

Appendix 20: Diabetes Complications

Both type 1 and type 2 diabetes are serious conditions, and can lead to the same complications. However, people living with diabetes can do many things to stay well. People living with diabetes should talk to their health-care team, who can help them get the care they need. As mentioned in previous sections, it is very important for people living with diabetes to eat healthy and increase their level of physical activity. It is also important for them to learn as much as possible about diabetes.

Keeping blood pressure and blood glucose at target will help to avoid diabetes complications such as heart attack, stroke, and damage to eyes, nerves and kidneys.

People living with diabetes should be screened for complications regularly. Below is information on the different types of diabetes complications, when and how to screen for the complications and how to reduce the risk of developing diabetes complications.

The ABCDES3 of diabetes management (reducing the risks of diabetes complications):

People living with diabetes are at increased risk for heart disease and stroke and other complications such as eye and kidney disease, nerve damage and foot problems. Keeping blood glucose, blood pressure and cholesterol in a healthy range can reduce the risk of complications. People living with diabetes can work with the community ADI worker, nurse, doctor, foot care nurse, or Diabetes Integration Project (DIP) team (if available in their community) to lower their risk of diabetes complications considerably by remembering their ABCDES3.

A = A1C

- This is a blood test done by the nurse or doctor.
- It is a measure of blood glucose levels over time.
- Optimal blood glucose control is usually 7% or less for people with diabetes.

B = Blood pressure

- Maintain optimal blood pressure (130/80 mmHg).

C = Cholesterol

- Maintain LDL cholesterol (“bad” cholesterol) target (usually 2.0 mmol/L or lower).

D = Drugs to protect the heart

- Take medication as prescribed to protect against heart attack and stroke. Includes medication for blood pressure and cholesterol.

E = Exercise goals and healthy eating

- Engage in at least 150 minutes of moderate to vigorous physical activity per week.
- Eat according to a healthy plan.
- Achieve and maintain a healthy body weight.

S = Self-management support

- Set a personalized goal.
- Identify barriers to achieving goals (pain, stress, mental health, financial and/or other concerns).

S = Screening or monitoring for complications

- Heart: ECG every 3-5 years if required.
- Foot: Yearly exam or more if required.
- Kidney: Yearly blood/urine tests or more if required.
- Eye: Yearly exam or more if required.

S = Smoking cessation

- Stop smoking.

For more information on staying healthy with diabetes, visit the Diabetes Canada website at: <http://guidelines.diabetes.ca/docs/patient-resources/staying-healthy-with-diabetes.pdf>



Use your ADI resources to teach this concept!

The glucose wands (picture provided) has been provided to every Manitoba ADI community program. Look for your glucose wands and use them to teach community members and workers about the importance of good blood glucose control.

Should you not have this resource, contact one of the ADI FNIHB team members. Refer to Appendix 11 for a full list of resources provided to the ADI community programs.

Screening for blood glucose control:**A1C:**

Adults living with diabetes should have their A1C measured every three months. The target for most adults should be 7.0% or lower. The target is individualized and based on a number of factors including life expectancy, risk and extent of heart disease, episodes of hypoglycemia, duration of diabetes and inability to achieve A1C of 7% or lower.

Use your ADI resources to teach this concept!

The A1C pillow (picture provided) has been provided to every Manitoba ADI community program. Look for your A1C pillow and use it to teach community members and workers about their A1C levels.

Should you not have this resource, contact one of the ADI FNIHB team members. Refer to Appendix 11 for a full list of resources provided to the ADI community programs.



Self-monitoring blood glucose:

People living with diabetes should use a glucose meter to help keep track of their blood glucose levels. They may need to make changes to their lifestyle (eating healthy and increasing their level of physical activity) and to their medication and insulin to achieve their blood glucose targets. A schedule should be developed between the person living with diabetes and the community health nurse to determine how often blood glucose levels need to be checked.

Targets:

- Premeal = 4.0-7.0 mmol/L for most people.
- 2 hour post meal = 5.0-10.0 mmol/L for most people.
- 2 hour post meal = 5.0-8.0 mmol/L if not achieving A1C targets.

HEART ATTACK AND STROKE:

People with diabetes are at very high risk of heart disease and stroke and may develop heart disease 15 years earlier than individuals without diabetes.

Coronary artery disease is the most common form of heart disease in diabetes.

This occurs when the major arteries that carry blood, oxygen, and nutrients to the heart become blocked and damaged in a process known as hardening of the arteries. If the arteries that supply the brain are hardened, this may lead to a stroke.



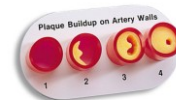
High blood glucose is one risk factor for heart attack or stroke, but people with diabetes often have a number of other risk factors. These include being overweight (especially with excess fat around the waist), inactive lifestyles, high blood pressure and high cholesterol. People who smoke or have a family history of heart disease or stroke are at even higher risk.

Reducing the risks for heart attack and stroke is a very large part of diabetes self-management. The good news is that people with diabetes can lower their risk of heart disease and stroke considerably by paying careful attention to all of their risk factors. Working with their health-care team to achieve the following targets is the key to good diabetes management. Achieving and maintaining a healthy weight through regular physical activity and healthy eating is important, but most people with diabetes will also require medications to reach these goals.

Use your ADI resources to teach this concept!

The artery section model (picture provided) has been provided to every Manitoba ADI community program. Look for your artery section model and use it to teach community members and workers about the importance of living a healthy lifestyle in order to prevent plaque buildup on the artery wall.

Should you not have this resource, contact one of the ADI FNIHB team members. Refer to Appendix 11 for a full list of resources provided to the ADI community programs.



Screening for heart attack and stroke:

Blood pressure:

All people with type 2 diabetes should have their blood pressure measured at every diabetes clinic visit. The target should be less than 130/80 mmHg.

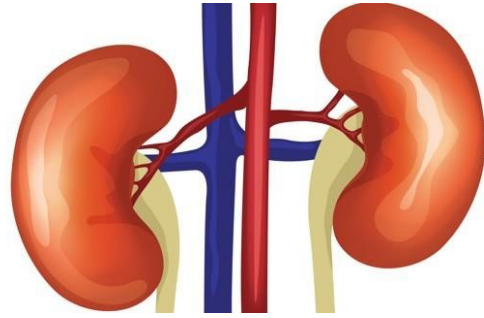
Limiting the sodium intake in the diet can help to control and lower the blood pressure for some individuals. However, some individuals will need to take prescribed medication to lower the blood pressure and to offer protection against heart attack and stroke.

Dyslipidemia (cholesterol):

People with diabetes should have their total cholesterol, HDL, LDL and triglycerides checked at diagnosis and then yearly if treatment is not initiated. More frequent testing is needed if treatment is initiated. LDL cholesterol should be less or equal to 2.0 mmol/L.

Many people with diabetes will be prescribed a drug called a statin to lower LDL (“bad”) cholesterol. Other drugs may sometimes also be used to increase HDL (“good”) cholesterol and to lower other blood fats such as triglycerides.

Low-dose Aspirin therapy may be recommended for some people with diabetes to help prevent blood clots from forming. Aspirin is available without a prescription, but is not safe for everyone. Individuals should talk to their doctor prior to taking an Aspirin to ensure that it is safe for them and to know what dose they should take.



KIDNEY FAILURE:

Diabetes is the leading cause of kidney disease in Canada and 50% of people with diabetes will have signs of kidney damage in their lifetime. However, good diabetes management and regular screening can prevent or delay the loss of kidney function.

What do kidneys do?

The kidneys filter the blood, removing waste through the urine. They also regulate the amount of fluid and salts in the body and are important for controlling blood pressure.

How kidney disease develops:

Over the years, high blood glucose levels and high blood pressure can damage the tiny blood vessels in the kidneys and prevent them from working properly. When the kidneys are not working properly, protein spills into the urine instead of being processed into the blood stream. Without treatment, the kidneys will eventually fail and dialysis or a kidney transplant will be required.

Loss of kidney function can be prevented or delayed by:

- Good blood glucose control
- Good blood pressure control
- Not smoking
- Taking your medications as prescribed
- Good cholesterol control
- Being physically active
- Eating well
- Being screened for kidney disease

Screening for kidney disease:

All people with type 1 diabetes should be screened for kidney disease after having diabetes for 5 years and then annually if they do not have chronic kidney disease. People with type 2 diabetes should be screened for kidney disease at diagnosis and then yearly if they do not have kidney disease.

Screening for kidney disease is done by:

- A blood test that checks your GFR, which tells how well your kidneys are filtering. GFR stands for glomerular (glow-MAIR-you-lure) filtration rate.
- A urine test that checks for albumin in your urine. Albumin is a protein that can pass into the urine when the kidneys are damaged.

EYE COMPLICATIONS:

People living with diabetes are at risk for many eye complications when their blood glucose levels remain uncontrolled, especially over a long periods of time. Some of the most common eye conditions or diseases that can result from someone living with diabetes are:

- Diabetic retinopathy
- Diabetic macular edema
- Cataracts
- Glaucoma



Symptoms:

Any one of these types of eye conditions/diseases can lead to vision symptoms or changes such as fluctuating or blurring of vision, occasional double vision, loss of visual field, flashes/floaters within the eyes, blotches or spots. Anyone of the symptoms can eventually lead to further vision changes, vision loss or blindness. There are also times when early signs of eye changes/diseases go unnoticed by the person living with diabetes. However, these eye changes/diseases can be first detected from a thorough examination performed by an eye doctor (optometrist).

What is retinopathy?

Over time, diabetes can cause changes in the retina at the back of the eye. The retina works by acting like a film projector in the back of the eye, projecting the image to the brain. The change is called retinopathy and affects approximately 23% of people with type 1 diabetes and 14% of people with type 2 diabetes on insulin. Our Indigenous

populations within Canada experience some of the highest prevalence rates of diabetic retinopathy as compared to the rest of Canadians. Approximately 1/3 of Indigenous people in Canada have not had an eye examination within the last two years.

Risk factors for retinopathy include:

- Longer duration of diabetes
- Uncontrolled blood glucose levels
- High blood pressure
- Pregnancy (with type 1 diabetes)
- Dyslipidemia



Screening for retinopathy:

All people with type 2 diabetes should be screened for retinopathy at time of diagnosis. Further, women with type 1 and type 2 diabetes or women who hope to become pregnant should be screened before conception, during the first trimester, as needed during pregnancy and within the first year post-partum.

The Retinal Screening Visioning Program (RSVP) is available to certain First Nations communities in Manitoba. The RSVP will screen all people living with diabetes for eye diseases. Speak to your community nurse to find out if the RSVP visits your community, or what other services are available for retinopathy screening.

Treatment:

If retinopathy is detected it can be treated with medication, laser therapy or surgery.

Prevention:

People living with diabetes can reduce their risk of diabetic retinopathy and other eye related problems by:

- Getting a regular eye exam upon diagnosis (for those diagnosed with type 2 diabetes; for those diagnosed with type 1 diabetes, they should have their eyes examined 5 years after diagnosis).
- Going for an eye exam annually or more frequently if needed.
- Remembering the ABCDES3
 - A - A1C = aim for an A1C of 7% or less by managing blood glucose.
 - B – Blood Pressure = aim for a blood pressure of less than 130/80 mmHg.
 - C – Cholesterol = The LDL (bad) cholesterol target is less than 2.0 mmol/L.
 - D – Drugs = to protect the heart – Speak with the health care team about medications.

- E – Exercise & Eating = Regular physical activity, healthy eating, and maintain a healthy body weight.
- S – Screening for complications = Ask the health care team about tests for heart, feet and kidneys too (not just your eyes).
- S – Smoking cessation = stop smoking.
- S – Self-management = stress and other barriers – set goals to reach and live well with diabetes such as managing stress effectively.

NERVE DAMAGE:

Nerve damage, or neuropathy, is a long-term complication of diabetes. Exposure to high blood glucose levels over an extended period of time causes damage to the nerves, including those going to the arms, hands, legs and feet.

Neuropathy can occur in many places in the body, but the most common symptoms are abnormal sensations in the toes and feet, including:

- Sharp, shooting pains
- Burning
- Tingling
- A feeling of being pricked with pins
- Throbbing
- Numbness (not able to properly feel pain, heat, or cold)



Neuropathy increases the risk for foot ulcers and amputation. Due to nerve damage in their feet and toes, people with diabetes who have neuropathy often do not notice minor cuts, sores, or blisters in these areas. If left untreated, these small wounds can easily become infected, lead to gangrene, and may eventually require amputation of the affected area.

For more information on foot care, visit Appendix 21 of this resource.

Risk factors for neuropathy:

- High blood glucose levels
- High triglycerides levels
- Being overweight
- Smoking
- High blood pressure



How to prevent complications of neuropathy:

Although there is no cure, you can effectively manage neuropathy through proper foot care, excellent blood glucose control and taking certain medications, as prescribed.

SEXUAL PROBLEMS:

Diabetes can cause sexual complications for both men and women. People with diabetes have a higher rate of sexual problems than the average Canadian. Sexual activity is a normal human activity, and the lack of it can decrease the quality of life and affect the quality and dynamics of the relationship with your partner.

Sexual issues for men:



Erectile dysfunction:

Approximately 34 to 45% of adult men with diabetes are affected by erectile dysfunction, which refers to a man's inability to get or keep an erection. Erectile dysfunction can impact the quality of life and can be an early sign of cardiovascular disease.

Uncontrolled diabetes causes damage to the walls of the blood vessels, which affects circulation and blood flow to the penis. In addition, nerve damage can affect erection quality. Erectile dysfunction can also be a side effect of drugs that are often prescribed to men with diabetes (these include some blood pressure-lowering drugs and anti-depressants).

Ejaculatory disorders:

Approximately 32-67% of males with diabetes experience some type of ejaculatory disorder. There are three different types of ejaculatory disorders: retrograde ejaculation; premature ejaculation; and retarded (delayed) ejaculation. Recognition of any type of ejaculation disorder is an important component in sexual quality of life and should be inquired during screening or sexual health function history.

What causes sexual issues in men?:

- Having diabetes for many years
- Poor blood glucose control
- Having high blood pressure
- Having high cholesterol

Sexual issues for women:

Uncontrolled blood glucose can lead to complications that effect one's sex life and can lead to sexual dysfunctions. Some of the major problems include:

- Physical problems (reduced sex drive, lack of vaginal lubrication, reduced ability to experience an orgasm)
- Psychological problems (having diabetes may lead to a loss of a positive self-image, feelings of unattractiveness, stress of dealing with a chronic disease)
- General health concerns (worries about pregnancy and contraception, frequent urinary tract infections or vaginal yeast infections, other health-related illnesses)

All of these issues can affect a woman's sexual health.

What causes sexual issues in women?:

- Reduced lubrication and reduced response due to nerve damage
- Poor blood glucose control can lead to recurrent urinary tract infections and yeast infections
- Low desire can be attributed to weight gain, depression and/or anxiety, which are all common for women with diabetes

Treatment:

Discussions of treatment options for sexual issues in both men and women should include the doctor, the person affected and the sexual partner. Intensive glycemic control is effective for preventing neuropathy and therefore sexual issues.

Erectile dysfunction can be treated for many men with drugs called PDE5 inhibitors, also known as Viagra, Cialis and Levitra, which can help a man achieve and maintain an erection. These drugs work by increasing blood flow to the penis, allowing an erection to occur. Injections and mechanical devices would be an alternative therapy choice for men with erectile dysfunction. These options should be discussed with the health care provider.

Hormone replacement therapy might be an option since lower levels of sex hormones are associated with diabetes for both men and women and can be a factor causing sexual issues. Hormone replacement therapy comes in the form of pills, patches, creams and injectable medicines.

The use of water-based lubricants is recommended for addressing vaginal dryness.

Prevention:

People living with diabetes can reduce their risk of sexual issues by:

- Keeping their blood glucose within target range
- Keeping their blood pressure within target range
- Keeping their cholesterol within target range
- Quit smoking
- Start exercising
- Having an annual physical and discussing their sexual history during that appointment

Sexual problems are not an easy topic to talk about, perhaps especially in a community where everybody knows each other. However, it is common for people living with diabetes to experience sexual problems and it greatly impacts the quality of life. As an ADI worker, educate your clients on sexual problems and diabetes and encourage all people living with diabetes to discuss this with the community nurse.

OTHER COMPLICATIONS:

Having uncontrolled diabetes can cause a number of complications including skin problems, gum disease, urinary tract infections, genital problems, thrush, tooth decay, stomach and bowel problems including constipation and diarrhea.

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TEACHING ACTIVITY:

Below is an example of how you can teach about all the diabetes complications. This can be done with an individual, or in a group setting.

It's Serious: (From the Do-It-Yourself: Diabetes Prevention Activities)

What you need:

-Construction paper	-Colour markers	-Display board
-Tape and scissors	-Blank labels	-Play-dough
-Foam tubing	-Dried spaghetti	-Protective glasses
-Margarine	-Work gloves	-Cotton balls

Show it!

1. Cut the foam tubing into finger-length pieces.
2. Put just enough play-dough in one piece, of tubing (so that the inside of the tubing is partially blocked). Label this tube "partially blocked artery".
3. Put more play-dough into the second piece of tubing (so that it is completely blocking the tubing). Label this tube "heart attack".
4. Do not add play-dough to the third piece of tubing. Label this this: "healthy artery".
5. Smear a small amount of margarine on the lenses of the protective glasses.
6. Put one cotton ball in each of the fingers of the work gloves.
7. Write a title: "serious health problems of diabetes" on a piece of construction paper, posting it up.
8. Also write each of the following health problems on individual pieces of construction paper and post them under the "serious health problems of diabetes" sign.
 - Stroke
 - Kidney failure
 - Blindness
 - Nerve damage
 - Erection problems
 - Amputations
 - Heart attack

Tell it!

- **Point to the health problems and say:**

- *“8 out of 10 people living with diabetes will die from heart attack or stroke.*

-*Over time, high blood glucose can cause other health problems such as kidney failure, blindness, nerve damage and erection problems. These are called complications of diabetes.”*

- **Show the group the three pieces of tubing and say:**

-*“High blood glucose can lead to blocked arteries.”*

- **Hold the completely blocked artery to your heart and say:**

-*“If this happens in the heart, it’s a heart attack.”*

- **Hold the completely blocked artery to your head and say:**

-*“If this happens in your brain, it’s a stroke.”*

- **Hold the spaghetti up to your eyes, lower back (kidneys) and your feet and say:**

-*“This noodle represents the tiny capillaries that are in your eyes, kidneys, and feet.*

-*When these capillaries are blocked they can snap and leak leading to blindness, kidney failure, and amputations.”*

- **Snap the spaghetti.**

- **Allow participants to try on the glasses and say:**

-*“These glasses represent blindness, one of the health problems related to high blood glucose. Diabetes is the leading cause of adult blindness.”*

- **Let them try on a work glove and feel the cotton ball and say:**

-*“This represents nerve damage in diabetes that can lead to foot injuries and amputations. It is difficult to feel things that can lead to injuries. Diabetes is the leading cause of amputations.”*

Have the participants try doing simple tasks with the gloves on like tying a shoe lace.

Key message: Diabetes is a serious disease where high blood glucose should not be ignored. Early diagnosis and good diabetes care can prevent or delay the serious health problems of diabetes.

Resources:

For a copy of the following powerpoint presentations, ask your Tribal Diabetes Coordinator (TDC), a FNIHB staff, or visit the website: www.mfndlc.ca

- Diabetes and High Blood Pressure
- Diabetes and Heart Health
- Diabetes and Eye Complications
- Diabetes and Sexual Health

For more information on diabetes and high blood pressure, visit the Diabetes Canada website at: <https://www.diabetes.ca/managing-my-diabetes/preventing-complications/high-blood-pressure>

For more information on diabetes and heart disease and stroke, visit the Diabetes Canada website at: <https://www.diabetes.ca/managing-my-diabetes/preventing-complications/heart-disease---stroke>

For more information on diabetes and kidney disease, visit the Diabetes Canada website at: <https://www.diabetes.ca/managing-my-diabetes/preventing-complications/kidney-disease>

For more information on diabetes and sex, visit the Diabetes Canada website at: <https://www.diabetes.ca/managing-my-diabetes/stories/sex---diabetes%E2%80%94what-you-need-to-know>