

INSULIN TO THE RESCUE

By Charles Apple | THE SPOKESMAN-REVIEW

On July 27, 1921 — 105 years ago — Frederick Banting and Charles Best of the University of Toronto first successfully isolated insulin, a hormone they believed could prevent diabetes.

Six months later, they began regular insulin injections for a 14-year-old boy who weighed just 15 pounds and was near death.

DIABETES GOES FROM A FATAL DIAGNOSIS TO A TREATABLE CONDITION

By the 1920s, scientists had a pretty good idea that a lack of insulin, a secretion of the pancreas, caused what was then called juvenile-onset diabetes — we now call that Type 1 diabetes. But they had difficulty finding a way to extract insulin from the pancreas without damaging the insulin.

Canadian surgeon Frederick Banting had the idea that if he could break down the pancreas in a way that left just the organ’s insulin-producing cells intact, he might have better results extracting that insulin. In November 1920, he teamed up with professor John Macleod at the University of Toronto, who provided laboratories and a research assistant, Charles Best, to experiment on dogs.

It took only six months for Banting and Best to succeed in pulling insulin from a dog’s pancreas. That insulin was then given to dogs whose pancreases had been removed. Their blood sugar levels improved after those injections.

In December 1921, biochemist James Collip joined the team, moving from dogs to cattle for insulin and perfecting a way to purify the insulin so it would be safe enough to test in humans.



UNIVERSITY OF TORONTO’S THOMAS FISHER RARE BOOK LIBRARY
Charles Best and Frederick Banting

On Jan. 11, 1922, 14-year-old Leonard Thompson — who suffered from Type 1 diabetes — received the first injection. Within 24 hours, his dangerously high blood sugar level had dropped but he developed a sore where he had received the injection and still had high levels of ketones — chemicals produced by the liver that can be life-threatening — in his urine.

Collip worked around the clock to purify the insulin extract even further. Thompson was given a second injection 12 days later. This time, his blood sugar levels became nearly normal and he had no other side effects. Diabetes was no longer

a death sentence for patients.

Neither Banting nor Macleod was interested in patenting their discovery, preferring insulin be used for the public good. As word spread of the good insulin can do, pharmaceutical companies appeared to be willing to file a patent on the team’s work. In order to keep that from happening, Banting, Macleod, Best and Collip patented their discovery and the process they used to extract and purify it and sold it for \$1 to the University of Toronto.

In October 1923, Banting and Macleod were awarded the Nobel Prize for their work in developing insulin. Banting split his half of the prize money with Best and Macleod split his half with Collip.

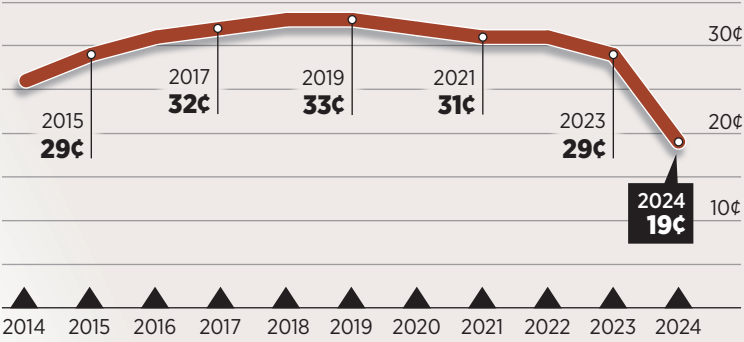
Today, both Type 1 and Type 2 diabetics can be treated with insulin — which often is self-administered via easy-to-use injection pens with screw-on needles. The pen at right, which holds 200 units or 2 milliliters of insulin, is one used by your Further Review guy.



CHARLES APPLE/THE SPOKESMAN-REVIEW

INSULIN RETAIL COSTS IN THE U.S.

Per unit — your Further Review guy currently takes 50 units a day.



Despite the wishes of the scientists who discovered insulin to keep it affordable to all who needed it, various new types have been developed over the years — types that have been patented and marketed. As a result, insulin costs skyrocketed.

The 2022 Inflation Reduction Act aided Medicare beneficiaries by limiting out-of-pocket insulin costs to \$35 per month, eliminating deductibles and limiting costs no more than the negotiated fair price of insulin.

DEFINITION OF TERMS

Type 1 diabetes

The pancreas fails to produce enough insulin. Formerly called “juvenile diabetes.”

Type 2 diabetes

The pancreas produces insulin but cells resist using it. Formerly called “adult-onset diabetes.”

Sources: “The Eureka! Moment: 100 Key Scientific Discoveries of the 20th Century” by Rupert Lee, “Life Science Library: Drugs” by Walter Modell, Alfred Lansing and the Editors of Time-Life Books, Centers for Disease Control and Prevention, American Diabetes Association, Diabetes UK, University of Massachusetts Chan Medical School, MedicalNewsToday.com, U.S. National Library of Medicine, Penn Today, Banting House NHSC, Statista, RAND Corporation, Kaiser Family Foundation