

CADTH COMMON DRUG REVIEW

Patient Input

Glucagon (TBC)

(Eli Lilly Canada Inc.)

Indication: Severe hypoglycemic reactions

CADTH received patient input from:

Diabetes Canada

Type 1 Together/Ensemble

August 15, 2019

Disclaimer: The views expressed in each submission are those of the submitting organization or individual; not necessarily the views of CADTH or of other organizations.

CADTH does not edit the content of the submissions.

CADTH does use reasonable care to prevent disclosure of personal information in posted material; however, it is ultimately the submitter's responsibility to ensure no personal information is included in the submission. The name of the submitting patient group and all conflict of interest information are included in the posted patient group submission; however, the name of the author, including the name of an individual patient or caregiver submitting the patient input, are not posted.

Patient Input Template for CADTH CDR and pCODR Programs

Name of the Drug and Indication	Glucagon, type 1 diabetes
Name of the Patient Group	Diabetes Canada
Author of the Submission	██████████
Name of the Primary Contact for This Submission	██████████
Email	██
Telephone Number	██████████

1. About Your Patient Group

If you have not yet registered with CADTH, describe the purpose of your organization. Include a link to your website.

Diabetes Canada leads the fight against diabetes by helping those affected by diabetes live healthy lives, preventing the onset and consequences of diabetes, and discovering a cure. It has a heritage of excellence and leadership, and its co-founder, Dr. Charles Best, along with Dr. Frederick Banting, is credited with the co-discovery of insulin. Diabetes Canada is supported in its efforts by a community-based network of volunteers, employees, health care professionals, researchers, and partners. By providing education and services, advocating on behalf of people with diabetes, supporting research, and translating research into practical applications, Diabetes Canada is delivery on its mission. For more information, please visit: www.diabetes.ca.

2. Information Gathering

CADTH is interested in hearing from a wide range of patients and caregivers in this patient input submission. Describe how you gathered the perspectives: for example, by interviews, focus groups, or survey; personal experience; or a combination of these. Where possible, include **when** the data were gathered; if data were gathered **in Canada** or elsewhere; demographics of the respondents; and **how many** patients, caregivers, and individuals with experience with the drug in review contributed insights. We will use this background to better understand the context of the perspectives shared.

The submission contains patient input from an online survey conducted in July 2019. The self-administered questionnaire was open for two weeks to people across Canada. The survey was directed at people living with type 1 diabetes and caregivers of people living with type 1 diabetes. It asked about respondents' lived experience with diabetes and diabetes medications, and expectations for new antihypoglycemic agents in Canada. Awareness of the survey was generated through Diabetes Canada's social media channels (Facebook and twitter).

The survey was answered by 272 respondents: 120 people living with type 1 diabetes and 152 caregivers of people living with type 1 diabetes. Of those who answered the questions about age and time since diagnosis (n=129), 24% have been living with type 1 diabetes for more than 20

years, 20% for 11 to 20 years, 14% from 6 to 10 years, 20% from 3 to 5 years, 12% from 1 to 2 years, and 9% for less than 1 year. Almost 50% (n=61) of respondents were under the age of 24 or caregivers for an individual under the age of 24. Thirty-six per cent of the sample was between the ages of 25 and 54, and 16% were above the age of 55.

The sample includes people from most Canadian provinces. Forty-five percent respondents live in Ontario, 12 % in each Alberta and British Columbia, 5% in Saskatchewan, 9% in Manitoba, 3% in Quebec, 2% from New Brunswick, 11% from Nova Scotia and 1% from Prince Edward Island. No responses were received from individuals living in Newfoundland and Labrador, Nunavut, Northwest Territories or the Yukon.

3. Disease Experience

CADTH involves clinical experts in every review to explain disease progression and treatment goals. Here we are interested in understanding the illness from a patient's perspective. Describe how the disease impacts patients' and caregivers' day-to-day life and quality of life. Are there any aspects of the illness that are more important to control than others?

Diabetes is a chronic, progressive disease with no known cure. Type 1 diabetes occurs when the body produces either very little or no insulin. Common symptoms of diabetes include extreme fatigue, unusual thirst, frequent urination and weight change (gain or loss).

Diabetes requires considerable self-management, including insulin by injection or pump, monitoring diet, engaging in regular physical activity, monitoring blood glucose and managing stress. Poor glucose control is serious and problematic. Low blood glucose can precipitate an acute crisis, such as confusion, coma, and/or seizure that, in addition to being dangerous conditions in and of themselves, may also contribute to motor vehicle, workplace or other type of accident causing harm. High blood glucose over time can irreversibly damage blood vessels and nerves, resulting in blindness, heart disease, kidney problems and lower limb amputations. The goal of diabetes management is to keep glucose levels within a target range to minimize acute symptoms and avoid or delay complications.

For most survey respondents, diabetes has negatively affected all aspects of their lives and limited activities and opportunities, including travel and career. They described the disease as “very scary”, “a struggle,” and something they “can’t get away from.” They expressed frustration and anger with the daily challenge of maintaining normalcy. They described diabetes as a disease that “interrupts daily life,” forces them to live in a regimented way and makes their schedules inflexible.

Several respondents talked about diabetes contributing to losses in their life: some have lost a driver's license, employment, their sense of independence and the ability to act spontaneously. This is especially true for young people who feel left out of youthful experiences (such as drinking with friends) or feel they are dangerously jeopardizing their health when they choose to participate.

Caregivers, especially those caring for children, express concern both for themselves and for the child they care for. They state that having a child with type 1 diabetes means they “never stop worrying” and are “always afraid” that their child will experience low glucose, and they note being “a slave to [blood glucose] numbers” and “obsessed with [blood glucose] numbers”.

Respondents also point to the strain on their expenses that living with diabetes brings about. They mention how managing diabetes “costs so much,” is “so expensive,” and how using the medication, devices and supplies that are best for them (for example, buying more expensive insulin or getting insulin pumps or continuous glucose monitors) “sets me back” and “is hard for the family.” They discuss having to juggle household expenses and make sacrifice on other experiences (family trips, hockey for kids, other leisure/recreation) or household items.

Below are some quotes from our survey that support the experiences of living with type 1 diabetes:

We’re constantly monitoring my son’s numbers day and night. During sports (which he plays many) always needing to pre-plan meals to avoid highs/lows and constant monitoring during the activity and sometimes up to 24 hours after watching for delayed lows. Sleep is interrupted every night, therefore lowering my and my son’s quality of life through lack of quality rest. We don’t have the ability to be spontaneous, we always need to pre-plan everything.

My son was diagnosed at 21 months with T1. He is now 8.5. T1 is a 24-hour job that never stops, it’s relentless. It’s rare that I get more than 6 hours sleep and it’s usually always broken up to ensure he is safe. It makes it difficult to concentrate at work. It is hard to find a balance and ensure that there is positive conversation around managing T1.

Diabetes requires extensive planning for meals, snacks, play dates, and insulin injections. Our household costs have increased dramatically. Foods that are special low carb alternatives, the costs of a CGM and consumables (disposable needles, finger pricks and test strips). I estimate that our household costs have increased by about \$350 a month for this.

Diabetes has affected almost all parts of my daily life. I think about it so much through the day. It has increased my stress and anxiety levels and impacted my sleep. I rarely get a good nights sleep due to diabetes. I’ve awoken before to paramedics standing over me – way more than once. That has a terrible affect on one’s mind and body to be scared to go to sleep.

I was diagnosed 2 months ago, and I am very overwhelmed figuring this out. I’m scared all the time, I can’t get my numbers right, and I worry about what that will do to my eyes and body in the future, and that worry just makes things worse – even my blood sugar. It’s such an awful cycle. I’m sure I’ll figure it out, but I wish I didn’t have to.

I had to change careers as a long-haul trucker because of diabetes. Now I’m constantly mentally preoccupied with the various needs. Did I test, did I bolus when I ate, do I have enough insulin for the day, when does my sensor expire, will alarms go off in meetings? The big one – will someone be able to take care of me if I lose consciousness?

4. Experiences with Currently Available Treatments

CADTH examines the clinical benefit and cost-effectiveness of new drugs compared with currently available treatments. We can use this information to evaluate how well the drug under review might address gaps if current therapies fall short for patients and caregivers.

Describe how well patients and caregivers are managing their illnesses with currently available treatments (please specify treatments). Consider benefits seen, and side effects experienced and their management. Also consider any difficulties accessing treatment (cost, travel to clinic, time off work) and receiving treatment (swallowing pills, infusion lines).

Diabetes Canada’s Clinical Practice Guidelines define hypoglycaemia as: 1) the development of autonomic or neuroglycopenic symptoms; 2) a low plasma glucose level (<4.0 mmol/L); and 3) symptoms responding to the administration of carbohydrate.

Hypoglycemia is a major challenge for people with type 1 diabetes trying to achieve glycemic targets. It can be severe and can result in confusion, coma or seizure, and require the assistance of others to bring blood sugar levels back into their target range. Frequent or severe hypoglycaemia can negatively impact one’s quality of life and bring about fear of future hypoglycaemia. This fear can lead some to reduced self-care and poor glucose control – they may intentionally run their blood sugars high in order to avoid going low.

Respondents said that they experienced the following symptoms of hypoglycaemia “sometimes” (“moderately”), “often” (“severely”) or “very often” (“very severely”) (n=140):

- Trembling/palpitations/sweating/anxiety/nausea/tingling/hunger (82%)
- Confusion/weakness/drowsiness/vision changes (73%)
- Difficulty speaking/headaches/dizziness (54%)
- Unconsciousness/coma/seizure (6%)
- Assistance of others is required (55%)
- Low plasma glucose (<4.0 mmol) (87%)

Of those who responded to this section of the survey (n=137), 30% (n=41) have experience using injected glucagon to treat severe hypoglycaemia. Of those who have used injected glucagon, 6% responded they are “very satisfied” with it, 17% said they are “satisfied”, 58% said they are “neither satisfied nor unsatisfied,” 14% are “unsatisfied” with their experiences of injected glucagon and 5% are “very unsatisfied.” These respondents rated the following side effects of using glucagon as “moderate” (“sometimes”), “severe” (“often”) or “very severe” (“very often”):

- Nausea (17%)
- Vomiting (13%)
- Skin rash (3%)
- Difficulty breathing (3%)

Respondents note being “happy that it’s available” and see glucagon as a “lifesaver.” They have “peace of mind” knowing that there is something available that could save their life in emergency situations. Respondents noted the importance of being able to have glucagon administered by injection when they are unable to consume food or liquids. As one participant succinctly says: “I like the part that it saves my life when otherwise I would have died.”

Respondents also note the benefits of having a mini-dose which can be administered when someone with T1D is ill, has dropping blood glucose levels, but is not unconscious. Those who are unwell, nauseous or vomiting, are unable to consume food or beverages, and they appreciate being able to take a smaller dose of glucagon to bring their sugar levels back up.

However, people living with T1D note that, in their experience, other people (such as partners/friends/colleagues) are intimidated and afraid to use glucagon. The complexity of preparing the dose is off-putting to people who are afraid that they will not be able to handle such a task when overwhelmed by panic in an emergency. They say that attempts to train others on the use of this lifesaving hormone is often challenging because others are “not receptive” or “too afraid to do it wrong,” which leaves people with T1D with little confidence that those around them would be able to help in an emergency.

I have glucagon but no one in my family is comfortable injecting it I hope for my sake that that day never comes.

When we used expired glucagon to demonstrate how to administer it to our daughter’s care providers, they find the whole thing very intimidating, especially the giant needle. The fact that you have to mix the powder with the liquid is also an issue. Everyone is scared they won’t remember or know what to do in an actual emergency. But I appreciate that we have something that if needed could save my daughter’s life.

I don’t like that it has to be mixed and then put back into the syringe. I’m worried about messing up, so I practice with expired boxes.

In an emergency situation, it is too much for untrained people. If glucagon is being used, the patient is most likely unconscious and/or having a seizure. If you’re unfamiliar with dealing with a patient in the middle of a seizure the added pressure can cause a person to freeze up – costing precious time.

Caregivers discuss being “nervous” to inject glucagon. They too find it intimidating – especially the “giant” or “huge” needle. They also site that they are very afraid that, in an emergency, mixing the solution would prove daunting. It is a complex process that would be difficult to follow if in a panic. Moreover, parents express concerns and challenges with their school aged children because “no [school] personnel are willing to administer it.” This leaves parents concerned for their children’s health and needing to take time away from work to help with emergency. Parents state challenges in school because they find there are “no personnel willing to administer it.”

We've never used it with our son but it seems like it would be daunting in a terrifying situation. If my son was seizing or in a coma from low BG I'm hopeful I would remain calm enough to go through all the steps to properly prepare the glucagon. A pen similar to an epi pen would be a better solution.

I like that there's a mini dose which is helpful when our daughter is sick and vomiting and unable to drink or eat and her blood glucose is dropping. I dislike that it needs to be mixed and that schools refuse to train or inject.

It's too hard to think when you are panicked.

Respondents also take issue with the cost of glucagon. They find the drug to be expensive, and without coverage, people find this burdensome. Seven respondents commented that they do not keep glucagon on hand due to barriers of cost. The concerns about cost are expounded due to the fact that glucagon expires quickly and must be replaced. Since a prescription is required to access it, this adds additional doctors visits and more time off work, also negatively impacting respondents perceptions of the drug.

It doesn't last very long. The first glucagon we got expired after 6 months and we keep having to re-purchase.

It costs a lot and you rarely use it. It almost always expires before we have a chance to use it, which is actually a good thing, but still. We keep old ones on hand to practice with, but it's a lot of money for a thing you hope to never use that you have to keep buying over and over again.

I hate that you have to get a prescription in order to get it. It's something that I'm required to have. It's like insulin. But instead of going and buying it, I have to see my doctor, get a prescription, miss work. It's a hassle. I already have enough appointments to try to stay healthy with this godforsaken disease. This seems really unnecessary.

5. Improved Outcomes

CADTH is interested in patients' views on what outcomes we should consider when evaluating new therapies. What improvements would patients and caregivers like to see in a new treatment that is not achieved in currently available treatments? How might daily life and quality of life for patients, caregivers, and families be different if the new treatment provided those desired improvements? What trade-offs do patients, families, and caregivers consider when choosing therapy?

Respondents rated the following criteria as "somewhat important" or "very important" when considering treatment for severe hypoglycemia:

- Route of administration is through injection (38%)
- Route of administration is through the nose (43%)

- Fast to administer (98%)
- Small chance of error (95%)
- Fast recovery (97%)

People living with T1D and their caregivers would like to see a glucagon treatment that is easier to administer. As noted above, the current treatment has several barriers. It is injected with a large needle which people find intimidating. Before administering, it requires pre-mixing which people find overwhelming in emergency situations and leaves the administration process prone to human error. Respondents would prefer to see a glucagon treatment that is pre-mixed and easy to administer, and they think their caregivers or others in their support networks would then be more willing to administer it. They also feel that having glucagon in other forms – be that inhaled or as an epi pen style – would make school personnel more willing to administer it which would greatly decrease the fear parents experience when sending their children to school.

It is time consuming to set up and such a large needle. It would be better if it was set up more like an epi pen. Less time spent setting it up and lower chances of bending the long needle.

It should be less prone to human error. We need an epi pen style or something similar.

I wish it could be a pre-mix or a spray or something less difficult.

I would expect inhaled glucagon to become widely available and for schools to be able to use it on T1D kids as most won't do it with a needle.

Most people helping a T1D would find the inhaled glucagon much easier and less intimidating.

It would be much easier to use a nasal spray to combat severe hypoglycemia. My husband would feel at ease administering a spray rather than injecting glucagon.

Intranasal sounds great! It would be so much easier to use!

People with diabetes and their caregivers are interested in glucagon that would be administered more easily and less visibly. People living with T1D feel that if glucagon could be administered like an epi pen, or inhaled, they would be less self-conscious of their disease because this process would garner them less attention. This would help decrease the stigma associated with managing their disease in public.

I kind of don't care because without it I would die, but administering glucagon is a bit of a spectacle. It's scary and it makes people think diabetes is scary. It makes people think diabetics are scary. I'd love if there was a way to treat a low that was less theatrical. Maybe something that could be rubbed on the skin? Something we could inhale? Even something like an epi pen would be better.

There are some things you can't change. People are always going to look when someone is having a seizure or passing out, but the glucagon process itself also draws a lot of attention. Makes us seem different. We don't need that kind of stigma. If we had something that was easier to administer, less involved, more conspicuous, that would help.

Respondents feel that the cost of glucagon is burdensome. This treatment is lifesaving and something they are required to have and paying out of pocket can be prohibitive. The fact that it expires quickly exacerbates this problem. They would like to see glucagon be less expensive, covered by drug plans, and have a longer shelf life.

I shouldn't have to pay so much for it. It is something that I need, or I could die.

I wish it wasn't so expensive. It is hard to cover. I would like whatever else they come up with to be more affordable for every day people.

I would like something cheaper and that lasts longer. If it's cheaper but you have to replace just as much, that's not much help. They should come up with something that won't expire so quickly.

Portability is also an issue. Participants would like to see glucagon incorporated into insulin pump systems. They wish the packaging would be more compact, lighter, and durable.

It should be less bulky to carry around.

Sometimes I don't take it with me because I just don't want to carry that huge box. I wish it was smaller.

I'm hoping they find a way to make glucagon stable at liquid state and it can be incorporated into a closed loop system, or into an epi pen style carrier.

I am hoping they eventually come out with a form that can be used in artificial pancreas setups.

6. Experience With Drug Under Review

CADTH will carefully review the relevant scientific literature and clinical studies. We would like to hear from patients about their individual experiences with the new drug. This can help reviewers better understand how the drug under review meets the needs and preferences of patients, caregivers, and families.

How did patients have access to the drug under review (for example, clinical trials, private insurance)? Compared to any previous therapies patients have used, what were the benefits experienced? What were the disadvantages? How did the benefits and disadvantages impact the lives of patients, caregivers, and families? Consider side effects and if they were tolerated or how they were managed. Was the drug easier to use than previous therapies? If so, how? Are there subgroups of patients within this disease state for whom this drug is particularly helpful? In what ways? If applicable, please provide the sequencing of therapies that patients would have used prior to and after in relation to the new drug under review. Please also include a summary statement of the key values that are important to patients and caregivers with respect to the drug under review.

Only one respondent had experience with intranasal glucagon. They did so through a clinical trial.

7. Companion Diagnostic Test

If the drug in review has a companion diagnostic, please comment. Companion diagnostics are laboratory tests that provide information essential for the safe and effective use of particular therapeutic drugs. They work by detecting specific biomarkers that predict more favourable responses to certain drugs. In practice, companion diagnostics can identify patients who are likely to benefit or experience harms from particular therapies, or monitor clinical responses to optimally guide treatment adjustments.

What are patient and caregiver experiences with the biomarker testing (companion diagnostic) associated with regarding the drug under review?

Consider:

- Access to testing: for example, proximity to testing facility, availability of appointment.
 - Testing: for example, how was the test done? Did testing delay the treatment from beginning? Were there any adverse effects associated with testing?
 - Cost of testing: Who paid for testing? If the cost was out of pocket, what was the impact of having to pay? Were there travel costs involved?
 - How patients and caregivers feel about testing: for example, understanding why the test happened, coping with anxiety while waiting for the test result, uncertainty about making a decision given the test result.
-

Not applicable

8. Anything Else?

Is there anything else specifically related to this drug review that CADTH reviewers or the expert committee should know?

Diabetes is a disease that requires intensive self-management. Diabetes Canada's 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada highlight the importance of personalized care when it comes to the pharmacological management of the condition. Patients and

physicians should have the capacity to choose the treatment that is best suited to a patient's condition and life circumstances.

It is important to prevent, recognize and treat hypoglycemic episodes secondary to the use of insulin or insulin secretagogues. Alongside the introduction of treatment for hypoglycemia, we recommend educational supports to help prevent hypoglycemia. It is important to counsel individuals who are at risk of hypoglycemia and their support persons about the signs of hypoglycemia and its treatment. Glucagon is a lifesaving agent that people with diabetes and their caregivers are thankful to have available, even though they hope to seldomly experience the emergency situations that force them to make use of it. Access to glucagon that is administered in a way that patients and caregivers find less intimidating and does not contribute to stigma of diabetes would fill a gap noted by this patient population.

Appendix: Patient Group Conflict of Interest Declaration

To maintain the objectivity and credibility of the CADTH CDR and pCODR programs, all participants in the drug review processes must disclose any real, potential, or perceived conflicts of interest. This Patient Group Conflict of Interest Declaration is required for participation. Declarations made do not negate or preclude the use of the patient group input. CADTH may contact your group with further questions, as needed.

1. Did you receive help from outside your patient group to complete this submission? If yes, please detail the help and who provided it.

We received no outside help to complete this submission.

2. Did you receive help from outside your patient group to collect or analyze data used in this submission? If yes, please detail the help and who provided it.

We received no outside help to collect or analyze this data.

3. List any companies or organizations that have provided your group with financial payment over the past two years AND who may have direct or indirect interest in the drug under review.

Company	Check Appropriate Dollar Range			
	\$0 to 5,000	\$5,001 to 10,000	\$10,001 to 50,000	In Excess of \$50,000

I hereby certify that I have the authority to disclose all relevant information with respect to any matter involving this patient group with a company, organization, or entity that may place this patient group in a real, potential, or perceived conflict of interest situation.

Name: Seema Nagpal
 Position: Vice President, Science and Policy
 Patient Group: Diabetes Canada
 Date: August 15th, 2019

Please find attached a list of organizations who have provided financial support to Diabetes Canada, along with the amounts provided.

Financial Contributions to Diabetes Canada (updated 2017)

Constituent/Name	Funder range (\$)
<i>AstraZeneca Canada Inc</i>	350,000+
<i>LifeScan Canada Ltd.</i>	350,000+
<i>Novo Nordisk Canada Inc</i>	350,000+
<i>Sanofi Canada</i>	350,000+
<i>Sun Life Financial</i>	350,000+
<i>Eli Lilly Canada Inc</i>	250,000-349,999
<i>Ascensia Diabetes Care</i>	175,000-249,999
<i>Janssen Inc</i>	175,000-249,999
<i>Medtronic Of Canada Ltd</i>	175,000-249,999
<i>Dairy Farmers Of Canada</i>	100,000-174,999
<i>Merck Canada Inc</i>	100,000-174,999
<i>WEIGHT WATCHERS</i>	100,000-174,999
<i>Abbott Diabetes Care</i>	50,000-99,999
<i>Canola Council Of Canada</i>	50,000-99,999
<i>Insulet Canada Corporation</i>	50,000-99,999
<i>Knight Therapeutics Inc.</i>	50,000-99,999
<i>Manulife Financial</i>	50,000-99,999
<i>Nestle Health Science</i>	50,000-99,999
<i>RBC Foundation</i>	50,000-99,999
<i>The Bank of Nova Scotia</i>	50,000-99,999
<i>Abbott Nutrition</i>	25,000-49,999
<i>BD Medical Diabetes Care</i>	25,000-49,999
<i>Beer Canada</i>	25,000-49,999
<i>Dexcom Canada</i>	25,000-49,999
<i>Dynacare</i>	25,000-49,999
<i>Heartland Food Products Group</i>	25,000-49,999
<i>McNeil Consumer Healthcare</i>	25,000-49,999
<i>Rexall Foundation</i>	25,000-49,999
<i>Roche Diabetes Care</i>	25,000-49,999
<i>SaskCanola</i>	25,000-49,999
<i>Auto Control Medical Inc</i>	5,000-24,999
<i>Bayer Pharmaceuticals</i>	5,000-24,999
<i>Boehringer Ingelheim (Canada) Ltd</i>	5,000-24,999
<i>Canadian Association of Optometrists</i>	5,000-24,999
<i>Canadian Produce Marketing Association</i>	5,000-24,999
<i>CHICKEN FARMERS OF CANADA</i>	5,000-24,999
<i>Edelman Canada</i>	5,000-24,999
<i>EOCI Pharmacomm Ltd.</i>	5,000-24,999
<i>Euro Harvest Bakery Wholesalers</i>	5,000-24,999
<i>Farleyco Marketing Inc</i>	5,000-24,999
<i>ForaCare Technology Canada Inc.</i>	5,000-24,999
<i>Holista Foods</i>	5,000-24,999
<i>InBody Canada</i>	5,000-24,999
<i>Innovative Medicines Canada</i>	5,000-24,999
<i>Ipsen</i>	5,000-24,999
<i>Jays Care Foundation</i>	5,000-24,999
<i>mdBriefCase Group Inc.</i>	5,000-24,999

<i>Montmed</i>	5,000-24,999
<i>Myelin & Associates</i>	5,000-24,999
<i>Novartis Pharmaceuticals Canada Inc</i>	5,000-24,999
<i>Ontario Pork Council</i>	5,000-24,999
<i>Original Energy Sales</i>	5,000-24,999
<i>Paladin Labs Inc</i>	5,000-24,999
<i>Pharmasave Drugs (National) Ltd</i>	5,000-24,999
<i>Prime Strategies Inc.</i>	5,000-24,999
<i>PULSE CANADA</i>	5,000-24,999
<i>Royal College Of Physicians And Surgeons Of Canada</i>	5,000-24,999
<i>Tykess Pharmaceuticals</i>	5,000-24,999
<i>Urban Poling Inc</i>	5,000-24,999
<i>Valeant Canada LP</i>	5,000-24,999
<i>VitalAire Canada Inc</i>	5,000-24,999

Patient Input Template for CADTH CDR and pCODR Programs

Name of the Drug and Indication	TBD / Nasal Glucagon
Name of the Patient Group	Type 1 Together/Ensemble
Author of the Submission	[REDACTED]
Name of the Primary Contact for This Submission	[REDACTED]
Email	[REDACTED]
Telephone Number	[REDACTED]

1. About Your Patient Group

Type 1 Together brings together Canadians living with Type 1 Diabetes (T1D). We make T1D easier to live with through social connection, information sharing, and advocacy. Our website is: www.type1together.ca. We primarily communicate with members of the T1D community through social media, including articles we post on our facebook pages/groups.

2. Information Gathering

Type 1 Together reached out to the members of the English-speaking Canadian T1D community via social media and word of mouth. We invited members to complete an online survey in English. Data were gathered between August 2 and August 13, 2019.

The English-speaking Canadian T1D community contributed 543 survey responses: 162 from people with T1D, 290 from parents who directly managed a child's T1D, 68 family members of someone with T1D (not directly responsible for blood glucose management), and 14 from other caregivers. Respondents appeared well-distributed age-wise: ages ranged from "under 13" to "70-84", and 91% of respondents indicated their age was between 26 and 69 years. Respondents reported residing in all provinces, Yukon, and Nunavut. No respondents identified as living outside of Canada.

Our data largely excludes the non-narrative responses received from 9 survey participants: 3 teachers, and 6 people from the type 2 diabetes community.

3. Disease Experience

T1D is an autoimmune disease where your body stops producing insulin. People with T1D must take insulin to avoid a quick death. T1D is not caused by lack of exercise, poor diet, or lifestyle.

Insulin requirements are determined and affected by more than 30 variables including: consumption of carbohydrates, consumption of fat/protein, activity level, type of activity, the number of days since one was last active, caffeine intake, alcohol consumption, extent of "dawn

phenomenon”, hormones, body weight, stress, illness, inflammation, altitude, menstrual cycle, and pregnancy. Both positive (such as being proposed to) and negative (such as fear) emotions can have dramatic effects on insulin requirements.

Taking too much insulin causes hypoglycemia (low blood sugar). Hypoglycemia is typically experienced as shakiness, anxiety, sweating, lethargy, confusion, rapid heartbeat, hunger, nausea, sleepiness, impaired vision, headaches, tongue/nose tingling, anger, crying, stomach aches and/or incoordination. Hypoglycemia can also cause seizure, unconsciousness, brain damage, and death.

Taking too little insulin in the short term causes hyperglycemia (high blood sugar). Hyperglycemia is typically experienced as nausea, extreme thirst, frequent urination, sleepiness, lethargy, anger, fatigue, increased appetite, dehydration, blurred vision, light-headedness, rapid breathing, rapid heart rate, vomiting, and/or difficulty waking up. Hyperglycemia can also cause rapid-onset coma and death.

Taking too little insulin in the long term increases the risks of diabetes complications: cardiovascular disease, heart attack, heart failure, atherosclerosis, peripheral vascular disease, high blood pressure, stroke, blindness, vision loss, vitreous hemorrhage, macular edema, glaucoma, cataracts, retinopathy, dementia, amputation, kidney failure, autonomic neuropathy, peripheral neuropathy, postural hypotension, gastroparesis, carpal tunnel, erectile dysfunction, fungal skin infections, hearing impairment, gum disease, skin ulcers, female infertility, and depression.

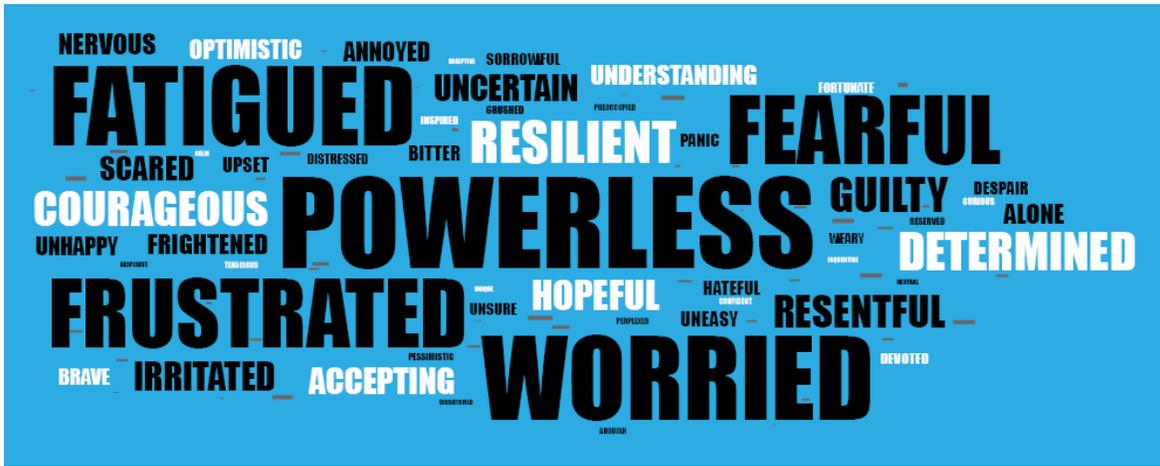
Frequently, it is not possible to predict how all variables affecting insulin requirements will affect you. With insulin requirements you struggle to predict, and punishments for taking too much or too little, T1D pins us between a rock and a hard place. Too much insulin, and you can die quickly. Too little insulin in the short term, and you can die in a coma. Too little insulin in the long term, and you increase your risk of dying slowly in the future from diabetes complications.

Balancing insulin is like walking on a tightrope blindfolded, in unpredictable and gusting winds, where different parts of the tightrope have different widths and tensions.

How well are we doing? *Not well.* In 2016, DAWN2 (Diabetes Attitudes, Needs, and Wishes) study data were published summarizing the experiences of the Canadian participants with T1D, who had been living with T1D for an average of 21 years. The study found that nearly half (48%) registered high levels of diabetes distress, defined as “significant emotional distress that interfered with diabetes outcomes”. Let’s put that last point into different words: *nearly half of people find T1D so crushing that their emotions interfere with their ability to manage their diabetes.* Caregivers are also affected by diabetes. DAWN2’s analysis of Canadian caregivers found that 33% experienced high diabetes distress.

The emotional experience of the T1D community is overwhelmingly negative. We asked the T1D community to pick 5 choices from a list of 111 emotions (of which 56 were positive and 55 were negative) to indicate how they felt about diabetes. We’ve illustrated their responses using font size to indicate relative frequency. Words in a black font indicate negative emotions, and words in white indicate positive emotions.

Themes of helplessness, exhaustion, anger, and fear outweigh optimism and resiliency.



Managing T1D well means walking a knife-edge of carefully calibrated insulin guesses/doses, very frequent glucose testing, exercise, healthy eating, calculating carbohydrate intake, omnipresent mindfulness of the 30+ variables that affect insulin requirements, and emotion (particularly fear) management. Managing T1D well requires extraordinary behavioural commitments and being attentive to it 24 hours a day, every day of your life, even when you're sleeping.

We do not have the tools we need. People with T1D need tools and technologies that make T1D safer, easier to manage, and less psychologically distressing to live with, not just over the weeks/months typical of a clinical trial, but over our lifetimes. We need to safely reduce and eliminate our risks of dying quickly or slowly developing diabetes complications from too much or too little insulin.

4. Experiences With Currently Available Treatments

While glucagon is an effective life-saving drug, adoption rates are reduced by patient burden. Dominant issues include affordability and barriers to usability/portability. Preparing and injecting glucagon is complex, and the process is prone to errors. Patient and caregiver confidence in successful delivery is low, especially during seizures. Further, patients in severe hypoglycemia may resist receiving a glucagon injection. Fear of hypoglycemia increases the prevalence of diabetes complications. School-age children with T1D are a particularly vulnerable population, as most schools will not support glucagon injections. School policies related to injected glucagon block children with T1D from fully integrating into society.

Point #1: Glucagon is an effective life-saving drug.

Of respondents who were aware of their glucagon history, 25% (n=513) indicated a history of glucagon use. Of respondents who reported using glucagon, 96% indicated that the glucagon resolved their hypoglycemia.

Point #2: Glucagon adoption rates are reduced by patient burden. Dominant issues include affordability and barriers to usability/portability.

Glucagon is the first-choice treatment for most, but 24% would prefer to have EMTs deliver IV

glucose. (n=430)

Although 98% of adults responsible for a child's T1D have glucagon at home, only 70% of respondents with T1D do. Glucagon kits are often left at home – 73% of the time for respondents with T1D. Approximately 2 in 3 children have a glucagon kit in school, and kits are less common at work. These lower adoption rates reflect the many barriers to injected glucagon usage.

People who do not carry glucagon everywhere predominantly cited barriers related to affordability, the kit being an inconvenient size, worries about kit stability temperatures, and not having anyone who could administer glucagon. Notably, 38% of respondents with T1D cited issues of affordability.

Pharmacists routinely affix “KEEP REFRIGERATED” stickers to some glucagon kits, and this confuses patients. Without reading the monograph, patients may never realize that glucagon kits are stable at room temperature for 18 months/until their expiration date.

- *“We can't keep it with us at all times because it is a challenge to keep the temperature regulated.”*
- *“I know people who not buy glucagon due to price. It's a choice between food/a roof over their head/insulin that keeps them alive or glucagon.”*

Point #3: Preparing and injecting glucagon is complex, and error prone.

Internal discussions within the submission team revealed that we, as patients experts, could not agree on how glucagon should be administered. Consulting the product monographs for clarity, we learned that one manufacturer's directions state that the glucagon must be injected into the buttocks, arm, or thigh, and the injection should be subcutaneous, intramuscular, or intravenous. The other manufacturer's kit indicates that the delivery should only be intramuscular, and offers a picture of a thigh while not describing the location. As patients, we are not trained to know which combinations of syringe depth and body location combine to hit muscle.

Preparing glucagon is a complex, multi-step process that intimidates even those who have been trained. The needle size intimidates family members and caregivers.

- *“I'm only 2 and a half months into my 3 year old's diagnosis. If I'm afraid to administer glucagon from a syringe (and I've now administered hundreds of needles of insulin), how can I expect a teacher or part time care provider to feel confident giving one in an emergency situation?”*
- *“I'm an RN and still don't feel comfortable with the thought of having to administer glucagon [injections].”*
- *“When your child lays helpless and you're in an emergency situation, you can get overwhelmed with the steps it takes to prepare glucagon. The long, large needle is intimidating, and it makes you hesitate to put into such a little leg. Being able to be more confident, and fast acting with glucagon administration will save lives, it will remove the barrier for the general population to help.”*
- *“Due to all the steps and chance of human error [schools in our district] are not permitted to administer glucagon, so while they are waiting an ambulance my child could die.”*
- *“My son called me at work 5 mins away screaming his brother was not waking up. What I saw when I came home was him blood all over from him biting his tongue from a seizure*

before. My oldest son was non responsive. I get ready to use [the glucagon] and the needle bends and breaks off in the powder. I got glucose gel and rubbed in gums and tried to get juice in him. Whatever I could to get sugar in him. He slowly come around a bit but was not very coherent and knew nothing going on. Caused my other son to have some PTSD and elevated anxiety for a long time.”

Our survey found that 12% of respondents (n=441) found the experience of preparing glucagon stressful or confusing. Many reported errors in administration, such as bending the syringe (2%), forgetting how to inject (3%), or forgetting to add the glucagon to the syringe (0.5%).

Delivery of glucagon is also complicated by the panic (adrenaline) experienced when a loved one is in an emergency situation. Physically and emotionally, It’s hard to calm yourself enough to prepare the glucagon and inject someone who is having a seizure.

Point #4: Confidence in successful delivery is low, especially during seizures

People with type 1 diabetes generally have no or low confidence that a trained person could correctly inject a full dose of glucagon. Lack of confidence grows in seizure situations, increasing from 62% to 81%.

Parents/guardians directly responsible for a child’s diabetes management and other family members self-assess confidence in their glucagon injection delivery capabilities as low. Only 45% have confidence in their ability to inject glucagon into a conscious patient, and only 19% are confident they could treat a patient having a seizure.

Unsurprisingly, 79% of respondents indicated they were “not confident” that an untrained person could successfully inject a full dose of glucagon.

- *“I’ve never been confident that anyone could give Glucagon correctly and have never had one with me as part of my emergency plan.”*
- *“I am uneasy administering that needle. This grandma would appreciate an easier method like nasal glucagon.”*
- *“When I explain how to use it I can feel myself losing the audience or see their fear that they may actually have to do this!?”*

Point #5: Patients in severe hypoglycemia may resist receiving a glucagon injection.

The glucagon needle is substantially larger than any other needle given for diabetes, and a person in severe hypoglycemia may fight receiving it.

Severe hypoglycemia can cause people not to recognize their loved ones. In Nova Scotia, in 2008, three police officers tried to help a man experiencing severe hypoglycemia. The three officers were unable to hold him down to provide treatment. They tasered him.

- *“My daughter was hysterical and hallucinating as I was trying to offer a juice box, sugar packets and gummy worms. She was screaming at the top of her lungs as if I was a stranger. I decided to pull out the glucagon kit. It was very frustrating having to read the*

instructions quick and having to draw the powder to be then added to the liquid vial all the while she is screaming at the top of her lungs having a panic attack over the big syringe. There was no calming her down, and she never got the dose as it was too dangerous of a situation as she was becoming a danger to herself.”

Point #6: Fear of hypoglycemia increases the prevalence of diabetes complications.

We asked respondents responsible for their own diabetes or for a child’s diabetes how often they deliberately kept their blood glucose level above target to avoid hypoglycemia. According to our data, “running high” is a common diabetes management strategy: 60% of respondents run high daily or weekly. Elevated blood glucose levels increase the risks of diabetes complications.

- *“My A1c is 7.0 and I am afraid of trying for a lower number.”*

Point #7: School-age children are particularly vulnerable. Most schools will not support glucagon injections.

According to our data, 68% Canadian children do not attend school in a safe environment: they do not receive support for glucagon injections from school staff. Five percent of parents pin their hopes on a single volunteer. In many schools, staff are forbidden from delivering glucagon, even if a teacher wanted to help.

- *“My son begins kindergarten this fall and I have no one willing to inject him to save his life should he have have a low blood sugar that leaves him unconscious or unable to be treated orally. This has caused me endless sleepless night of worry.”*
- *“In Manitoba, schools will not even discuss the idea of glucagon. It’s terrifying sending your kid to school!”*
- *“The school board is NOT ALLOWED to administer glucagon. They can only sit back and watch my child go unconscious and possible seize while calling 911 and waiting for an ambulance. RIDICULOUS.”*

Point #8: School policies related to injected glucagon block children with T1D from fully integrating into society.

Some parents are not comfortable with putting their children in an unsafe/unsupported environment. Some parents home school, or put their children in private school. They don’t feel that allowing their children to participate in public education is an adequately safe option.

Some students have been denied participation in a school trip under the reasoning that the school policy is to call an ambulance instead of injecting glucagon, and that the trip location is remote enough that an ambulance may not arrive quickly.

- *“We put our daughter in a private school (costing us \$15,000 a year!) because the local public school board refused to administer glucagon because of the exposed syringe and the steps required. Thankfully we had the means to make the private school work, but this is not the case for everyone.”*

Summary: Type 1 Together/Ensemble calls upon CADTH/CDR to recommend nasal glucagon for public coverage.

Access to nasal glucagon will bring significant peace of mind, improve safety, and save lives. It should reduce the T1D community’s reliance on EMTs to treat severe hypoglycemia. It should make people living with T1D, their families, and their caregivers more confident in their ability to successfully manage severe hypoglycemia, and this increased confidence may reduce the rates of diabetes complications. Finally, nasal glucagon may bring unimaginable relief to the thousands of parents that send their children into unsafe environments, and should help Canadian children integrate more fully into Canadian society.

5. Improved Outcomes

People with T1D want, would benefit most from, and deserve a full cure. That’s the goal. A cure would provide profound and unimaginable relief in many aspects of functioning for both the person living with T1D and their family/caregivers.

We look for the following improvements in our treatment regimens:

- Improved health/blood glucose management with less work. Is as effective, or is more effective.
- Can eat a “normal” diet
- Reduced risk of complications
- Increased safety
- Reduced emotional burden
- Reduced financial burden
- Less pain
- Equality and choice

Cost is the primary trade-off when it comes to selecting treatments to manage T1D.

Remote monitoring, remote control and cloud-based data storage are emerging considerations in therapy selection. Both people with diabetes and their caregivers want to see all relevant diabetes data on their phones.

A small number of patients, part of the #WeAreNotWaiting community, use patient-created and third-party devices to “loop” – to control insulin delivery via closed loop systems. Closed loop systems consist of Health Canada-licensed glucose sensors and insulin pumps, along with third-party devices and software to automate basal insulin delivery via a cell phone app.

6. Experience With Drug Under Review

Type 1 Together specifically sought feedback from clinical trial participants; we requested that Lilly reach out to their Canadian clinical trial investigators, to see if they’d be willing to distribute the survey URL to their clinical trial participants. We received no confirmation that this occurred. Ultimately, three survey respondents indicated having experience with nasal glucagon via a clinical trial, however, none commented on their clinical trial experience.

7. Anything Else?

Free-text responses in the survey received frequent, and unsolicited, comparisons to the availability of Narcan/naloxone and defibrillators. Many respondents felt that nasal glucagon kits should be a standard part of first aid kits, and that kits should be free and widely available, under programs similar to the Ontario Naloxone Program for Pharmacies or Quebec's Programme de gratuité du médicament naloxone.

- *“We should not have to pay as this is not a luxury, it is about our child’s avoiding a coma, brain damage or death.”*
- *“Families should not have to make a choice between purchasing a life saving medication vs food or paying bills. It is a fact that Glucagon saves lives and all families should have it at their disposal.”*

Patients also questioned the free syringes given to drug users (but not people with T1D), and the funding of sex change operations. They expressed strongly that the first priority of public health should be to save lives in acute crisis. Many responses reflected a strong sense of “Why are they covering that, but not what we need to stay alive?”

Appendix: Patient Group Conflict of Interest Declaration

To maintain the objectivity and credibility of the CADTH CDR and pCODR programs, all participants in the drug review processes must disclose any real, potential, or perceived conflicts of interest. This Patient Group Conflict of Interest Declaration is required for participation. Declarations made do not negate or preclude the use of the patient group input. CADTH may contact your group with further questions, as needed.

1. Did you receive help from outside your patient group to complete this submission? If yes, please detail the help and who provided it.

Some patients with Type 1 Diabetes acquired experience with nasal glucagon via Canadian clinical trials. Type 1 Together wanted to invite these patients to complete the anonymous survey. We asked Lilly to ask the investigators if they would be willing to distribute the survey URL to their trial participants.

2. Did you receive help from outside your patient group to collect or analyze data used in this submission? If yes, please detail the help and who provided it.

Type 1 Together wrote the survey. We also wrote, coded, and hosted script-free, cookie-free, tracker-free web pages on our site to collect the survey data. We analyzed the data ourselves, using R and Tableau.

3. List any companies or organizations that have provided your group with financial payment over the past two years AND who may have direct or indirect interest in the drug under review.

Type 1 Together has never received funding from any company or organization. To date, all costs have been paid by our leadership team.

I hereby certify that I have the authority to disclose all relevant information with respect to any matter involving this patient group with a company, organization, or entity that may place this patient group in a real, potential, or perceived conflict of interest situation.

Name: Jen Alexander
Position: Founder
Patient Group: Type 1 Together
Date: August 15, 2019