

What's new in Diabetes Management

It's been nearly a century since Canadian researchers discovered a way to treat diabetes using insulin. Since then, many technological advances have made the lives of people living with diabetes longer and easier. CADTH has assessed some of the latest technologies in diabetes care in a new set of Issues in Emerging Health Technologies bulletins.

Point-of-Care A1C Testing to Diagnose Type 2 Diabetes

cadth.ca/point-of-care-a1c-testing-to-diagnose-type-2-diabetes

Issue: Glycated hemoglobin (A1C) is a blood marker used to monitor blood sugar levels in people with type 1 and type 2 diabetes. The test gives clinicians an overall picture of average blood sugar levels during a period of weeks or months. Traditionally, determining A1C levels requires testing in a lab.

Technology: Point-of-care testing allows clinicians to test A1C levels in their office. The countertop analyzers provide results in minutes. Potential benefits include convenience, quicker diagnosis, and easier access to testing for underserved populations.

Bottom Line: No point-of-care A1C devices are approved by Health Canada or the US FDA for the diagnosis of type 2 diabetes, though one system is currently under review by both parties.

Flash Glucose Monitoring

cadth.ca/flash-glucose-monitoring

Issue: Continuous glucose monitors (CGMs) available on the market today make it easy for people with diabetes to monitor blood sugar levels, but they have the disadvantage of needing daily calibration using finger-stick tests.

Technology: A flash glucose monitoring system has been developed that comes factory-calibrated and doesn't require self-monitoring of blood glucose or daily calibration by the user. The system consists of a small sensor worn on the back of the arm that continuously reads glucose levels through a filament inserted just beneath the skin. The sensor can be scanned by a clinician to view a record of a patient's glucose levels, trends, and patterns for up to 14 days.

Bottom Line: One flash glucose monitoring system is approved for use in Canada but is not yet commercially available. A consumer version of the system, intended for use by people with diabetes, is currently under review by the US FDA.

Pressure-Sensing Insoles

cadth.ca/pressure-sensing-insoles

Issue: For people with diabetes, long-term exposure to high blood sugar can cause serious damage to the nerves of the hands, feet, and limbs. This damage (diabetic peripheral neuropathy) includes losing pain sensation, and poses a serious risk for developing wounds and infections that can lead to amputation.

Technology: Pressure-sensing shoe insoles connect wirelessly to a smartwatch and alert the user when there is a potentially dangerous pressure point on their foot that they might not feel. The user can then take appropriate actions to reduce the pressure, such as sitting down or adjusting their foot position.

Bottom Line: One insole system has been approved by Health Canada and is now available.

Glucagon Patch

cadth.ca/glucagon-patch

Issue: In a glycemic emergency, the only option for delivering a dose of glucagon to bring blood glucose levels back to normal is through a solution that must be mixed right before injection.

Technology: A glucagon patch is being developed which may prove to be more user-friendly, particularly in emergency situations. The disposable patch uses hundreds of drug-coated microneedles on its underside to deliver glucagon through the skin.

Bottom Line: The glucagon patch is not yet commercially available but is in clinical development. The patch technology is also under development for the treatment of other diseases.

Artificial Pancreas

cadth.ca/artificial-pancreas

Issue: People with type 1 diabetes must frequently check their glucose levels using a finger-stick test or continuous glucose monitor and then carefully decide the right insulin dose needed to maintain proper levels of blood glucose.

Technology: Wearable systems mimic some of the functions of the pancreas in controlling insulin delivery. These systems combine a continuous glucose monitor with a pump that delivers insulin as needed.

Bottom Line: A number of these systems are under development worldwide, and one was just approved by the US FDA, though it is not yet licensed by Health Canada.

Islet Cell Replacement

cadth.ca/islet-cell-replacement

Issue: Type 1 diabetes results from the destruction of insulin-producing cells in the islets of the pancreas. A small percentage of people with type 1 diabetes have severe and debilitating problems with hypoglycemia (low blood sugar) that may benefit from islet cell replacement.

Technology: In one therapy under development, pancreatic stem cells are created in the lab and then implanted in a patient, where they mature into functional islet cells that can sense changes in blood sugar levels and release insulin when needed. Another therapy being developed also uses this technology but adds a barrier (encapsulation) to shield the islet cells from the immune system, thus eliminating the need for immunosuppression drugs.

Bottom Line: These therapies are not yet approved and early clinical trials are under way.

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