

the plan to turn type one into
typenone



With our strategy and your support, we will create a world without Type 1 Diabetes (T1D). Join us.



We're the plan to change the future type

At JDRF, our plan is to create a future where:

Your blood glucose levels can be controlled automatically

You can sleep, eat, exercise, and live as if T1D is not in your life

T1D can be cured and is no longer present in your body

T1D can be prevented and never threaten anyone again

JDRF is turning Type One into Type None

WITH NOT JUST A VISION, BUT A PLAN

JDRF is the only global organization with a strategic research plan to end T1D. Our plan ensures that there will be an ongoing stream of life-changing therapies moving from development through to commercialization that lessen the impact of T1D. We want to keep people with T1D healthy and safe today until we reach our ultimate goal of a cure and universal prevention of T1D.

WITH ONGOING ADVANCES

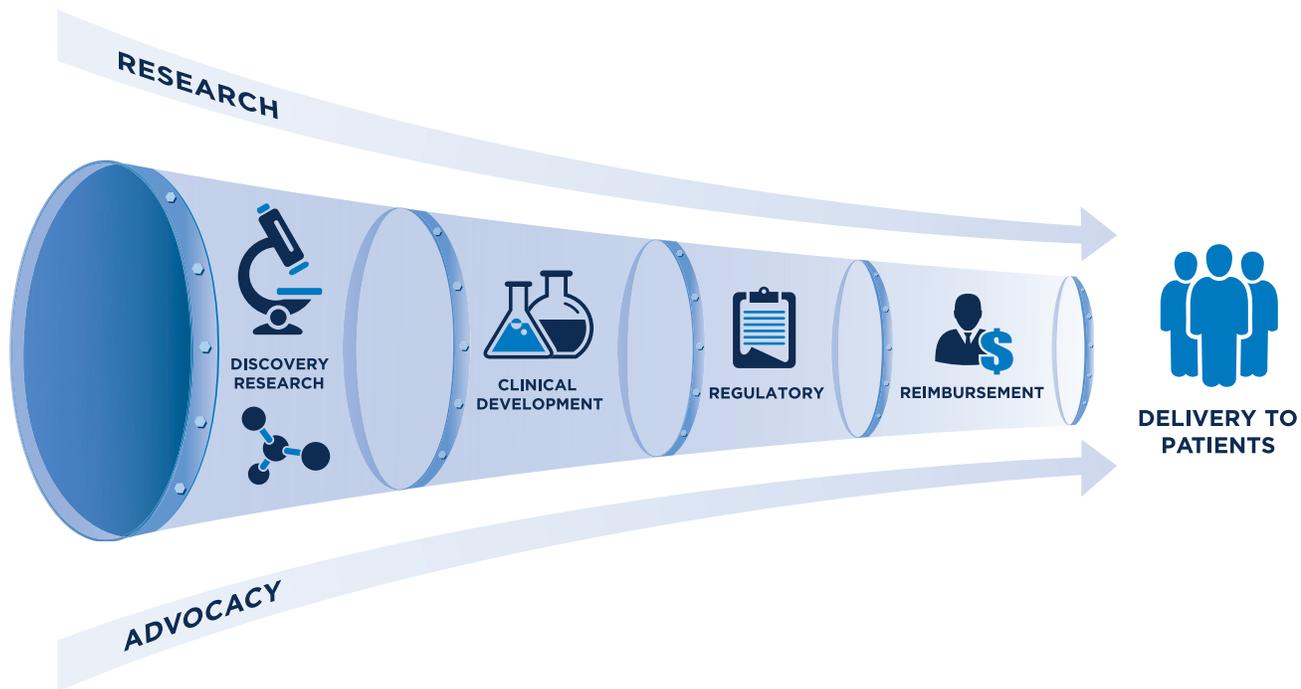
JDRF funded research is driving significant advances in T1D therapies, showing us that there won't be one "eureka" moment that will cause T1D to vanish all at once. Instead, exciting and meaningful progress will come from a series of research programs across a variety of therapeutic approaches.

WITH YOUR SUPPORT

JDRF's plan for progress requires more funding than we have today. JDRF funds over \$100 million in T1D research each year. Currently, JDRF's ongoing research programs total \$530 million around the world to discover and develop therapies to improve life with T1D, and eventually eliminate T1D from our lives entirely. But it is not enough. We know we can get from Type One to Type None faster by accelerating our fundraising and continuing to build momentum in T1D research. Your support is critical to creating a future where T1D is a thing of the past.

We're the always moving forward type

At JDRF, we're focused on bringing life-changing therapies from the lab to the community by impacting every stage of the drug delivery pipeline.



WORKING THE PIPELINE to expedite and sustain meaningful scientific progress, made possible by our donors, is the key to delivering progressively advanced therapies. This means:

- Driving research across the entire scientific and development spectrum, from discovery in the laboratory to delivery to patients
- Collaborating with public, private, academic, and corporate partners to expedite delivery of real-world solutions
- Advocating for progress that will improve lives today and lead to a cure tomorrow

The path forward from Type One to Type None is a continuum of therapies that leads to a cure. As our research programs and therapies move through the pipeline, new treatments will progressively remove the daily burden, side effects, and complications. The outcome will be a flow of therapies that restores glycemic control on the way to our ultimate goal of restoring normal physiology.

We're the make our research matter type

JDRF research focuses on key therapies that hold significant promise in turning Type One into Type None



ARTIFICIAL PANCREAS

A series of increasingly sophisticated artificial pancreas systems that progressively eliminate blood glucose testing and automate delivery of insulin and additional hormones



COMPLICATIONS

Therapies that progressively treat and reverse debilitating complications resulting from the impact of T1D throughout the body



ENCAPSULATION

Implantable beta cell replacement therapies that restore insulin independence without the need for intensive immune suppression



SMART INSULIN

Single dose of insulin that circulates in the bloodstream and turns on when it's needed and off when it's not



RESTORATION

The body's beta cell function is restored and the autoimmune attack is halted—in short, the biologic cure for T1D



PREVENTION

Slow or halt the progression of T1D before insulin dependence, and long-term, eliminate the risk of developing the disease

We're the progress is inevitable type

JDRF has a strategic research plan that will deliver a sustained stream of new, life-changing therapies

NEAR TERM



COMPLICATIONS

Diabetic Eye Disease
Predictive Diagnostics



ARTIFICIAL PANCREAS

Low Glucose Suspend
Treat-to-Range

This timeline is based on clinical delivery goals of identified therapies and will be updated as progress is achieved.



MID TERM



ARTIFICIAL PANCREAS

Treat-to-Target
Multihormone



ENCAPSULATION

Implantable Islets



SMART INSULIN

Control



PREVENTION

Secondary Prevention

LONG TERM



PREVENTION

Primary: Vaccine



COMPLICATIONS

Comprehensive Prevention Therapy



RESTORATION

New beta cell growth protected from immune attack

Together, we will turn Type One into Type None

JDRF is uniquely positioned to create a future without T1D. We're driving progress from advances in the lab to therapies that positively impact everyone with T1D by:

- **Partnering** with academia, foundations, government, and industry to leverage our research investments
- **Advocating** to ensure that new therapies are both available and affordable
- **Managing** funds efficiently, which earned us our 2012 designation as one of *Forbes Magazine's* Top 5 charitable organizations
- **Harnessing** the passion of our dedicated volunteers and donors

As successful as JDRF has been, there is still a large gap between where we are now and what we need to deliver life-changing therapies in the future. To achieve our vision of a world without T1D, more funding is essential.

T1D impacts millions of lives around the world

Type 1 diabetes (T1D) is an autoimmune disease that strikes both children and adults. Unrelated to diet or lifestyle, T1D causes lifelong dependence on injected insulin and carries the constant worry of life-threatening complications. It requires intensive, never-ending management. There are no days off, and there is no cure yet.

30,000 The number of people diagnosed with T1D every year in the US

85% The number of those living with T1D who are adults

23% The increase in the prevalence of T1D in people under age 20 from 2001 to 2009

\$14.9 billion The annual US healthcare costs of T1D

Your contributions will help accelerate progress down the path to improving lives and curing T1D. **Visit JDRF.org and join us in turning Type One into Type None.**



Artificial Pancreas

Imagine...

a future where tight glucose control is maintained automatically.

Imagine a young man like Bobby. Diagnosed at 3, he wasn't much older when he learned how to test and inject insulin by himself. And while he may see himself as "tough," that doesn't make living with type 1 diabetes (T1D) any easier—for him or his parents, who've had more than a few sleepless nights.

Now imagine how all that changes with an artificial pancreas. Once Bobby has the device, the system will do all the heavy lifting involved in managing his T1D. It will give Bobby insulin as he needs it, prevent most high- and low-blood-sugar events, and provide alerts if his glucose levels ever go too low or too high—even in the middle of the night. Bobby will still probably initially need to do some occasional finger sticks and provide information to the system before he eats or runs around. But that's it.

Bobby can sleep soundly, and so can Mom and Dad. Because for the first time, T1D will take a backseat...day and night.

JDRF isn't just imagining this. We're making it happen.

"For the first time, T1D will take a backseat in Bobby's life."

An artificial pancreas system, insulin taken just once a day, vaccines that prevent T1D, implanted beta cells free from autoimmune attack, and restoration of beta cells are all part of JDRF's plan to progressively remove T1D from people's lives until it is finally gone.

But as we work to deliver these advances, one fact is inescapable: increased funding is essential. Clinical trials and development are expensive. And for these possibilities to become life-changing realities, JDRF needs your help.

Because with your support, we can create a world without T1D.

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Artificial Pancreas

Why

Currently, managing T1D is relentless. It requires people to constantly balance insulin delivery against the amount of food eaten, the amount of exercise, and even the stress of the workplace or school. Few people, regardless of age, can focus on this balancing act every moment of the day. But technology can.

What

Artificial pancreas (AP) systems will be the most revolutionary advance in diabetes care since the discovery of insulin. Like the body's pancreas, AP systems will react to rising blood-glucose levels by combining monitoring technology with insulin pumps to provide the right amount of insulin at the right time. Not only will AP systems result in much tighter control, lowering the risk of health complications later in life, they will also reduce the constant worry about blood-sugar levels and what must be done to manage them.

How

Back in 2006, JDRF launched the Artificial Pancreas Project. The goal of the project was simple but stunningly ambitious: use new technology and science to replicate, as closely as possible, the operation of a normal human pancreas.

When JDRF stepped in, little was happening in the field. But through a strategic approach of direct funding and collaborative ventures, dramatic advances using integrated smart technology to automate insulin management have already occurred—with more in development and being applied to real-world solutions.

Today, we're drawing closer to seeing AP systems come to market and closer to our end goal of Type None. In late 2012, the FDA released final guidance for device makers to secure approval and commercialize the system. Outpatient trials of first-generation systems are already under way. You can see one person's experience living with an AP system at tiny.cc/aptrial.

But as game changing as the initial AP systems will be, they're only one milestone in our sights. And we need your support to further the advancements. It's going to take tens of millions of dollars for JDRF to continue working on initiatives to advance AP systems, such as developing even faster-acting insulin and delivery to boost the overall performance of the AP system; improving blood-glucose sensing technology to achieve greater accuracy, ease of use, and more accurate control; and creating systems that add hormones such as amylin, glucagon, or leptin to allow for full automation and the most precise control imaginable.

All of these initiatives are bringing us closer to making an artificial pancreas that fully automates insulin dosing and achieving our ultimate goal of turning **Type One into Type None.**

AVAILABILITY FOR T1D

Short term, extending into mid term with growing numbers participating in human testing.

INVESTMENT NEED

Current need:

\$50 million

Anticipated 5-year need:

\$85 million



Encapsulation

Imagine...

a future where a simple procedure eliminates the need for insulin for up to 24 months.

Imagine Dave. He has lived with type 1 diabetes (T1D) since he was 12 years old. Dave's been a proactive patient and has adopted new advances in T1D treatment—from the artificial pancreas to faster insulin. And thanks to a new outpatient procedure he just had, Dave is now insulin free.

During the procedure, Dave's doctor implanted a small tea bag-like "packet" under his skin using a local anesthetic. The packet, containing new beta cells derived from other cell sources, will produce insulin as Dave needs it for up to 24 months.

Occasionally, Dave will have to check his blood glucose and visit his doctor to monitor the status of his treatment, but other than that, Dave is living his life essentially T1D free. No daily blood-glucose monitoring, no carb counting, no extreme lows or highs, and no multiple daily injections of insulin. Technically, he may not be cured. But he sure feels like it.

JDRF isn't just imagining this. We're making it happen.

"Dave is living his life essentially T1D free."

An artificial pancreas system, insulin taken just once a day, vaccines that prevent T1D, implanted beta cells free from autoimmune attack, and restoration of beta cells are all part of JDRF's plan to progressively remove T1D from people's lives until it is finally gone.

But as we work to deliver these advances, one fact is inescapable: increased funding is essential. Clinical trials and development are expensive. And for these possibilities to become life-changing realities, JDRF needs your help.

Because with your support we can create a world without T1D.

Visit [JDRF.org](https://www.jdrf.org) to learn how you can turn Type One into Type None.



Encapsulation

Why

Encapsulated cell therapy has the potential to virtually eliminate the relentless daily management burden for those living with T1D: no need for multiple daily insulin injections or pump therapy, no more constant blood testing, and no more carb counting. People with T1D would just go about their daily lives for extended periods of time as if they didn't even have the disease.

What

New beta cells are created and wrapped in a permeable, protective barrier which is implanted in the body. The new beta cells release insulin when needed while the barrier protects them from being destroyed by the autoimmune attack.

How

About a decade ago there was considerable excitement in the T1D community about islet cell transplants—the transplantation of insulin-producing cells back into the body. But islet transplants have a big downside: high doses of potentially toxic immunosuppressive drugs are needed to block the same autoimmune attack that initially triggered T1D.

Encapsulation describes a therapy where a pouch composed of beta cells or islet cells, surrounded by a protective barrier, is implanted into the body. The barrier keeps the newly implanted cells alive by hiding them from the immune system, providing a safe environment where they can function normally. The cells constantly assess the amount of glucose in the blood and release exactly the correct amount of insulin. And unlike islet transplants, no immunosuppressive drugs are required.

In efforts to reach our ultimate goal of a world without T1D, JDRF has been a leader in driving encapsulation research forward. In fact, we have already supported some of the earliest human trials to evaluate select encapsulation strategies. Specifically, through our industry partnerships, JDRF is testing the ability of encapsulated pig islets to reverse severe hypoglycemic unawareness in humans. And we're helping to advance encapsulated stem cell precursors to beta cells into human testing. In the years ahead, JDRF will advance a number of encapsulation approaches to human trials as quickly as possible to determine which are the most promising, effective, and safe to deliver to people living with T1D.

And although a lot of progress has been made, it will require tens of millions to continue. Support our efforts to find a cure—and together we can change **Type One into Type None.**

AVAILABILITY FOR T1D

Mid term with growing portfolio of human testing in short term.

INVESTMENT NEED

Current need:

\$25 million

Anticipated 5-year need:

\$60+ million



Smart Insulin

Imagine...

a world where a single daily dose gives people with T1D insulin only when they need it.

Imagine Ashley, who was diagnosed with type 1 diabetes (T1D) at 3 years old. She has been using an artificial pancreas, which has been hugely effective in managing her diabetes and improving her overall health and quality of life.

But Ashley recently replaced it with a groundbreaking new therapy: smart insulin. This new insulin, given as a once-daily dose, circulates in her body, only activating when her blood glucose starts to rise. Once her glucose levels return to the normal range, the insulin delivery is suspended until it's needed again.

This just-in-time, just-as-needed source of insulin means that Ashley leaves behind many of the T1D chores she was forced to live with for years. Each morning she gives herself an injection or takes a pill that ensures she has enough insulin to cover her needs for the day...and that's it. She can leave infusion sets and external devices behind. Now, when Ashley eats, sleeps, exercises, or deals with the stress of school, the smart insulin does all the work.

JDRF isn't just imagining this. We're making it happen.

"Each morning, she gives herself enough insulin to cover her needs for the day...and that's it."

An artificial pancreas system, insulin taken just once a day, vaccines that prevent T1D, implanted beta cells free from autoimmune attack, and restoration of beta cells are all part of JDRF's plan to progressively remove T1D from people's lives until it is finally gone.

But as we work to deliver these advances, one fact is inescapable: increased funding is essential. Clinical trials and development are expensive. And for these possibilities to become life-changing realities, JDRF needs your help.

Because with your support we can create a world without T1D.

Visit JDRF.org to learn how you can turn Type One into Type None.



Smart Insulin

Why

Eliminating virtually all of the daily burdens associated with mechanically managing the disease would profoundly enhance and simplify the lives of people with T1D. Moreover, by improving overall blood-glucose controls, the risks of life-threatening complications would sharply diminish, leading to longer, healthier lives.

What

Smart insulin is a form of insulin that circulates in the bloodstream and turns on when it's needed to lower blood sugars and off when blood sugars are at safe levels.

How

In 2003, an MIT chemical engineer founded a company called SmartCells, to develop smart insulin.

While others were skeptical, JDRF and its allies saw promise. First the National Institutes of Health provided initial funding, using funds appropriated by Congress in response to JDRF's advocacy efforts. Then, JDRF added its funding to take it to the next stage. And in 2010, the pharmaceutical company Merck acquired SmartCells. The evolution of SmartCells is powerful validation of JDRF's strategy to support early stage therapy development to draw the capital and commercial know-how of major drug and biotech manufacturers to the T1D field.

Progress on therapies like smart insulin require scientists from a wide array of disciplines, including many who have no previous exposure to the T1D field, such as biochemists, chemical engineers, and pharmacologists.

While still years away from becoming a treatment, smart insulin will, with continued JDRF investment, become another life-changing therapy for those with T1D. But we still need tens of millions of dollars to get smart insulin into the hands of those who need it. Support our efforts and together we can change **Type One into Type None.**

AVAILABILITY FOR T1D

Mid term with growing portfolio of human testing

INVESTMENT NEED

Current need:

\$3 million

Anticipated 5-year need:

\$25+ million



Restoration

Imagine...
a future where T1D is just a memory.

Imagine Bill and Jake, both living with type 1 diabetes (T1D).

Each was diagnosed at a different age and in a different decade. And each has benefited from the ongoing advances JDRF research has driven in T1D treatment and care. But, through all the changes that have made their lives easier and healthier, they always believed there would one day be a cure that would allow them to leave diabetes completely behind.

And with the help of decades of support, that day has finally arrived. Because scientists funded by JDRF perfected a therapy that allows the body to restore its own beta cells while teaching the immune system not to attack these new cells. Bill and Jake underwent a course of drug therapy that caused their bodies to “regenerate” new beta cells.

A few months later, their doctors confirmed: they were producing their own insulin again and the new cells were free from attack. They were cured. While they never felt defined by their T1D, it constantly interfered in their lives. Now, they have what so many worked for and dreamed about: a life without T1D.

JDRF isn't just imagining this. We're making it happen.

“Today, they are living a life without T1D.”

An artificial pancreas system, insulin taken just once a day, vaccines that prevent T1D, implanted beta cells free from autoimmune attack, and restoration of beta cells are all part of JDRF's plan to progressively remove T1D from people's lives until it is finally gone.

But as we work to deliver these advances, one fact is inescapable: increased funding is essential. Clinical trials and development are expensive. And for these possibilities to become life-changing realities, JDRF needs your help.

Because with your support we can create a world without T1D.

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Restoration

Why

A full biological cure is the ultimate and permanent solution to all the complexity and problems of T1D. The delivery of that cure would mean the fulfillment of JDRF's vision of a world without T1D.

What

We now know that the human body has an amazing ability to heal itself. For a decade, JDRF has been exploring ways to restore the body's ability to produce insulin while preventing the autoimmune attack that triggers T1D. We've funded dozens of human trials to test various immune interventions, and each one has added to our understanding of what's necessary to stop the immune attack. Together, these areas of investigation will eventually yield a permanent cure for T1D.

How

Research to cure T1D still represents the majority of JDRF's research portfolio and we've made tremendous progress over the years. But restoring the body's ability to create new beta cells while simultaneously preventing recurrence of the deadly autoimmune attack is the greatest challenge yet. We're working to accomplish something that no one else has: permanently turning off an autoimmune response. We're confident it can be done, and JDRF is leading the way in funding research aimed at this historic goal.

JDRF researchers have already demonstrated that the body has the ability to grow new beta cells in certain situations, such as pregnancy. Even those with long-term T1D have shown they can still grow beta cells. Now, JDRF is advancing a number of approaches to trigger the body's ability to do the same in all those with T1D. JDRF is also exploring how to reprogram other cells in the body to become beta cells. And we're exploring

ways the pancreas can become its own source of new beta cells.

At the same time, we've discovered a number of suspected triggers associated with the onset of T1D, including certain viruses. This has opened the door to the development of new approaches that would prevent the destructive immune system response in T1D. This might take the form of a viral vaccine, similar to the polio vaccine, or it might be a therapy similar to an allergy shot, which would educate or reeducate the body's immune system not to initiate an attack on the beta cells.

In the last decade the field of regenerative medicine has exploded. JDRF has been, and with your support will remain, at the forefront of this scientific revolution. But we still need tens of millions of dollars to continue the progress. Support the most promising route to a cure and together we can finally change **Type One into Type None.**

AVAILABILITY FOR T1D

Long term

INVESTMENT NEED

Current need:

\$65 million

Anticipated 5-year need:

\$150+ million



Prevention

Imagine...

a future without the threat of T1D.

Imagine a young father like Brendan. He doesn't remember a time when he didn't have type 1 diabetes (T1D). Over his 30 years, Brendan has benefited from many new treatment options JDRF helped deliver. In fact, he now enjoys a freedom his friends and family without T1D have taken for granted their entire lives. But of everything he has gained, the most important is knowing he won't have to worry that his child will one day be diagnosed with T1D as well.

That's because JDRF's research over many years has led to highly effective ways to identify children at high risk of developing T1D, allowing doctors to give these kids a series of shots—like a vaccine—that prevents the body from initiating the attack that leads to T1D. As a result, Brendan, his wife, and the proud grandparents can experience the normal joys of a new child, without the fear of T1D.

JDRF isn't just imagining this. We're making it happen.

“A decade ago, they would have worried.”

An artificial pancreas system, insulin taken just once a day, vaccines that prevent T1D, implanted beta cells free from autoimmune attack, and restoration of beta cells are all part of JDRF's plan to progressively remove T1D from people's lives until it is finally gone.

But as we work to deliver these advances, one fact is inescapable: increased funding is essential. Clinical trials and development are expensive. And for these possibilities to become life-changing realities, JDRF needs your help.

Because with your support we can create a world without T1D.

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Prevention

Why

Preventing people from ever developing T1D is the ultimate answer. Consider polio or smallpox—neither have been cured, but effective vaccines have largely eradicated these diseases from our society.

What

JDRF is pursuing both primary and secondary prevention strategies.

Primary prevention means literally preventing the autoimmune attack so people never develop T1D at all.

Secondary prevention is focused on finding ways to prevent insulin dependence in individuals at risk or where the autoimmune attack on beta cells has already begun.

How

In the primary prevention area, JDRF has identified a number of potential triggers associated with the onset of T1D, including certain viruses. This opens the door to the development of new viral vaccines that stop these triggers and prevent the subsequent autoimmune system attack. Another effective primary prevention strategy involves developing vaccines, similar to allergy shots, that train the body's immune system not to initiate an attack on the beta cells.

JDRF's secondary prevention efforts are aimed at preserving beta cell function in children and adults at risk for T1D, or those who have been recently diagnosed—a critical effort, as new cases overall are growing by 4% annually and the number of kids with T1D is likely to double every 15 or 20 years.

We're looking at several promising avenues to achieve this goal. We know that inflammation of the beta cells is one of the causes of beta cell death. Therefore, we are pursuing strategies that would alleviate this inflammation, thus

helping the remaining beta cells to survive. Another route is finding therapies to help beta cells survive attack. For example, the use of autoantigen vaccines and highly targeted immunotherapies that impact only the part of the immune system associated with destroying beta cells may be effective secondary prevention strategies. In addition, we're conducting clinical trials of drugs developed for other conditions that may help with beta cell preservation.

Both primary and secondary prevention approaches show considerable promise, but critical knowledge gaps remain. We need to make progress to screen for the risk, susceptibility, and onset of the autoimmune attack. We need to better understand how the disease progresses to allow us to develop tailored ways to intervene at various early stages to prevent insulin dependence. All this requires more funding. It will take tens of millions of dollars to continue this research and make prevention a reality. With your support, together we can change **Type One into Type None.**

AVAILABILITY FOR T1D

Long term

INVESTMENT NEED

Current need:

\$25 million

Anticipated 5-year need:

\$100 million