with insulin resistance (PCOS, NAFLD)
- depression and eating disorders

**\*A strong interdisciplinary health care team is important for your child's health, but there are also lots of things YOU as a parent can do to help at home**

You can support your child mentally, spiritually, emotionally, and physically



## Emotional

- focus on health not blame or guilt, this will help your child move forward and manage living with diabetes

## Mental

- learn as much as you can about diabetes, your knowledge will help your child feel secure
- manage stress in healthy ways this will help your child stay calm
- approach healthy lifestyle changes as a family, this will help your child feel supported

## Spiritually

Focus on having healthy relationships within the family, community, and with nature. This may help your child feel supported & more likely to be successful with self-care

## Physically

Help your child reach or maintain a healthy weight. Cook healthy meals, be active together, make sure your child is able to have a good night's sleep



# Kids, Teens, & Type 2 Diabetes

## Teaching Tool

Type 2 diabetes is a disease in which the pancreas does not produce enough insulin, or the body does not properly use the insulin it makes. Learning that your child is diagnosed with type 2 diabetes can give rise to many emotions. When children are diagnosed with diabetes, parents need to be very involved in learning about the condition, participating in the routines and sharing management decisions. As they get older, they will learn how to care for themselves, but parents still play an important role in a child's health care team.

As a result of type 2 diabetes, sugar (glucose) builds up in the blood instead of being used for energy. The body gets sugar from foods like bread, potatoes, rice, pasta, milk and fruit. To use this sugar, the body needs insulin. Insulin is a hormone that helps the body to control the level of sugar in the blood.

Type 2 diabetes was once a condition that occurred only in adults. Today we see it more in teens and even in children. Most of these children are from ethnic groups at high risk for type 2 diabetes (African, Arab, Asian, Hispanic, Indigenous or South Asian). In Canada, 44% of children who are diagnosed with type 2 diabetes are of Aboriginal heritage.

## Who is at risk?

Type 2 diabetes in children has increased around the world over the past 20 years.

Factors that increase a child's risk for developing type 2 diabetes include:

- Being overweight or inactive
- Being a member of an ethnic group at high risk for type 2 diabetes (African, Arab, Asian, Hispanic, Indigenous or South Asian)
- Having a family history of type 2 diabetes
- Being born to a mother who had diabetes during pregnancy
- Having any of the following:

Dark, velvety patches of skin on the neck and under the arms (a skin condition known as *acanthosis nigricans*)

- High levels of fat or cholesterol in the blood
- High blood pressure
- Polycystic ovarian syndrome (a condition in females that can include no menstrual periods, unusual hair growth and being overweight)
- High levels of fatty deposits in the liver
- Taking certain medications for mental health conditions



## Symptoms of type 2 diabetes

Symptoms of type 2 diabetes include:

- Increased thirst
- Going to the bathroom more
- Blurred vision
- Yeast infections
- Tiredness

However, many children with type 2 diabetes do not have any symptoms and are diagnosed only when screened for other health risks related to being overweight. Diabetes Canada recommends that children who are at a high risk of developing type 2 diabetes should be checked by their doctor every two years using an A1C and a fasting or random blood sugar test.

## Tips for prevention

Healthy living behaviours that include healthy eating and physical activity can reduce the risk of developing type 2 diabetes. Set an example for your children by eating healthy and being physically active. Try these healthy habits:

- Drink water instead of sugary drinks (pop, juice, iced tea, slushies).
- Offer healthy snack choices, such as fresh fruits and cut-up veggies.
- Reduce sedentary time and get moving: walk or bike whenever possible. Children should get 60 minutes of exercise daily.
  - Examples: running, playing soccer, bike riding, swimming, dance
- Switch to lower-fat dairy products, such as 1% or skim milk
- Reduce screen time (television, computers, etc.) to no more than 2 hours per day and replace it with active play time.
- Establish routines that help children get enough good quality sleep.
- Follow Eating Well with Canada's Food Guide and the Canadian 24-Hour Movement Guidelines.

## Teens and Diabetes

When children are diagnosed with diabetes, parents need to be very involved in learning about the condition, participating in the routines at an appropriate level and sharing management decisions. As children grow into young adults, they need to learn the details of their condition and how to care for themselves.

### For teens and young adults: learning to help yourself

Are you thinking about moving away from home to go to school or to work in a different city? Are you planning to travel, move in with friends or simply be more independent with your diabetes management?

If so, congratulations, you are taking a big step and it's normal to have questions on what that all means while living with type 1 diabetes. In the past, it was likely very easy to consult or rely on your parents to make decisions or keep track of your diabetes. Now that you're ready to step into adulthood, many things are going to be your responsibility and it's ok to wonder how it's all going to work.

To learn more about eating well on your own, dating with diabetes, driving, and more, please read *Generation D: For young adults living with type 1 diabetes*.

Note that these tips are not meant to replace the advice and help that your doctor and diabetes health-care team provide. It is important you create and regularly update your own personalized diabetes treatment plan.

### For parents: learning to let go

As a child matures, the challenge for many families is finding the balance between parental monitoring and teen independence. On the one hand, careful diabetes management is vitally important to the immediate and long-term health of your child. On the other hand, you can't be with your child 24/7. Even if you could take total control of your child's diabetes (which you can't), teens are more likely to rebel against tight restrictions. Rather, you may want to strive for a supporting rather than controlling role in your teen's diabetes care. Here are some suggestions:

- Recognize how devastating diabetes can be to a teen. Your teen wants to be carefree, and independent, just like their friends. Instead, they feel burdened with a lifelong condition and restricted by tests and injections. Help your teen figure out ways to fit diabetes into their schedule; share the load where you can (e.g., help record blood sugar results or offer to give one injection each day). Look for support from your diabetes team, including the social worker. Find out if your teen is interested in joining a peer support group and where this might be available.
- Be positive and non-judgmental about your teen's diabetes management. Avoid using terms such as "good" or "bad" when referring to blood sugar levels. Instead, focus on

- helping your teen evaluate blood sugar levels and determining a course of action. For example, ask, "Your blood sugar is higher than your target, so what do you need to do?"
- Understand, and help your teen understand, that adolescents with diabetes require more insulin as they grow and go through puberty. This is normal. It is not a sign of worsening diabetes.
  - Encourage your teen to participate in sports and other activities, which are great for building self-esteem. Help them to figure out how to prevent low blood sugar (hypoglycemia), which often accompanies increased activity, by testing frequently and either reducing insulin or increasing food intake.
  - Ensure that your teen understands the potentially devastating consequences that smoking, alcohol and drugs can have for people with diabetes. If you are not comfortable talking with your teen about these issues, be sure to ask your diabetes professional to raise the subject with them.
  - Avoid focusing on weight and body shape in your teen. Rather, focus on promoting healthy living behaviours for all members of the family. Some teens discover that when they are getting inadequate amounts of insulin they lose weight. Although the discovery may be accidental, some teens (particularly girls) are tempted to reduce or skip their insulin repeatedly in order to lose weight. This risky behaviour leads to poor sugar management, a risk of diabetes ketoacidosis (a life-threatening condition that arises from a serious insulin shortage) and a high risk for long-term complications. Parents who suspect this behaviour in their teen should take steps to supervise each insulin injection while they seek the advice from their diabetes team.
  - Be flexible and willing to help or step back as your teen needs. Watch for signs that your teen is struggling with his diabetes management: signs of high blood sugar levels (frequent urination, extreme thirst), low blood sugar episodes (hypoglycemia), poor school attendance, depression or a significant change in behaviour. If your child shows any of these signs, re-involve yourself in your teen's diabetes and talk to his diabetes professional for further advice.
  - Keep the lines of communication open. Instead of nagging or criticizing, use open-ended questions that encourage conversation. For example, ask: "How do you feel you are coping with your diabetes?", "What are you finding most difficult about it?", or "What would help you now?"

With patience and a positive attitude, you can help your teen become a responsible, independent and healthy young adult.

# Type 2 Diabetes Prevention Checklist

## For parents & guardians

- Set a family rule limiting screen time per day**  
Remember screens include not just the TV and computer but also cell phones, video games, & iPads
- Engage in physical activity as a family every day**  
This could mean going for a walk in the morning or after dinner, playing outside in the evening, or doing simple exercises in the home together
- Cook 3 healthy meals at home & eat together as a family**  
Meals rich in fruits and vegetables, whole grains, traditional and lean meats, legumes, nuts and seeds make for a delicious nutritious diet!
- Have healthy snacks available such as fruits and vegetables, nuts, or homemade whole grain muffins**  
Chopped carrots, bell peppers, celery & homemade hummus is an excellent example of a simple healthy snack!
- Remove or limit unhealthy snacks in your home environment, this means sugary drinks too!**  
Consumption of sweet treats and drinks will decline if they are not readily available at home. It is a lot easier to eat healthily without tempting treats in the cupboards!
- Breastfeed young children, exclusively for 6 months and supplementary for up to 2 years \*check this**  
This has been shown to reduce risks of childhood obesity and diabetes.
- Set a bed time that allows your child to get the sleep they need.**  
This means 9 – 11 hours for children 9 – 13, and 8 – 10 hours for children 14- 18.
- Be a positive role model – your kids are more likely to make healthy choices if you do too!**  
Children are likely to follow the example of their parents, be the best example you can be and make healthy choices to support a healthy family!





## Sleep is an important part of type 2 diabetes prevention & management, especially for children. Here are some healthy sleep habit guidelines

"The amount of sleep required by the average person is five minutes more"  
- Wilson Mizener

Having a relaxing routine before bed gets your body in the mood to fall asleep. Try reading a book, doing some stretches, or making a warm cup of tea before bed to help you wind down.

**Establish a sleep time routine.**

**Try to go to bed and wake up at the same time every day**

**Wind down before bed, away from bright screens**

The bright lights in cell phones, computers, and televisions disrupt the natural sleep signals our body send. These lights can cause excitement, alertness, or stress that can make it difficult to fall asleep. Try turning them off an hour before bed.

For adults, if you have trouble sleeping even if this means you are a little tired during the day. Eliminating the nap may make it much easier to fall asleep at night

**Avoid naps for older kids**

**Set up a comfortable sleep environment**

Ideal sleeping conditions should be dark, quiet, and cool. Does your child feel safe? Sometimes fears of monsters under the bed or in the closet can make it tricky for kids to sleep, some children need a little reassurance and/or a nightlight to help them relax.

**Avoid caffeine**

This is an important topic to touch on because caffeine can be found in lots of items we wouldn't normally think of. Coffee, tea, energy drinks of course but cola and chocolate also contains caffeine, try to make sure your child avoids these close to bed time

