



# Sugar Monitoring Technologies

Helen (Hailun) Shi,  
Bsc. Pharm., APA., PharmD, CDE, CTE, CBE

# Disclosures

I have the Relationships with commercial interests:

Advisory Board/Speakers Bureau – None

Funding (Grants/Honoraria) : Amgen Canada

Research/Clinical Trials: None

Speaker/Consulting Fees: Abbot, Amgen, Ascensia, Assertio, AstraZeneca, Becton Dickinson and Company, Dexcom, Eli Lilly, liV Agency, Novo Nordisk, Novartis, GlaxoSmithKline,

Other: None

Current/past Employee of Calgary COOP, IDA, Sobey's, Medicine Shoppe, Safeway, Shopper's Drug Mart

Investments: Investments in sponsor organization or entity with product in program - None

Patent in product - None

Speaking Fees for current program:

I have received a speaker's fee from Abbot, Ascensia, and Dexcom for this learning activity

This learning activity has received financial support from Abbot, Ascensia, and Dexcom in the form of Speaker fee and demonstration products seen

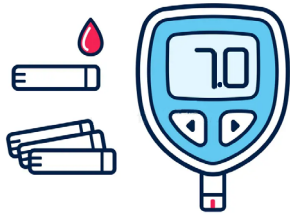
A red ribbon banner with a central rectangular section and two flared ends, resembling a ribbon tied in the middle. The word "Objectives" is written in white serif font on the central section.

## Objectives

- Understand the differences between various diabetes sugar testing devices
- Identify the advantages and disadvantages of different diabetes sugar testing devices
- Comprehend how capillary glucose monitoring and continuous glucose monitoring function differently and appreciate the advantages of each approach in diabetes management
- Gain the ability to address typical patient questions regarding diabetes sugar testing devices
- Understand current climate for insurance coverage for different diabetes sugar testing devices.

# Content Overview

## 1. CBG Device Use



Using Capillary Blood  
Glucose Monitors

## 4. CGM Overview



Continuous Glucose  
Monitoring

## 2. CBG Device types



Comparison of Capillary  
Blood Glucose Monitors

## 3. FGMO Overview



Flash Glucose Monitoring

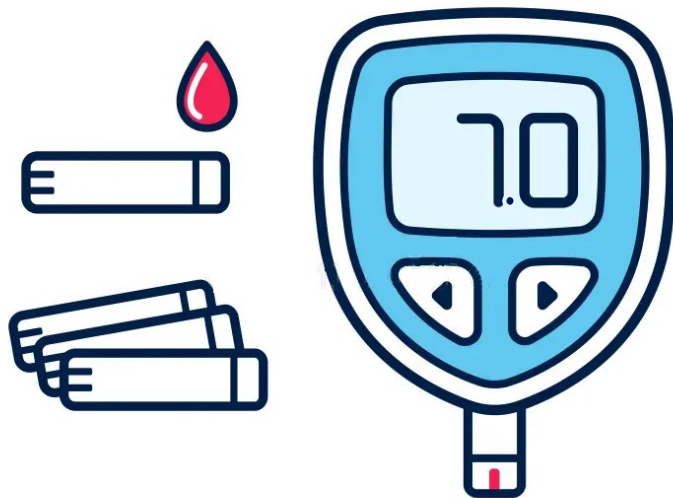
## 5. Coverage



Coverage for Testing  
in Alberta



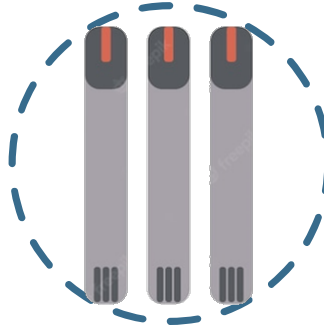
## 1. CBG Device Use



### Using Capillary Blood Glucose Monitors

(Previously known as SMBG – Self Monitoring Blood Glucose)

# CBG Monitoring Components



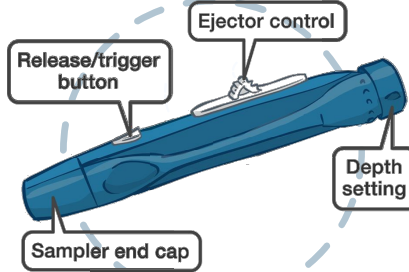
**Test Strips**

One time use  
Apply Blood to

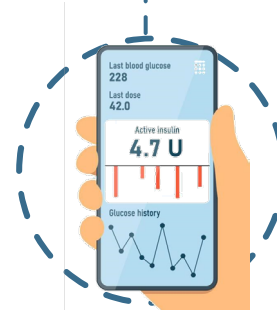


**Lancets**

Contains Needle  
Used for Finger Pokes For Blood



**Lancet Device**  
Holds Lancet to  
Perform Finger Poke



**Phone App (Optional)**

Will store and Chart Past  
Blood Sugar Measurements



**Meter**

Strip is Inserted into  
Meter to get Blood  
Sugar Measurement

Remind patients to check the expiry on their strips, especially if they don't test regularly

# Blood Glucose Testing Steps



1

Insert Strip into Meter  
It will usually display a symbol meaning "add blood"



2

Insert the Lancet into the Lancet Device  
Twist the circle part of the lancet off to expose the needles after putting lancet into



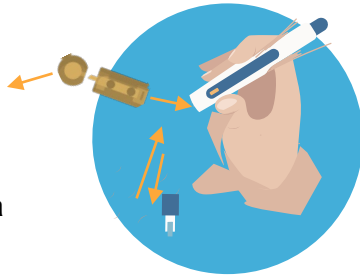
4

Add Blood to Strip  
Where the blood goes might differ between different strips



5

Get Blood Glucose Reading  
This may take the meter a moment

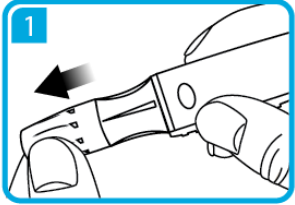


3

Use Lancet Device to Poke Fingers for Blood  
There usually a dial to adjust how deep the lancet goes



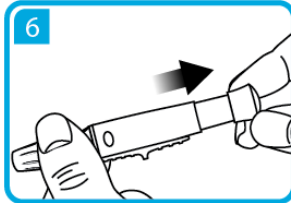
# Breakdown of Lancet Use



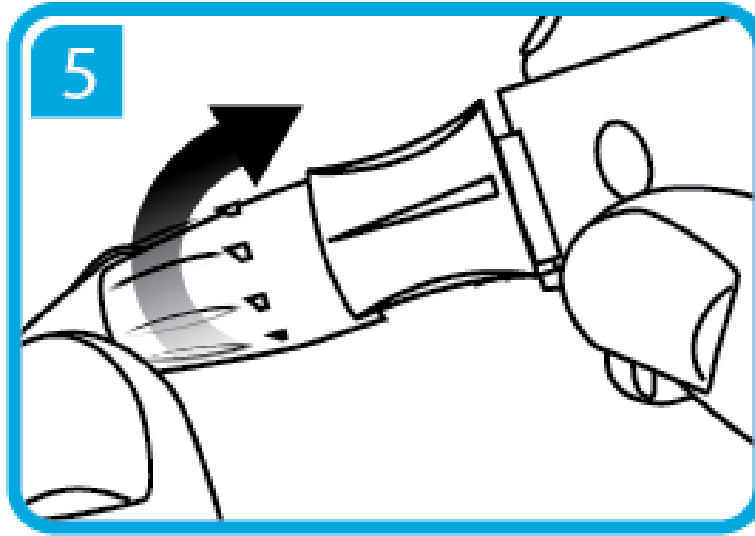
Remove the Device Cap



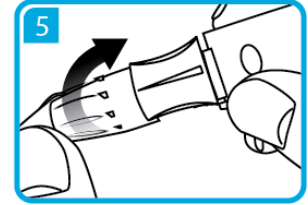
Insert a  
into the



Load the Device  
(Click indicator)



## Adjust the lancing depth

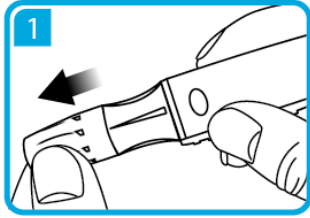


Adjust the lancing depth

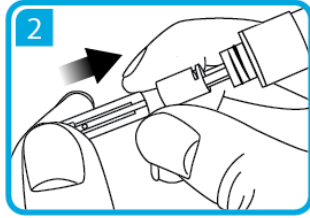


et safely  
ce

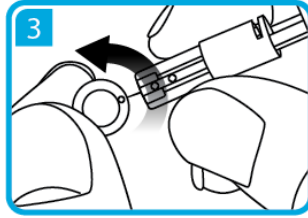
# Breakdown of Lancet Use



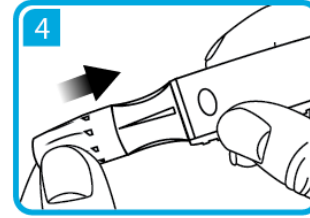
Remove the Device Cap



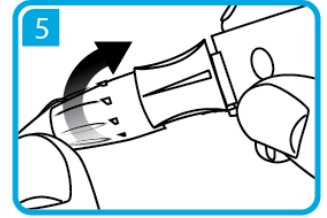
Insert a new Lancet into the Device



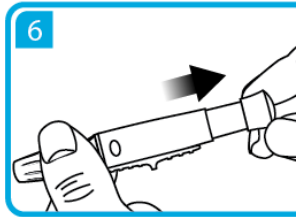
Twist off and pull out safety cap of the Lancet



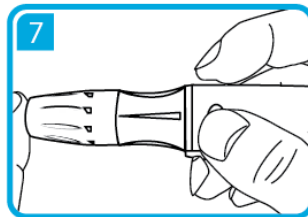
Put the Device Cap back on



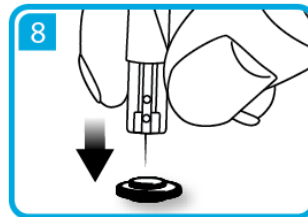
Adjust the lancing depth



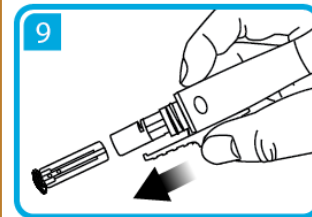
Load the Device  
(Click indicator)



Activate the Device  
to obtain blood sample



Drive the Lancet into  
the safety cap



Eject the Lancet safely  
from the Device

# Blood Glucose Testing Steps



1

Insert Strip into  
Meter  
It will usually display a  
symbol meaning  
“add blood”

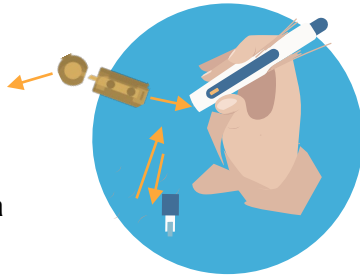
2

Insert the Lancet into  
the Lancet Device  
Twist the circle part of  
the lancet off to expose  
the needles after  
putting lancet into



3

Use Lancet Device  
to Poke Fingers for  
Blood  
There usually a dial to  
adjust how need the  
lancet goes



4

Add Blood to Strip  
Where the blood goes  
might differ between  
different strips



5

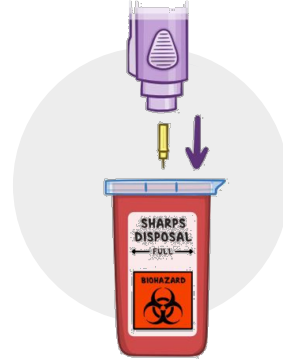
Get Blood Glucose  
Reading  
This may take the  
meter a moment



# Additional Considerations



**Wash Hands**  
Anything on their  
finger may effect  
the glucose result



**Remember to Give  
the Patient a  
Sharps Container**



**Poke the Right  
Part of the Finger**

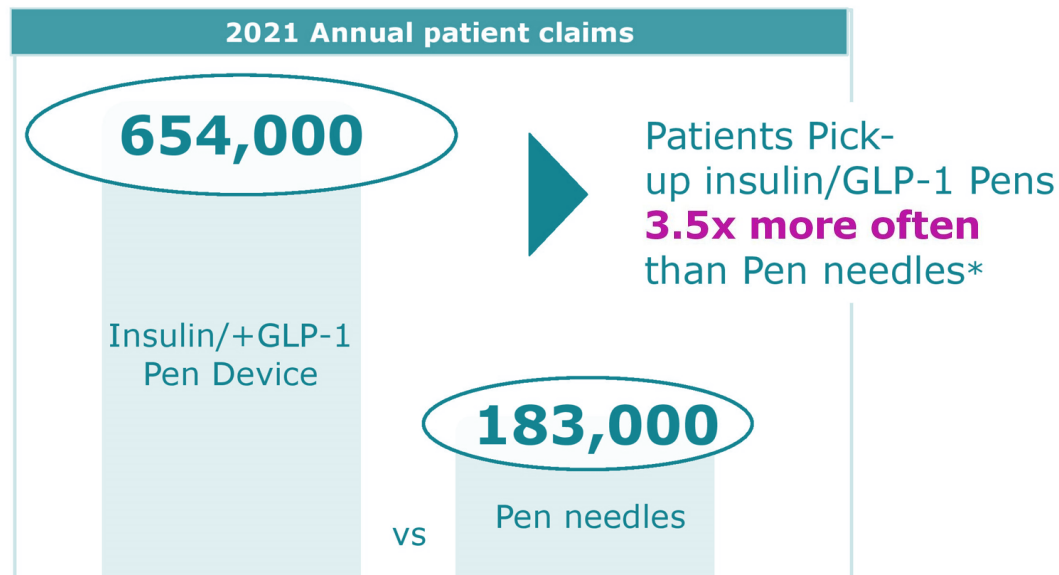
Other locations  
can cause nerve  
damage and  
added pain



**Lancets Shouldn't  
Be Reused**

Needles can get dull  
even after 1 use and  
cause nerve damage

Patients pick up insulin 3.5 times more often than their pen needles. Are patients receiving enough supplies to inject optimally?



\*IQVIA RxDynamics Jan – Dec 2021 – Unique Patients 12 months submitting Rx Pen Needles vs Insulin / GLP-1 Pen devices

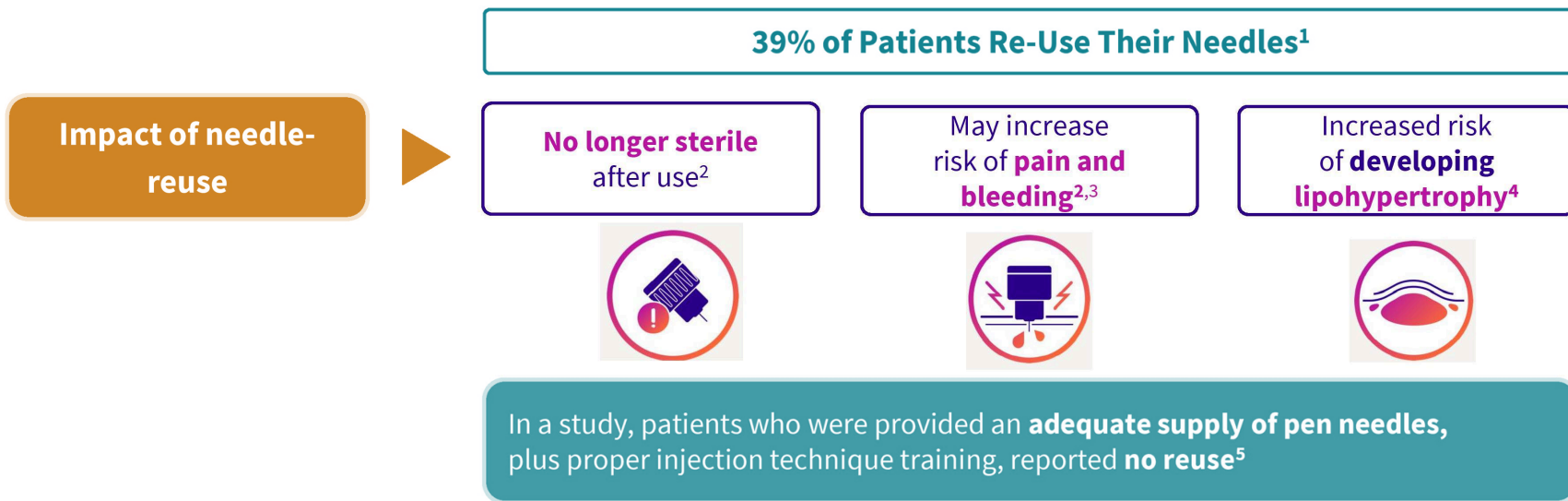
embecta, formerly part of BD. BD is the manufacturer of the advertised products.

embecta and the embecta logo are trademarks of Embecta Corp. BD and the BD Logo are trademarks of Becton, Dickinson and Company. All other trademarks are the property of their respective owners. © 2022 Embecta Corp. All rights reserved.





# Ensuring That Patients Have Adequate Supply Of Pen Needles/Insulin Syringes May Reduce The Risk Of Needle-reuse



1. Bari B, et al. Diabetes Ther. 2020;11:2595-2609. 2. Frid AH, Kreugel G, Grassi G, et al. New insulin delivery recommendations. Mayo Clin Proc. 2016;91(9):1231-1255. 3. American Diabetes Association. Standards of Medical Care in Diabetes – 2021. Diabetes Care. 2021;44(Suppl 1):S1-S232. 4. Frid AH, Hirsch LJ, Menchior AR, Morel DR, Strauss KW. Worldwide injection technique questionnaire study: injecting complications and the role of the professional. Mayo Clin Proc. 2016;91(9):1224-1230. 5. Misnikova IV, et al. Diabetes Ther. 2017;8(6):1309-1318.

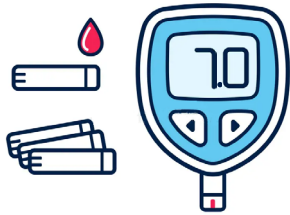
embecta, formerly part of BD. BD is the manufacturer of the advertised products.

embecta and the embecta logo are trademarks of Embecta Corp. BD and the BD Logo are trademarks of Becton, Dickinson and Company. All other trademarks are the property of their respective owners. © 2022 Embecta Corp. All rights reserved.



# Content Overview

## 1. CBG Device Use



Using Capillary Blood  
Glucose Monitors

## 4. CGM Overview



Continuous Glucose  
Monitoring

## 2. CBG Device types



Comparison of Capillary  
Blood Glucose Monitors

## 3. FGM Overview



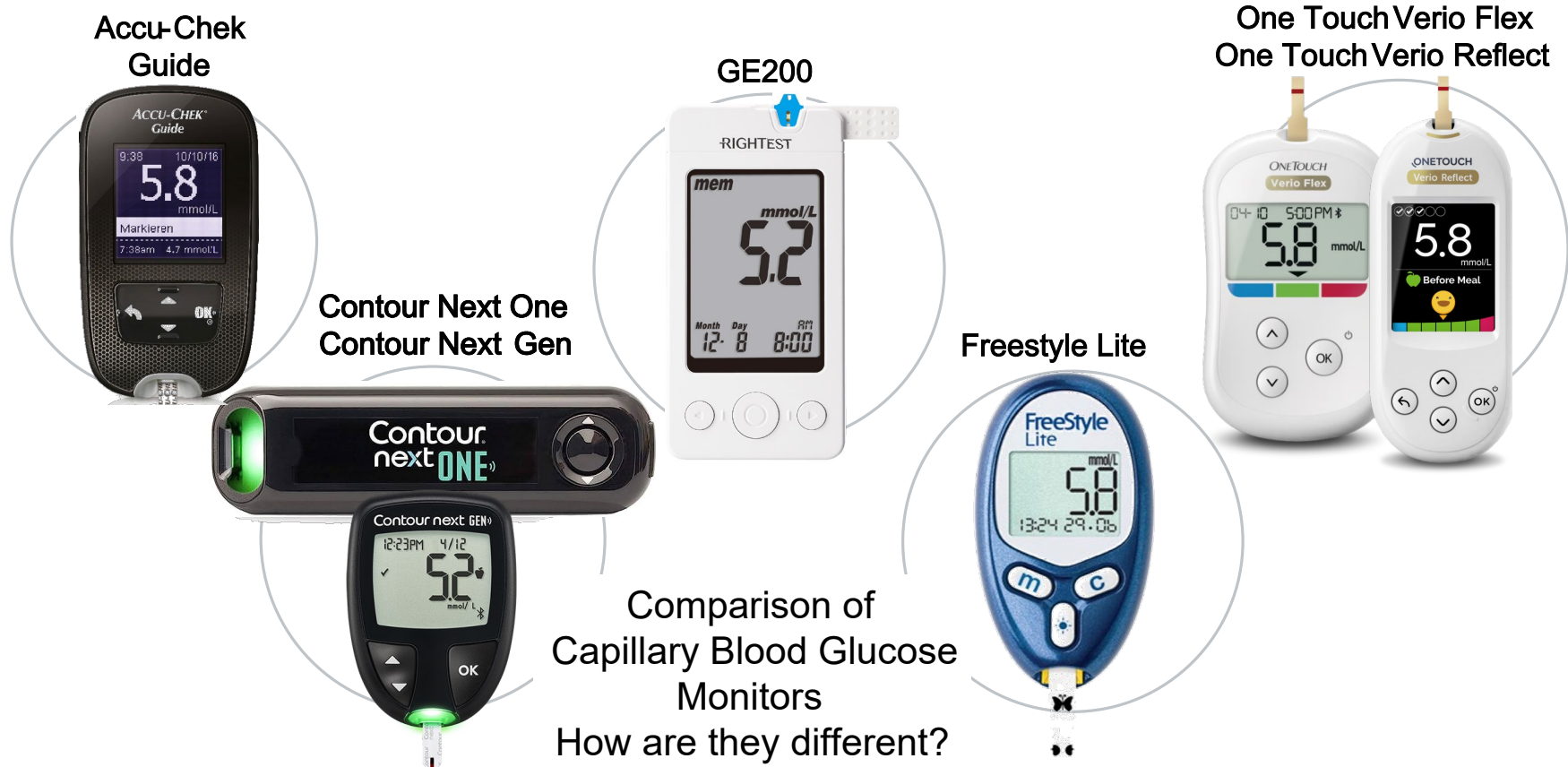
Flash Glucose Monitoring

## 5. Coverage



Coverage for Testing  
in Alberta

## 2. CBG Device types

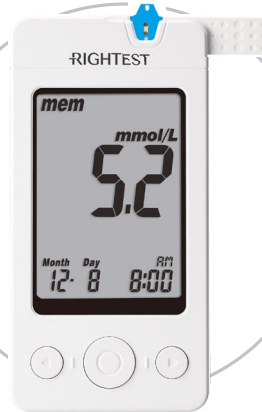


## Meter Shape

Accu-Chek  
Guide



GE200



One Touch Verio Flex  
One Touch Verio Reflect



Contour Next One  
Contour Next Gen



Freestyle Lite

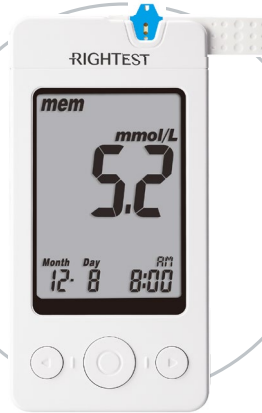


## Accuracy

Accu-Chek  
Guide



GE200



One Touch Verio Flex  
One Touch Verio Reflect



Contour Next One  
Contour Next Gen



Freestyle Lite



typically  $\pm 0.3$  mmol/L

Otherwise typically  $\pm 0.6$  mmol/L

## Amount of Blood Required

Accu-Chek  
Guide



0.6 $\mu$ L

Contour Next One  
Contour Next Gen



0.6 $\mu$ L

GE200



0.75 $\mu$ L

Freestyle Lite



0.3 $\mu$ L

One Touch Verio Flex  
One Touch Verio Reflect



0.4 $\mu$ L

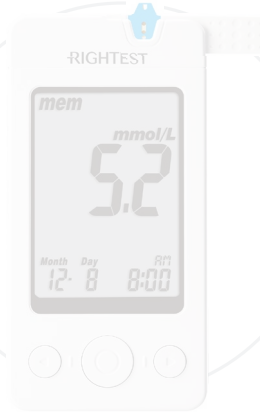


## Can Add More Blood

Accu-Chek  
Guide



GE200



One Touch Verio Flex  
One Touch Verio Reflect



Contour Next One  
Contour Next Gen



Freestyle Lite



## Alternate Site Testing





## Colors Indicating High or Low Sugars



## Colors Indicating High or Low Sugars



## Other Considerations



## Other Considerations



# The Strips

Accu-Chek  
Guide



Contour Next One  
Contour Next Gen



GE200



Freestyle Lite



One Touch Verio Flex  
One Touch Verio Reflect



The benefits  
start here with  
ZipWik™ tabs



## The Strips

Accu-Chek  
Guide



SmartPack®  
prevents spilled strips



Contour Next One  
Contour Next Gen



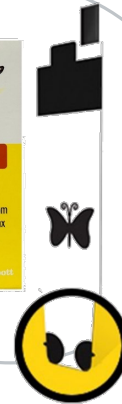
GE200



One Touch Verio Flex  
One Touch Verio Reflect



Freestyle Lite



The benefits  
start here with  
ZipWik™ tabs

## The Lancets and Lancet Device

Accu-Chek  
Softclix



Contour Next One  
Contour Next Gen



GE200



Freestyle Lite



One Touch Verio Flex  
One Touch Verio Reflect



## The Lancets and Lancet Device





## The Lancets and Lancet Device



## The Lancets and Lancet Device

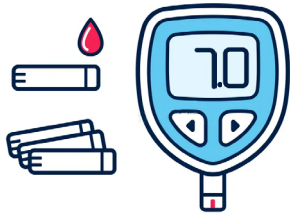


Do not remove the drum  
until all lancets have been used



# Content Overview

## 1. CBG Device Use



Using Capillary Blood  
Glucose Monitors

## 4. CGM Overview



Continuous Glucose  
Monitoring

## 2. CBG Device types



Comparison of Capillary  
Blood Glucose Monitors

## 3. FGMO Overview



Flash Glucose Monitoring

## 5. Coverage



Coverage for Testing  
in Alberta

# Principles of Sensor Technology

Using Capillary Blood

CGM Overview

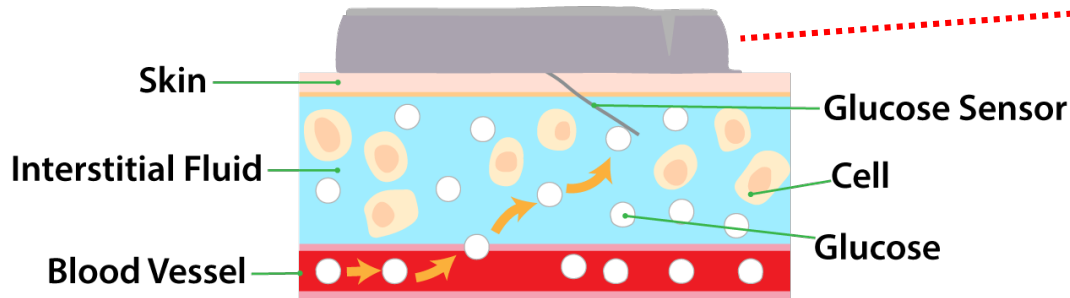
Flash Glucose Monitoring  
(also known as Intermittent scan  
continuous glucose monitoring – isCGM)

Comparison of Capillary  
Glucose Monitors

Coverage for Testing  
in Alberta

# What is a Glucose Sensor?

A small wearable device that measures interstitial glucose concentration continuously



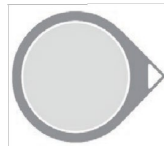
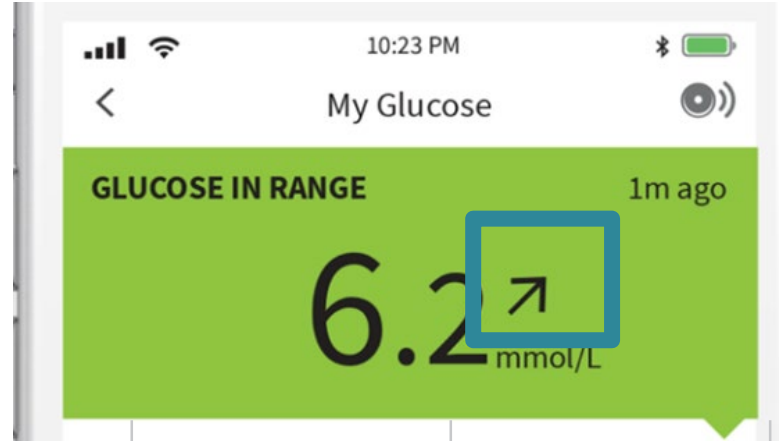
## Different Than CBG



# Follow the arrows

## FAQ

If my sensor number doesn't match my blood glucose meter?



Steady



Slowly Rising



Slowly Falling



Rising



Falling



Rapidly Rising



Rapidly Falling



## FAQ

If my sensor  
number  
doesn't  
match my  
blood  
glucose  
meter?

**Most importantly:**

**It is been shown  
repeatedly to be accurate  
enough for patients with  
diabetes to safely dose  
their insulin based off  
these values**



## Content Overview

### 3. FGM Overview



**Flash Glucose Monitoring**  
(also known as **Intermittent scan**  
continuous glucose monitoring – isCGM)

### 4. CGM Overview



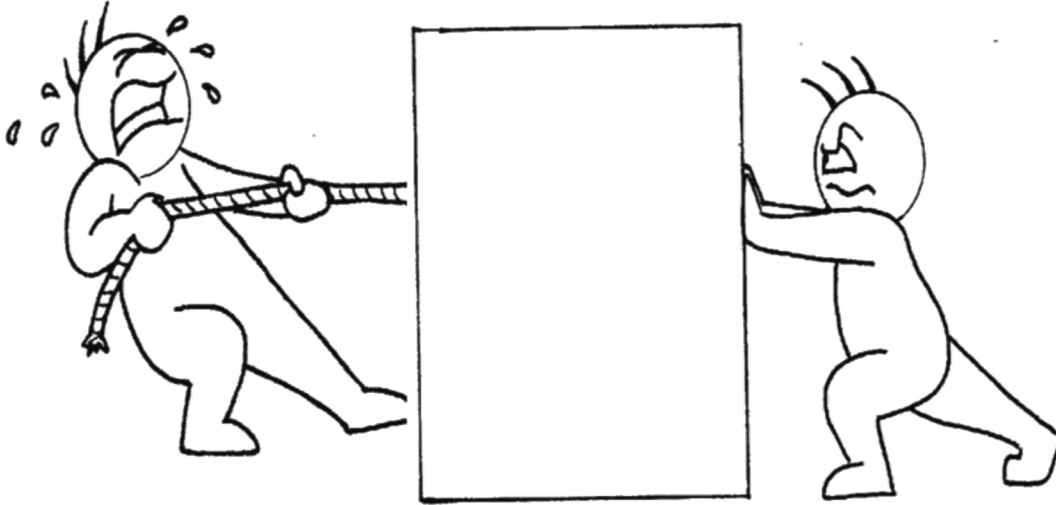
**Continuous Glucose Monitoring**  
(also known as **real time** continuous  
glucose monitoring – rtCGM)

**FAQ what's the difference?**

# FGM vs CGM

## Pull and Push

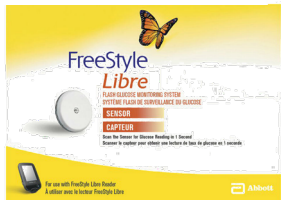
Sensor information is only recorded when the sensor gets scanned by the user



Sensor is continuously sending measurements to phone via Bluetooth – Gaps in data due to phone being too far away

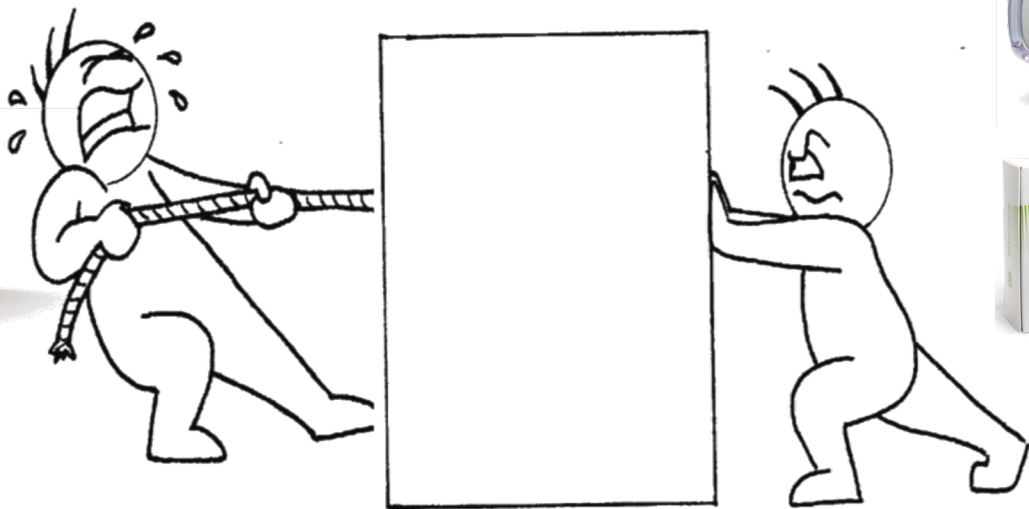


FreeStyle LibreLink - CA  
Abbott Diabetes Care Inc. • Medical  
2.9 ★ 50K+

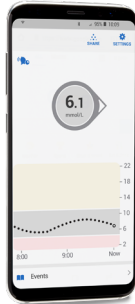
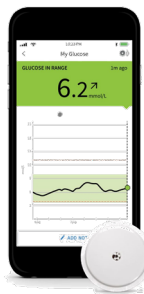


# FGM vs CGM

## Pull and Push



FreeStyle  
Libre 2



### 3. FGMOverview

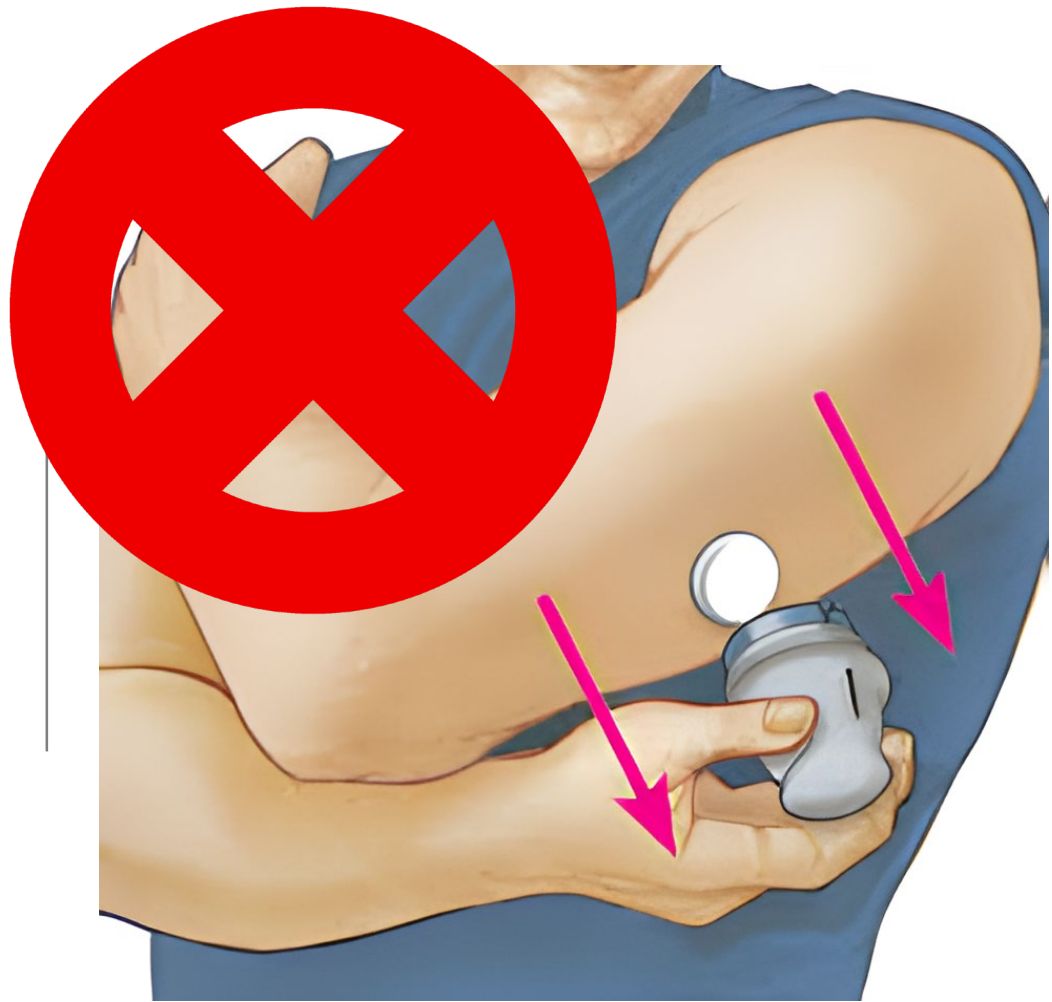


# Libre 1 & 2 Components

# Application – Libre 1 & 2

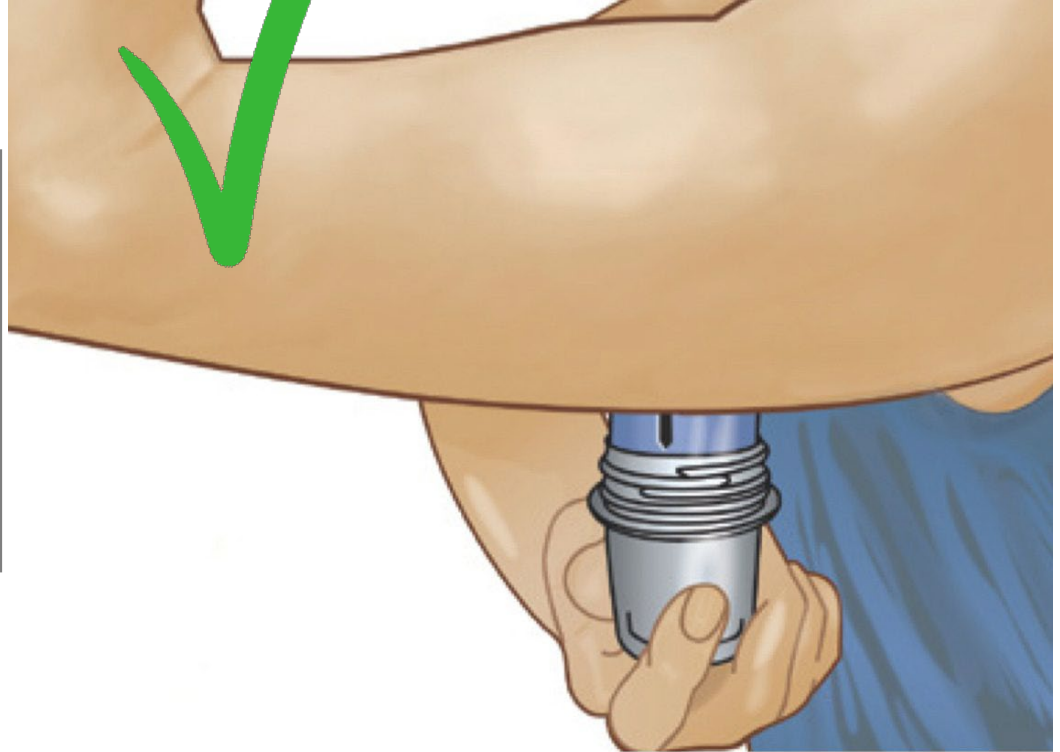


How do I  
prevent the  
sensor from  
falling off?





How do I  
prevent the  
sensor from  
falling off?



1. Choose a site that is at least 2.5 cm (1 inch) away from an insulin injection site. To prevent discomfort or skin irritation, you should select a different site other than the one most recently used. 2. CAUTION: Do NOT use if the sensor pack or the sensor.

# Components – Dexcom G6

The simple to use **auto-applicator** easily inserts a small sensor just beneath the skin with one touch.

The **sensor** measures glucose levels from just underneath the skin\*.

The **transmitter** fastens on top of the sensor and wirelessly sends data to a **receiver**<sup>‡</sup> or **compatible smart device**<sup>‡</sup> loaded with the **Dexcom G6 app**.

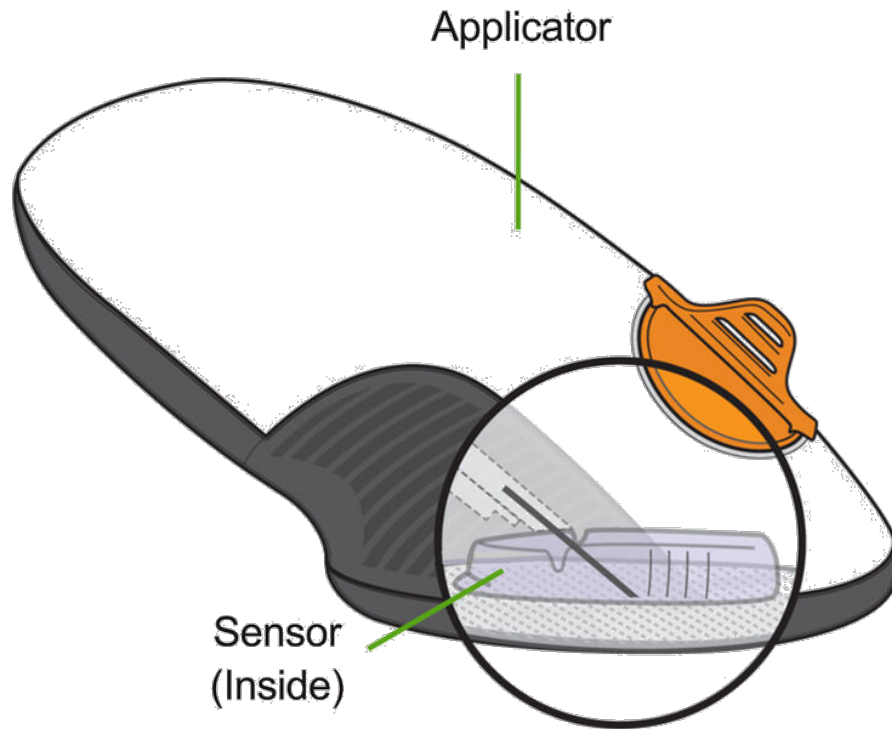


A **display device**<sup>‡</sup> continuously shows current glucose value, speed and direction of change.





# Applicator



# Components – Dexcom G6



## **Sensor**

(10 days use)

Monitors interstitial glucose levels through a small wire inserted just underneath the skin, sending a signal to the attached transmitter.



## **Transmitter**

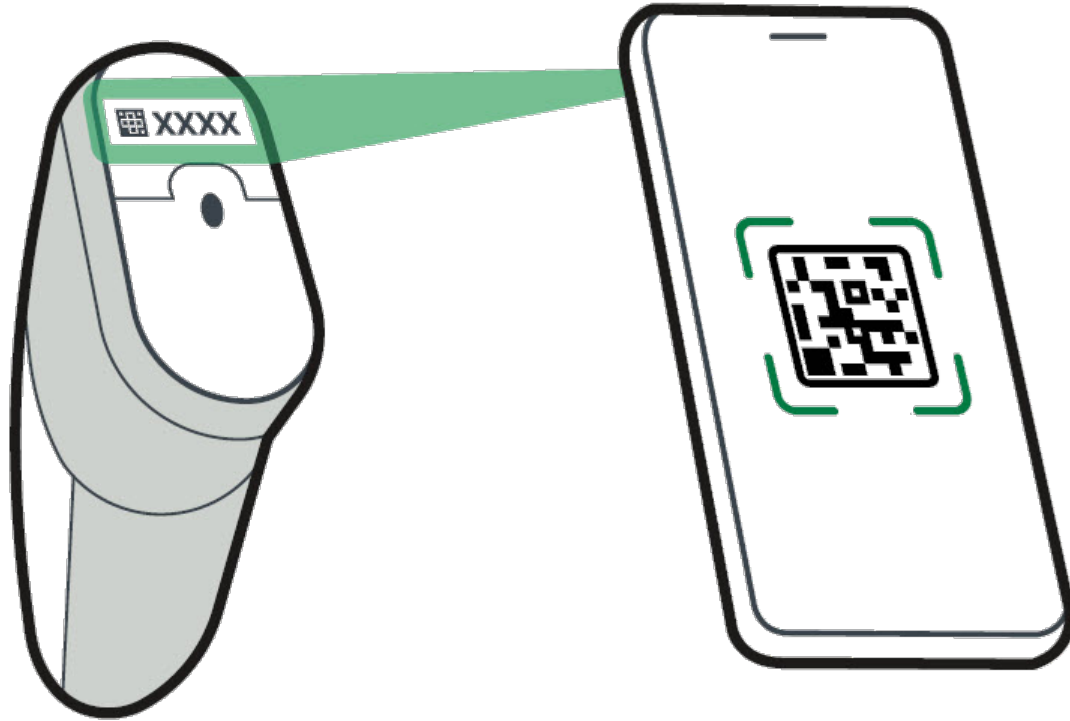
(3 months use)

Fastened on top of the sensor; sends data wirelessly to the wearer's compatible display device.<sup>†</sup>

<sup>†</sup> Internet connectivity required for data sharing. Following requires the use of the Follow App.

\* Dexcom G6 app required for patients to receive real-time glucose data on a compatible smart phone. Smart device sold separately. To view a list of compatible smart devices, visit [dexcom.com/compatibility](https://dexcom.com/compatibility)

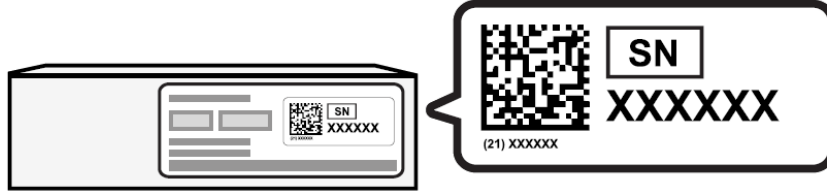
# Dexcom G6- Application



# Dexcom G6– Transmitter Application

- Enter your Serial Number (SN) from:

Transmitter box



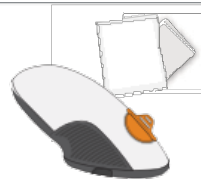
or

Back of transmitter

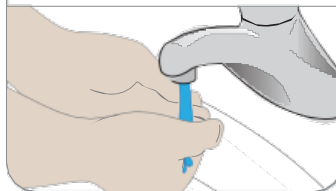


# Dexcom G6– Sensor Application

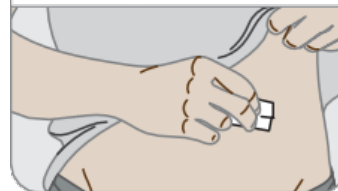
- 1** Get sensor applicator an alcohol wipe.



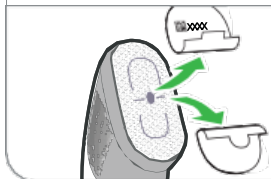
- 2** Wash and dry hands.



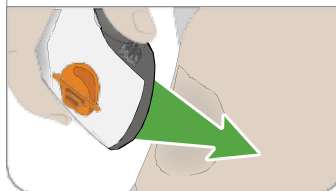
- 3** Clean sensor site with alcohol wipe.



- 4** Peel off adhesive backings. Do not touch adhesive.



- 5** Place applicator on skin.



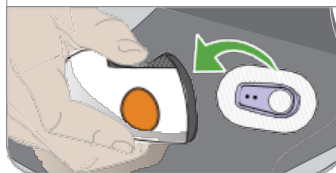
- 6** Fold and break off safety guard.



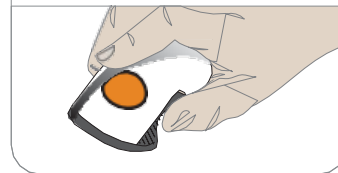
- 7** Press button to insert sensor.



- 8** Remove applicator from skin leaving patch and holder on.



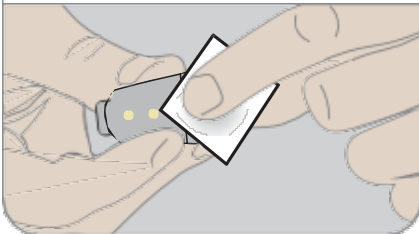
- 9** Discard applicator. Follow local guidelines for blood-contacting components.



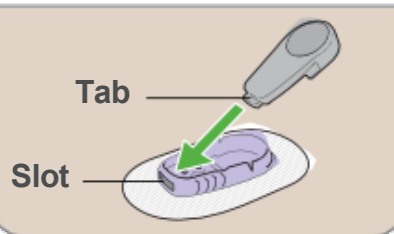
# Dexcom G6– Transmitter Application

## B Snap in transmitter

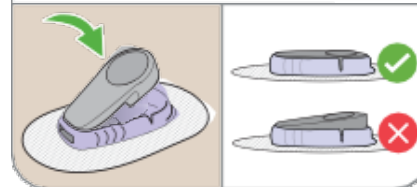
1 Clean transmitter with alcohol wipe.



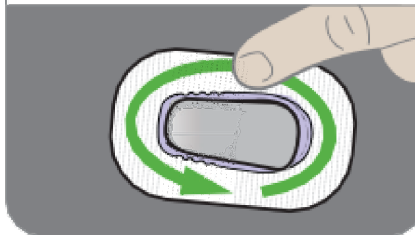
2 Insert transmitter, tab first, into holder



3 Snap in transmitter. It clicks into place. Make sure it is flat and snug in holder.



4 Rub around patch 3 times.



# Dexcom G7

## DISPLAY DEVICE

A compatible Apple or Android smart device<sup>1</sup> or optional touch screen receiver displays real-time glucose data, and allows users to upload data to Dexcom CLARITY<sup>1</sup> and to share with followers.<sup>5</sup>

## ALL-IN-ONE SENSOR AND TRANSMITTER

Inserted just underneath the skin with a simple one-touch applicator, the sensor measures interstitial glucose levels and sends data via Bluetooth to a display device, every 5 minutes.





# Dexcom G7



# Dexcom G7- Application



# Dexcom G7- Application



How do I  
prevent the  
sensor from  
falling off?



Freestyle Libre Sensor Covers  
Waterproof-30 Pack Freestyle Libre 2  
Adhesive Patches,Transparent CGM  
Overpatch Tape Lasting to 14 Days...

★★★★☆ ~ 405

\$16<sup>99</sup> (\$0.57/count) ~~\$22.67~~

✓prime FREE delivery by Friday, Dec 3



# Additional Difference

System Name	Libre 1 Sensor (no longer manufactured)	Libre 2 Sensor with Reader (Readers can be difficult to get)	Libre 2 Sensor with Phone App	Dexcom G6	Dexcom G7 (Recently Approved, no yet available)
Type of system	isCGM with 8 hours of memory	isCGM with 8 hours of memory	rtCGM ~10 meter range	rtCGM ~10 meter range	rtCGM ~10 meter range
Age Indications	≥ 18 yrs old	≥ 4 yrs old	≥ 4 yrs old	≥ 2 yrs old	≥ 2 yrs old
Sensor Warm Up Duration	1 hour after 1 <sup>st</sup> scan	1 hour after 1 <sup>st</sup> scan	1 hour after 1 <sup>st</sup> scan	2 hours after Sensor Connects with Phone	30 minutes after sensor insertion

# Additional Difference

System Name	Libre 1 Sensor (no longer manufactured)	Libre 2 Sensor with Reader (Readers can be difficult to get)	Libre 2 Sensor with Phone App	Dexcom G6	Dexcom G7 (Recently Approved, no yet available)
Sensor Placement Location	Back of the arm			For all patients: Back of the arm and abdomen  Ages 2-17 can use upper buttocks as additional site  Not indicated in Pregnant patients	For all patients: Back of the arm  Not Pregnant patients can also use their abdomen  Patients age 2-6 can also use the upper buttocks
Sensor Duration	Up to 14 days			Sensor for Up to 10 days  Transmitter works for 90 days	10 Days with a 12 Hour Grace Period

1 Using Your G6 Guide 2 FreeStyle Libre 2 User Guide & FreeStyle LibreLink User Guide 3 Requires the Follow App and an internet connection. Followers should always confirm readings on the Dexcom G6 App or Receiver before making treatment decisions 4 FreeStyle Librelink Smartphone Compatibility Guide5 For a list of compatible devices, please visit [dexcom.com/compatibility](https://dexcom.com/compatibility). Use of the smart watch requires the Dexcom G6 App on a compatible smartphone.

# Additional Difference

System Name	Libre 1 Sensor (no longer manufactured)	Libre 2 Sensor with Reader (Readers can be difficult to get)	Libre 2 Sensor with Phone App	Dexcom G6	Dexcom G7 (Recently Approved, no yet available)
Rise/Fall Rate Alert	No			Yes	
Predictive Urgent Low Soon Alert*	No			Yes	
High and Low Alarm	No	Yes	Yes	Yes	Yes

1 Using Your G6 Guide 2 FreeStyle Libre 2 User Guide & FreeStyle LibreLink User Guide 3 Requires the Follow App and an internet connection. Followers should always confirm readings on the Dexcom G6 App or Receiver before making treatment decisions 4 FreeStyle LibreLink Smartphone Compatibility Guide5 For a list of compatible devices, please visit [dexcom.com/compatibility](https://dexcom.com/compatibility). Use of the smart watch requires the Dexcom G6 App on a compatible smartphone.

\*Provides a warning up to 20 minutes in advance of serious hypoglycemia (glucose levels at or below 3.1 mmol/L).

†Lets users know when their sensor glucose is at or below 3.1 mmol/L.



# Additional Difference

System Name	Libre 1 Sensor (no longer manufactured)	Libre 2 Sensor with Reader (Readers can be difficult to get)	Libre 2 Sensor with Phone App	Dexcom G6	Dexcom G7 (Recently Approved, no yet available)
Compatible with Automated Insulin Delivery (AID) Systems (aka Insulin Pumps)	No			Yes ‡	
Display Devices	Smartphone <sup>4</sup> or Reader	Reader	Smartphone	Smartphone <sup>5</sup> , smart watch <sup>5</sup> , or receiver	Smartphones or Receiver


‡When integrated with the Tandem t:slim X2 Insulin Pump. 1 Using Your G6 Guide 2 FreeStyle Libre 2 User Guide & FreeStyle LibreLink User Guide 3 Requires the Follow App and an internet connection. Followers should always confirm readings on the Dexcom G6 App or Receiver before making treatment decisions 4 FreeStyle Librelink Smartphone Compatibility Guide 5 For a list of compatible devices, please visit [dexcom.com/compatibility](https://dexcom.com/compatibility). Use of the smart watch requires the Dexcom G6 App on a compatible smartphone.

# Additional Difference

System Name	Libre 1 Sensor (no longer manufactured)	Libre 2 Sensor with Reader (Readers can be difficult to get)	Libre 2 Sensor with Phone App	Dexcom G6	Dexcom G7 (Recently Approved, no yet available)
Water Resistance of Sensors (not the readers/receivers)	Up to 30 minutes in 1 meter (3ft)			Up to 24 hours in 2.4 meters (8ft)	
Known Interferents	Ascorbic acid (Vitamin C) <sup>2</sup>			Hydroxyurea <sup>1</sup>	
Frequency of Readings	1 reading per minute			1 reading every 5 minutes	

1 Using Your G6 Guide 2 FreeStyle Libre 2 User Guide & FreeStyle LibreLink User Guide 3 Requires the Follow App and an internet connection. Followers should always confirm readings on the Dexcom G6 App or Receiver before making treatment decisions 4 FreeStyle Librelink Smartphone Compatibility Guide5 For a list of compatible devices, please visit [dexcom.com/compatibility](https://dexcom.com/compatibility). Use of the smart watch requires the Dexcom G6 App on a compatible smartphone.

# Additional Difference

System Name	Libre 1 Sensor (no longer manufactured)	Libre 2 Sensor with Reader (Readers can be difficult to get)	Libre 2 Sensor with Phone App	Dexcom G6	Dexcom G7 (Recently Approved, no yet available)
App		N/A			
Remote Monitoring	<p>Yes - only shared when scanned.</p> <p>Displayed on LibreLinkUp app</p> 			<p>Yes - shared continuously.</p> <p>Displayed on the Dexcom Follow app <sup>3</sup>.</p> 	

## Additional Difference

Please note that unlike the Libre app, the G6 or G7 app only allows user to use the last 24 hours of information

For additional graphs and history, the user needs to install the dexcom clarity app seen here



Dexcom G6

Dexcom G7  
(Recently Approved,  
no yet available)



Yes - shared continuously.

Displayed on the Dexcom Follow app <sup>3</sup>.



Mo

## 5. Coverage



Coverage for Testing in  
Alberta



# As of July 2021

Method Of Diabetes Management	Coverage Maximum For Group 1, 66 And 20514 For Diabetes Supply Per Benefit Year	Quantity Maximum For Low Income Plans For BGTS Per Benefit Year
<b>Treated with insulin</b>	\$2,400	3,000 Strips
<b>Treated with diabetes medications with high risk of hypoglycemia</b>	\$320	400 Strips
<b>Treated with diabetes medications with low risk of hypoglycemia</b>	\$160	200 Strips
<b>Treated via diet and/or exercise</b>	\$160	200 Strips



# As of July 2021

**Unfortunately Only Capillary blood glucose is covered at this time  
Sensor technology is not a benefit in any circumstance**

**Diabetes Supplies is defined as:**

Blood glucose strips,

Lancets and penlets,

Blood monitoring devices with a doctor's authorization. This is limited to a one -time benefit not to exceed \$70.00,

Glucose calibration solution when required to monitor accuracy of monitoring device

**Insulin using diabetics can also receive:**

Injection supplies: needles, syringes and needles for insulin pens

Glucose test strips



As of April 25, 2023

Method of Diabetes Management	Coverage for Capillary Blood Glucose	Coverage for Continuous Glucose Monitoring
Treated with insulin	800 test strips and lancets per 100 days	14 Sensors every 6 months
Treated with diabetes medications with high risk of hypoglycemia	400 test strips and lancets per 365 days	Not a benefit
Treated with diabetes medications with low risk of hypoglycemia	200 test strips and lancets per 365 days	Not a benefit
Treated via diet and/or exercise	200 test strips and lancets per 365 days	Not a benefit

# Thank You for Your Attention!

