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This cancer drug is saving lives. It's also threatening to break Canadian health-care budgets

One out of every $10 spent on cancer treatments in Canada goes towards Keytruda. Experts warn that something has to give.

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Ian MacAlpine for the Toronto Star

By Megan Ogilvie Health Reporter

Four years ago, Bill Lake, a retired engineer and avid beekeeper from Battersea, Ontario, was told he had incurable colon cancer.

By the time a CT scan revealed tumours had spread to his lymph nodes, doctors at Kingston General Hospital didn't think they could halt the disease.

To Shari, Lake's wife of nearly 40 years, the diagnosis felt like a death sentence.

"We had no hope," she said. "They gave us one year before he would be palliative."

Lake started to check items off his bucket list: a trip with Shari to Newfoundland; a new pontoon boat for sunset cruises on a nearby lake; extra sleepovers with his granddaughter.

Then, in late 2022, the 64-year-old was offered a second chance. Earlier that year, the Ontario government had started to fund an immunotherapy drug for his rare form of colon cancer.

Called pembrolizumab, also known by its brand name Keytruda, the drug had worked wonders for patients with advanced melanoma and lung cancer, giving people years instead of just months to live. Doctors encouraged Lake to give it a shot.

The immunotherapy worked. By the spring, Lake was laughing again at family jokes, and he'd gone back to beekeeping, spending hours each day tending his backyard hives.

"This drug," said Shari, "it gave us back our hope."

First approved by Health Canada in 2015, Keytruda has revolutionized how some types of cancers are treated, extending lives far beyond what is possible with chemotherapy and radiation.

Bill Lake, a retired engineer and beekeeper, in his backyard in Battersea, Ont., with some of his many hives. After being diagnosed with a rare form of colon cancer in 2022, Lake was afraid he'd have to give up beekeeping.

Sophie Bouquillon/Toronto Star

But its cost is extraordinarily steep. One year of Keytruda treatment carries an estimated sticker price of $150,000 per patient. And as the drug gets approved for a growing number of cancers, opening access to thousands more patients a year, total costs are soaring.

In 2023 alone, researchers estimate that Canada spent nearly $800 million on Keytruda, based on its list price, making it the single biggest hospital drug expense in the country.

"One out of every $10 spent on cancer hospital treatments is going toward this drug," said Mina Tadrous, a pharmaceutical policy researcher at the University of Toronto.

"For people who manage health systems, those numbers have to be concerning."

Keytruda is the world's top-selling brand pharmaceutical, generating more than $30 billion (U.S.) in sales last year alone.

For Merck & Co, the New Jersey-based pharmaceutical giant behind the medication, Keytruda is nothing short of a blockbuster.

But for the health-care systems writing the cheques, it has become known as a budget breaker.

The Star has partnered with the International Consortium of Investigative Journalists on the Cancer Calculus, a yearlong project with 47 media partners in 37 countries, examining the lengths Merck takes to maximize profits on its breakthrough drug.

The investigation found the company uses a combination of patent strategies, secret pricing negotiations and relentless lobbying to maintain Keytruda's steep price around the world, pushing its annual revenues for the drug beyond those of McDonald's or the National Football League.

But even as demand for Keytruda has risen, Merck has shown little interest in curbing its prices.

Across five continents, the ICIJ investigation found deep inequities in who can access this life-extending medication, its cost making it inaccessible to patients in many parts of the world. That divide is exacerbated by Merck's insistence that a higher dosage should be administered per patient than experts say is necessary.

Cancer Calculus

Cancer Calculus is a global collaboration between the Toronto Star and the nonprofit International Consortium of Investigative Journalists. If you like journalism like this, please make a donation to ICIJ to support it.

Canada has been one of the few countries worldwide to secure cost savings by pushing back against Merck's aggressive dosing strategy. But the medication has still put a massive strain on health budgets.

"It doesn't take a lot of economic arithmetic to start asking questions about how long we can continue to pay for these drugs," said Dr. Christopher Booth, a professor and oncologist at Queen's University who researches the financial impacts of cancer drugs on provincial health budgets.

For Booth, as well as for many of the more than two dozen oncologists, economists, pharmaceutical policy experts and industry insiders interviewed for this article, drugs such as Keytruda will force the health-care system — and society at large — to confront an uncomfortable question:

What other health services will we have to give up to keep spending more and more money on expensive cancer medicines?

A ‘very clever’ drug mechanism

Lake has a rare subtype of metastatic colorectal cancer called MSI that affects about 15 per cent of patients.

By the time he was offered Keytruda, Lake had undergone surgery to remove the portion of his bowel blocked by cancer. Five rounds of radiation had failed to shrink the tumours in the lymph nodes in his neck. He was also told the highly aggressive cancer was resistant to chemotherapy.

The genetic makeup of MSI, however, left it vulnerable to Keytruda.

“The drug’s mechanism is very clever,” said Booth, Lake’s oncologist at Kingston Health Sciences Centre. “Keytruda itself does nothing to the cancer cell. What it does is essentially remove the brakes on the body’s immune system and unleashes it to fight the cancer.”

First approved for advanced melanoma, Keytruda has drastically rewritten the prognosis of the deadly skin cancer. Stage four melanoma once carried a median life expectancy of less than a year. With Keytruda, doctors now speak of 10-year survival trajectories for some patients.

Booth said the drug has had similar “remarkable” effects on lung cancer, kidney cancer and Lake’s rare subtype of colon cancer.

“Historically, patients like Bill would live for a number of months or a couple of years at most and we use chemotherapy for as long as it works,” Booth said. “Now, when we use immunotherapy, many patients go into these prolonged remissions, where their cancers almost disappear.”

Dr. Christopher Booth, a professor and oncologist at Queen's University, said drugs like Keytruda extend lives but are putting increasing pressure on health system budgets.

Ian MacAlpine for the Toronto Star

Since 2015, Health Canada has approved Keytruda for 35 different indications, including treating forms of breast, gastric and endometrial cancers. For these three, Booth said Keytruda's results have been more modest.

Lake, whose immunotherapy schedule took him to Kingston General every three weeks, never missed an appointment for the IV infusion. He recalls no ill effects from the treatment — "I just went about my normal day." He and Shari were stunned when doctors said the tumours in his lymph nodes were shrinking.

'Breaking point' looms for cancer drug spending

As Keytruda offers new hope to patients, those who manage public health budgets have been watching — and worrying about — its cost.

Not only do Keytruda and other immunotherapy drugs have high price tags, with public list prices often exceeding $100,000 (Canadian) per person per year, patients are living longer while on treatment, pushing up overall spending.

Between 2010 and 2019, sales of cancer medicines in Canada tripled, climbing from $1.3 billion to $3.9 billion.

By 2021, the independent federal agency responsible for monitoring and regulating the prices of patented medicines issued a stark warning over “very costly” cancer therapies.

“The costs associated with oncology medicines present an increasingly significant challenge to the sustainability of Canadian public drug plans nationwide,” the report from the Patented Medicine Prices Review Board said.

Since then, experts say budget pressures have only intensified.

“It was a significant issue a decade ago. It’s even more of a significant issue now,” said Scott Gavura, director of Provincial Drug Reimbursement Programs at Ontario Health.

In a rare interview, Gavura, whose role sits at the centre of how the province decides which cancer medicines to cover, acknowledged the rate of spending on drug treatments is a “significant pressure point” for already stretched health systems.

A 2024 study, which analyzed data from Ontario’s cancer agency, found that cancer drug spending in the province rose from $500 million in 2012 to $1.7 billion by 2022.

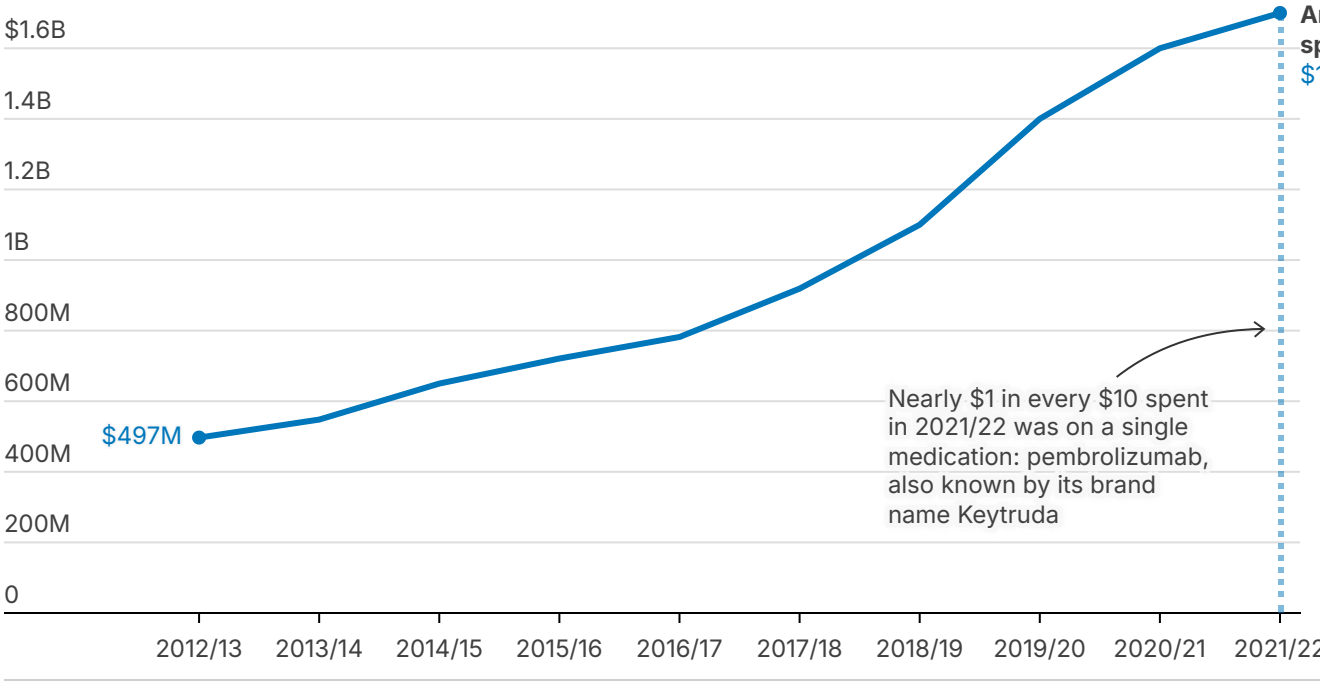
Booth, who led the study, said the research highlighted something even more striking: cancer drug spending increased by about 15 per cent per year, far outpacing the provincial health budget’s annual growth of between 3 and 7 per cent.

He said Keytruda and other types of immunotherapies are among the biggest drivers of this accelerated spending.

“If we don’t figure out how to make this sustainable, we’re going to hit a breaking point.”

The rising cost of cancer drugs

Over 10 years, the amount Ontario spent on cancer medication more than tripled — from roughly $500 million to $1.7 billion.



Data collected and published in "Cost and value of cancer medicines in a single-payer public health system in Ontario, Canada: a cross-sectional study."

SOURCE: ONTARIO FORMULARIES TORONTO STAR GRAPHIC

Gavura, a co-author of the 2024 study, agreed that ensuring costly cancer medicines don't crowd out other health-system investments is forcing difficult trade-offs.

"In a cancer system, or health system, a drug is just one aspect of it. You need to have all the other pieces within the system for patients to benefit from that therapy," he said.

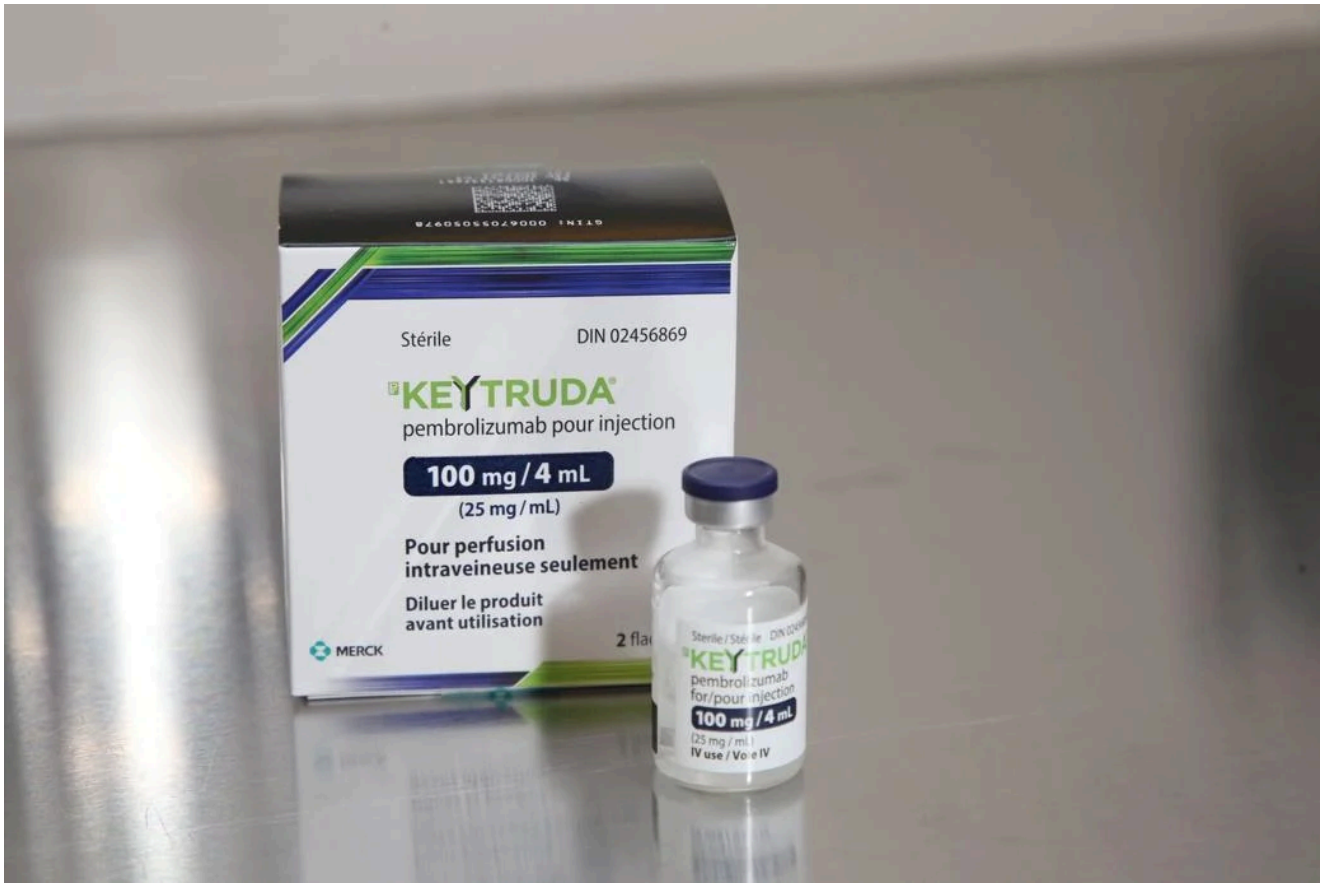
Confidential negotiations set drug prices

There's a complicating factor in trying to answer those broader health budget questions: the secretive nature of pharmaceutical pricing.

Drug manufacturers set official list prices for brand-name medicines when they come to market. But the true price paid by governments may be substantially lower, negotiated behind closed doors with drug companies. That discounted price is kept from the public.

Experts who spoke to the Star called list prices arbitrary — one described them as "indefensible" — and said they are primarily based on a company's desired return on investment, not the drug's actual development and manufacturing cost. They

also vary between countries.



Keytruda is the world's top-selling brand drug.

Ian MacAlpine for the Toronto Star

In the case of Keytruda, the ICIJ investigation found significant disparities in Merck's initial prediscount prices. In Indonesia, a 100 mg vial of Keytruda is listed at $850 (U.S.), while the same vial in the U.S could be listed at $6,015.

In Canada, the list price for a 100 mg vial of Keytruda is $4,400 (Canadian), according to Canada's Drug Agency, the national body that independently reviews new medicines and recommends whether provinces should fund them.

In a statement, Merck Canada said it has a long history of responsibly pricing its medications "to reflect their value to patients, payers and society."

"To ensure our products reach as many patients as possible, we price them differentially across markets, and sometimes within markets, according to numerous factors," Merck Canada said. The company noted these factors include "the value a therapy brings to patients and the health-care system, countries' pricing and reimbursement systems and the ability of governments to finance health-care."

Secret deals benefit pharma industry, experts say

In general, Canada has some of the highest pharmaceutical list prices in the world, ranking fifth among 31 OECD countries, according to the Patented Medicine Prices Review Board. Tadrous, the U of T policy expert, said list prices, while inflated, represent the starting point for confidential negotiations between drug companies and governments.

“You hope in the back-and-forth that they can end up somewhere in the middle,” said Tadrous, who holds a Canada Research Chair in pharmaceutical policy and real-world evidence. He said these “black box” deals are not simple price cuts, but involve complex rebate structures, including volume-based discounts.

“Then that price is locked up in a vault and kept secret from everybody.”

Many pharmaceutical policy experts say Canada’s drug-funding process does appear to deliver deep price reductions. The pan-Canadian Pharmaceutical Alliance, which negotiates drug prices on behalf of provinces and territories, said it brokered more than $5 billion in discounts last fiscal year.

Still, other experts argue that if a critical drug like Keytruda starts off with a sky-high list price, governments will struggle to reach a fair public payer cost; the price gap is just too wide.

They also say the secrecy built into the system benefits drug companies, allowing them to maintain their negotiating power in Canada and other countries while also protecting the much-larger U.S. market.

Merck Canada said it rejects suggestions that its “approach to intellectual property undermines access,” adding that “protecting innovation is a necessary part of developing new medicines and sustaining the long-term research needed to bring future treatments to patients.”

The company noted that Keytruda is “one of the largest pharmaceutical R&D programs ever undertaken, with more than 2,800 clinical trials worldwide.”

Douglas Clark, an Ottawa-based pharmaceutical industry consultant, said private companies take on huge risk in developing new drugs and have a right to make a profit. He said it’s also true that governments are finding it increasingly difficult to make room in their budgets for high-cost drugs like Keytruda, even with negotiated discounts.

That tension, said Clark, a former executive with both the pan-Canadian Pharmaceutical Alliance and the Patented Medicine Prices Review Board, is especially heightened for drugs that can save or extend lives.

"At its best the industry does God's work, bringing breakthrough cures to market for conditions that until recently amounted to a death sentence, but that can't serve as a licence to charge the devil's price, such that no one can afford it."

Canada pushes back on Keytruda pricing with weight-based dosing

Beyond negotiated discounts, Canada has taken further — and much bolder — steps to cut Keytruda costs. It's among just a handful of countries to push back against Merck's dosing guidelines for Keytruda, adopting a strategy that allows for dosing patients according to their weight.

This means many Canadian patients receive a lower dose of Keytruda than what the company currently recommends, leading to cost savings for the system.

Canada's move is backed by Merck's own scientific evidence. The company's original clinical trials showed Keytruda was safe, effective and extended lives when patients were dosed by weight.

But starting in 2016, Merck moved to a fixed, 200-mg dose for adult patients, meaning every patient, no matter their weight, would be given the same amount of Keytruda.

The company has stated a fixed dose is simpler to prescribe and reduces the risk of dosing errors, while providing the same clinical benefit as weight-based dosing.

But according to six experts who spoke to the Star, Merck's fixed dose is likely an overestimate, giving many patients more than they need. Many also said Merck likely adopted fixed dosing with Keytruda to maximize company profits.

"If you step back and look at the financial responsibilities of a corporation, it's to generate the largest profits," said Booth. "And if you take that one step further in the pharmaceutical industry, that means it's really about selling as much drug as you can, at the highest possible price, for the most patients, for the longest duration."

In a statement, Merck Canada rejected this characterization, stating that it "misrepresents the integrity of our research, our pricing practices, or our commitment to patients."

The company stated it has determined the optimal dose and treatment duration of Keytruda through extensive clinical trials.

The company went on to say that it "cannot be assumed that weight-based doses that have not been thoroughly studied would have the same therapeutic effect as the label-recommended fixed doses."

According to the ICIJ, the Netherlands and Israel have moved to weight-based dosing, and research is underway in India to see if even lower doses can benefit patients. The investigation pointed to a World Health Organization modelling projection that found the world could save $5 billion (U.S.) by 2040 if lung cancer patients received Keytruda based on their weight instead of using Merck's fixed dose.

Matthew Herder, a health law expert and professor of pharmacology at Dalhousie University, said while there is strong clinical and economic evidence backing Canada's decision to prescribe Keytruda by a patient's weight, it's also a "Band Aid solution" to minimize the budget impact of such a high-cost drug.

Bill and Shari Lake in their kitchen, almost two years since Lake's final dose of Keytruda.

Sophie Bouquillon/Toronto Star

Instead, Canada should be pushing for broader system reforms to bring down the list prices of brand-name medicines that drug companies set for the country. The ceiling price to even start discount negotiations is far too high, Herder said.

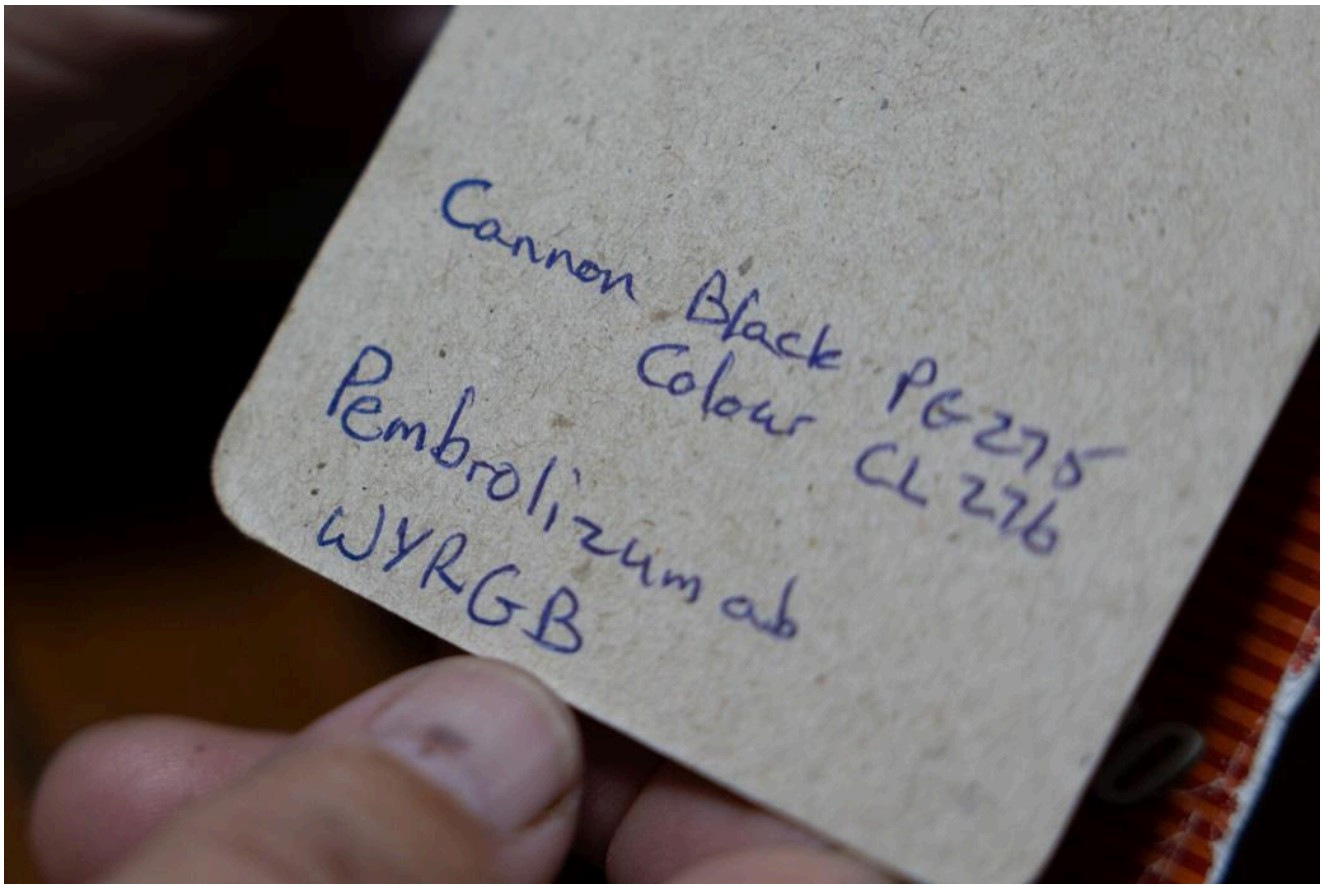
"All of the evidence we've got, in every country that's looked at this properly, is that these drugs are priced at levels where they displace multiple times more health than they produce."

‘The reason I’m still here’

Sitting at his kitchen table, the sun streaming in through the patio door, Lake is startled to learn the list price for Keytruda.

He knew the drug was expensive but not that each of his 35 infusions had an estimated sticker price of almost $12,000 (Canadian).

When Shari shows him her quick calculation for two years of Keytruda treatment — more than $400,000 at the pre-discounted price — Lake leans back in his chair and lets out a long sigh.



Bill Lake’s notebook.

Sophie Bouquillon/Toronto Star

Shari just smiles: “He’s worth it.”

Booth is just as pleased that breakthrough medicines like Keytruda are extending his patient’s lives.

He stressed that tough conversations about high-cost cancer therapies isn’t to make patients feel guilty. Instead, the scrutiny should be on the drug companies that set prices.

"Delivering a treatment that has such a radical impact on a patient's life is one of the things that drew all of us into oncology," Booth said. "We want to see more effective treatments like this developed — and be able to have a health system be able to pay for them."

It's been almost two years since Lake's final dose of Keytruda and he remains in remission. He's spent much of this summer with his bees, already harvesting 900 kg of honey.

A left over habit from his days as an engineer, Lake stashes a small notebook in the breast pocket of his shirt. He uses it to keep track of his bee colonies and honey business, but also to jot down dates for birthdays, bank account numbers and any other detail he wants to keep fresh in his mind.

Lake has written "pembrolizumab" — Keytruda's pharmaceutical name — on the inside cover.

"I need help remembering how to spell that," he said with a laugh. "It's the reason I'm still here."

With files from Amy Dempsey Raven (Toronto Star), Sydney P. Freedberg, Brenda Medina and Denise Ajiri (ICIJ)

Megan Ogilvie is a Toronto-based health reporter for the Star. Follow her on Twitter: **@megan_ogilvie** *or reach her via email:* ***mogilvie@thestar.ca****.*

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