



Plain Language Patient Summary

Changes to treatment strategies for people living with type 2 diabetes

Date of summary: December 2020

- This plain language patient summary is intended for a non-clinician audience. It summarizes content from one chapter in the supplement **Type 2 Diabetes 2021**, a collection of articles written for family physicians and other family health care professionals.
- The medicines discussed in this summary are approved to treat type 2 diabetes.

What did this chapter look at?

- This chapter looks at how approaches to treatment for people with type 2 diabetes and other health conditions have changed over time.
- Type 2 diabetes is a common health condition where the level of sugar (glucose) in the blood is increased. It affects around 34 million people in the United States.
- People with type 2 diabetes are more likely to develop other health conditions, as shown below.



3 in 10 will develop **cardiovascular disease** – a general term for a wide range of health conditions that affect the heart and blood vessels

4 in 10 will develop **chronic kidney disease** – a health condition where the kidneys do not work as well as they should



3 in 10 will develop **heart failure** – a health condition where the heart stops pumping blood around the body as well as it should

8 in 10 will develop **high blood pressure** (hypertension)



8 in 10 will develop **high levels of cholesterol and other fats** in the blood (dyslipidemia)

8 in 10 will become **overweight or obese**



How have treatment strategies changed over time?

- In the past, the main aim of treatment was to maintain a low blood sugar level.
- Health care professionals measure the proportion of a blood protein (hemoglobin) that has sugar attached to it to indicate a person's average blood sugar levels over time. This is known as the glycated hemoglobin (A1c) level.
- More recent evidence suggests that considering other health conditions that people with type 2 diabetes may have can have benefits. These benefits include better control of their type 2 diabetes and improved survival.
- Reducing A1c levels is still a key aim of treatment, but the target level may vary depending on the individual. Personalizing blood sugar treatment targets based on whether a person has other health conditions can ultimately improve their long-term quality of life.

7.0%

A target A1c that is generally appropriate for adults who are not pregnant.

6.5%

A lower target A1c may be preferred when it can be achieved safely.

8.0%

A higher target A1c may be considered if a person has other health conditions, a limited life expectancy, or is at risk of having very low blood sugar levels (severe hypoglycemia).

What medicines did the authors look at?

- Lifestyle changes, such as increased exercise and changes to diet, can help to improve blood sugar. Many people need medicine too.
- Metformin is usually the first choice of medicine for people with type 2 diabetes.
 - Metformin works by decreasing the amount of sugar the liver releases into the blood.
 - Metformin also helps the body respond better to insulin. Insulin is a hormone that helps control blood sugar levels.
 - People may need additional medicines over time to reach and maintain treatment targets for type 2 diabetes. These medicines usually are added to metformin but may be used alone.
- The boxes below show how 5 groups of type 2 diabetes medicines work. The boxes also show medicines in that group – the generic name is first and the brand or trade name is in parentheses.

Sodium-glucose co-transporter 2 inhibitors (SGLT2 inhibitors)

Help the kidneys to remove extra sugar from the body.

- Canagliflozin (Invokana®)
- Dapagliflozin (Farxiga®)
- Empagliflozin (Jardiance®)
- Ertugliflozin (Steglatro®)
- Combination pills with other medicines, like metformin, are also available

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs)

Increase incretin levels (a gut hormone). This helps the body produce more insulin and lower blood sugar levels when needed.

- Dulaglutide (Trulicity®)
- Exenatide (Byetta®)
- Exentide XR (Bydureon® and Bydureon BCise®)
- Liraglutide (Victoza®)
- Lixisenatide (Adlyxin®)
- Semaglutide (tablet: Rybelsus®; injection: Ozempic®)

Dipeptidyl peptidase-4 inhibitors (DPP-4 inhibitors)

Help the body produce more insulin and lower blood sugar levels when needed.

- Alogliptin (Nesina®)
- Linagliptin (Tradjenta®)
- Saxagliptin (Onglyza®)
- Sitagliptin (Januvia®)
- Combination pills with other medicines, like metformin, are also available

Sulfonylureas

Increase the amount of insulin made by the pancreas.

- Glipizide (Glucotrol®, Glucotrol XL® [extended release], generics available)
- Glyburide (Diabeta®, Glynase®, generics available)
- Glimepiride (Amaryl®, generics available)
- Tolbutamide (no brand name)

Thiazolidinediones

Help the body better use insulin.

- Pioglitazone (Actos®)
- Rosiglitazone (Avandia®)
- Combination pills with other medicines, like metformin, are also available



How to say

- **Alogliptin** (a-low-GLIP-tin). It is also called **Nesina** (ness-EE-na)
- **Canagliflozin** (can-A-gli-FLOW-zin). It is also called **Invokana** (in-VO-CAHN-a)
- **Dapagliflozin** (dap-A-gli-FLOW-zin). It is also called **Farxiga** (far-ZEE-ga)
- **Dulaglutide** (du-la-GLOO-tide). It is also called **Trulicity** (true-LI-city)
- **Dyslipidemia** (dys-lip-id-emia)
- **Empagliflozin** (em-PAH-gli-FLOW-zin). It is also called **Jardiance** (JAR-dee-ance)
- **Ertugliflozin** (err-TUG-gli-FLOW-zin). It is also called **Steglatro** (ste-GLA-trow)
- **Exenatide** (eck-SEN-a-tide) and **exenatide XR**. It is also called **Byetta** (bi-ET-ta) and **Bydureon** (bi-door-E-ON)
- **Glimepiride** (GLIH-meh-peh-ride). It is also called **Amaryl** (A-mah-rill)
- **Glipizide** (GLIP-eh-zide). It is also called **Glucotrol** (GLUE-co-trol) or **Glucotrol XL**
- **Glyburide** (GLY-bur-ide). It is also called **Diabeta** (DIE-a-beta) or **Glynase** (GLY-neh-es)
- **Hemoglobin** (HE-mo-GLO-bin)
- **Hypoglycemia** (hi-POH-gly-SEE-mee-ah)
- **Linagliptin** (lin-ah-GLIP-tin). It is also called **Tradjenta** (tra-GENT-a)
- **Liraglutide** (leer-a-GLOO-tide). It is also called **Victoza** (VIC-toe-za)
- **Lixisenatide** (LICK-see-SEN-a-tide). It is also called **Adlyxin** (ADD-eh-licks-en)
- **Metformin** (met-FORM-in)
- **Pioglitazone** (PIE-oh-gli-ta-zone). It is also called **Actos** (ACK-toes)
- **Rosiglitazone** (RO-si-gli-ta-zone). It is also called **Avandia** (Ah-van-dee-ah).
- **Saxagliptin** (SAX-a-GLIP-tin). It is also called **Onglyza** (on-GLEE-za)
- **Semaglutide** (sem-a-GLOO-tide). The tablet is also called **Rybelsus** (rie-BELL-sus), the injection is also called **Ozempic** (OH-sem-pick)
- **Sitagliptin** (sit-ah-GLIP-tin). It is also called **Januvia** (jan-OO-vee-a)
- **Sulfonylurea** (SULF-fah-nil-yoo-ree-ah)
- **Thiazolidinedione** (THIGH-ah-ZO-li-deen-DYE-own)
- **Tolbutamide** (TOLL-bute-ah-mide)

How do other health conditions affect treatment choice?



Other health conditions



Considerations for glucose-lowering treatment



Conditions that affect the heart or blood vessels

(cardiovascular disease)

- Certain blood sugar-lowering medicines such as **SGLT2 inhibitors** and **GLP-1 RAs** may be preferred, as they can reduce the risk of negative cardiovascular outcomes.



Reduced kidney function

- Some medicines including **metformin** may not be safe for people who have severe kidney problems.
- **SGLT2 inhibitors** and **GLP-1 RAs** may be useful if people need an additional blood sugar-lowering medicine or cannot take **metformin**.
- **SGLT2 inhibitors** may prevent kidney function from getting worse.



Heart failure

- People with unstable heart failure should avoid **metformin**.
- In people with established heart failure, **SGLT2 inhibitors** can help to reduce the risk of hospitalization.
- People with heart failure should avoid **thiazolidinediones**, as they are associated with an increased risk of heart failure.



Overweight/obesity

- Some blood sugar-lowering medicines can affect body weight, and a health care professional may bring this up when discussing which medication to use.

Weight loss



Metformin, SGLT2 inhibitors, GLP-1 RAs

Weight neutral



DPP-4 inhibitors

Weight gain



Thiazolidinediones, sulfonylureas, insulin

What are the key take-home points?

- Type 2 diabetes affects a wide range of people, and there is no one-size-fits-all approach to treatment.
- People with type 2 diabetes are more likely to develop other health conditions.
- Any treatment strategies for people with type 2 diabetes should be tailored to the individual, taking into account other conditions they may have, any personal preferences, and treatment cost.