FEASIBILITY OF OUTPATIENT AUTOMATED BLOOD GLUCOSE CONTROL WITH THE ILET BIONIC PANCREAS FOR TREATMENT OF CYSTIC FIBROSIS RELATED DIABETES

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Protocol Title: FEASIBILITY OF OUTPATIENT AUTOMATED BLOOD GLUCOSE CONTROL WITH THE iLET BIONIC PANCREAS FOR TREATMENT OF CYSTIC FIBROSIS RELATED DIABETES

Principal Investigator: Melissa S. Putman, MD, MMSc

Site Principal Investigator:

Description of Subject Population: Adults and pediatric patients ages 10 and older with cystic fibrosis-related diabetes

About this consent form

Please read this form carefully. It tells you important information about a research study. A member of our research team will also talk to you about taking part in this research study. People who agree to take part in research studies are called "subjects." This term will be used throughout this consent form.

Partners HealthCare System is made up of Partners hospitals, health care providers, and researchers. In the rest of this consent form, we refer to the Partners system simply as "Partners."

If you decide to take part in this research study, you must sign this form to show that you want to take part. We will give you a signed copy of this form to keep.

Some of the people who are eligible to take part in this study may not be able to give consent because they are less than 18 years of age (a minor). Instead, we will ask their parent(s) to give permission for them to take part in the study and will ask them to agree (give their assent) to take part. Throughout the consent form, "you" always refers to the person who takes part in the study.

Key Information

Taking part in this research study is up to you. You can decide not to take part. If you decide to take part now, you can change your mind and drop out later. Your decision won't change the medical care you get within Partners now or in the future.

The following key information is to help you decide whether or not to take part in this research study. We have included more details about the research in the Detailed Information section that follows the key information.

Why is this research study being done?

The standard treatment for Cystic Fibrosis Related Diabetes (CFRD) is to give insulin either by injection or by infusion from a pump that provides insulin through a small tube (catheter) inserted under the skin. The person with CFRD must decide how much insulin to give, and when.

In this research study we want to test a new method for managing CFRD, using the iLet™ bionic pancreas. The iLet™ bionic pancreas is an automated insulin delivery system that is comprised of an insulin pump, a continuous glucose monitor (CGM), and a computer program. The CGM measures your glucose level. It sends this information to the insulin pump. The computer program on the insulin pump decides how much insulin should be given. Usually if your glucose level is going up, the insulin pump will increase the amount of insulin you get. If your glucose level is going down, it will decrease the amount of insulin you get.

How long will you take part in this research study?

If you decide to join this research study, it will take you about 6 months to complete the study. During this time, we will ask you to make at least 4 study visits to our office, the Diabetes Research Center, located at 50 Staniford Street, Suite 301, in Boston, MA. These visits may also occur via videoconferencing instead of in person. There are 4 scheduled check-ins over the phone during each study period.

What will happen if you take part in this research study?

If you decide to join this research study, we will ask you to sign this consent form before we do any study procedures. You will wear the iLet™ bionic pancreas for two weeks. We call this the Bionic Pancreas period. You will also manage your diabetes care the way you usually do for two weeks. We call this the Usual Care period. You will need to complete three study visits in this

four-week period. A detailed description of each study visit can be found later in this consent form in the section called "What will happen in this research study?"

Why might you choose to take part in this study?

We cannot promise any benefits to you from taking part in this research study. However, possible benefits may include a lower average blood glucose (BG) while wearing the iLet bionic pancreas. Others with CFRD may benefit in the future from what we learn in this study.

Why might you choose NOT to take part in this study?

Taking part in this research study has some risks and requirements that you should consider carefully.

Important risks and possible discomforts to know about include high and low blood glucose levels, and pain like a pinprick from the insertion of infusion sites and CGM sensors.

A detailed description of side effects, risks, and possible discomforts can be found later in this consent form in the section called "What are the risks and possible discomforts from being in this research study?"

Other things to consider are the time it will take to complete the study. The screening visit and Study Start Visit will be about 2-3 hours long. The Crossover and Study Stop Visits will each be about 1-2 hours long. These visits may be done virtually via videoconferencing. Each of the 4 scheduled phone call check ins will take approximately 15 minutes, and can be done at a time that is convenient for you.

What other treatments or procedures are available for your condition?

Other treatments or procedures that are available to treat CFRD include insulin infusion pumps or insulin injections. The Dexcom G6 CGM, without the rest of the iLet bionic pancreas, is available for anyone with diabetes.

If you have questions or concerns about this research study, whom can you call?

You can call us with your questions or concerns. Our telephone numbers are listed below. Ask questions as often as you want.

Melissa S. Putman, MD, MMSc is the person in charge of this research study. You can call her at 857-218-5017 Monday through Friday, 9 am to 5 pm.

If you have questions about the scheduling of appointments or study visits, call **Sarah Gaston** at **617-726-1848** or **Rachel Bartholomew** at **617-724-7851.**

If you want to speak with someone **not** directly involved in this research study, please contact the Partners Human Research Committee office. You can call them at 857-282-1900.

You can talk to them about:

- Your rights as a research subject
- Your concerns about the research
- A complaint about the research
- Any pressure to take part in, or to continue in the research study

Detailed Information

A description of this clinical trial will be available on *http://www.ClinicalTrials.gov,* as required by U.S. Law. This Web site will not include information that can identify you. At most, the Web site will include a summary of the results. You can search this Web site at any time.

Why is this research study being done?

In this research study, we want to test a new method for managing Cystic Fibrosis Related Diabetes (CFRD), using the iLet™ bionic pancreas. The iLet™ bionic pancreas is an automated insulin delivery system that is comprised of an insulin pump, a continuous glucose monitor (CGM), and a computer program. The CGM measures your blood glucose (BG) level. It sends this information to the insulin pump. The computer program on the insulin pump decides how much insulin should be given. Usually if your glucose level is going up, the insulin pump will increase the amount of insulin you get. If your glucose level is going down, it will decrease the amount of insulin you get.

The standard treatment for CFRD is to give insulin either by injection or by infusion from a pump that provides insulin through a small tube (catheter) inserted under the skin. The person with CFRD has to decide how much insulin to give, and when. The bionic pancreas is different, because the bionic pancreas automatically determines the amount of insulin using a computer-generated system based on blood sugar levels.

We have shown in other research studies that the iLet can improve BG control in people with type 1 diabetes (T1D). We are doing this study to find out whether the iLet can also improve BG control in people with CFRD.

The iLet bionic pancreas is not approved by the U.S. Food and Drug Administration (FDA) to treat CFRD. This means it is "investigational" and may only be used in research studies.

There are several devices that will be used in this study. The devices are:

1. The **iLet bionic pancreas** is a handheld device that includes an insulin chamber and the Bionic Pancreas Control Algorithm. The iLet bionic pancreas calculates and doses insulin automatically to regulate BG, based on the CGM glucose readings it receives from the Dexcom G6 CGM. The iLet bionic pancreas is not approved by the FDA for use in treating CFRD. Therefore, the device is considered experimental and may only be used in research studies.

2. The **Dexcom G6 Continuous Glucose Monitor (CGM)** will be used in both study periods. It uses a small sensor inserted under the skin to measure glucose levels every 5 minutes. The Dexcom G6 CGM is approved to monitor glucose levels in people with CFRD.

a. In the Usual Care period, subjects that don't already use a Dexcom G6 CGM will be provided with a Dexcom G6 Pro. The Dexcom G6 Pro lets us record your blood sugars, but you will not be able to see them.
b. In the Bionic Pancreas period, the Dexcom G6 CGM will be used by the iLet bionic pancreas to give insulin.

3. The **Ascensia Contour Next One glucose meter** is an FDA approved fingerstick BG meter. This meter will be used for all BG measurements during the study.

4. The **Abbott Precision Xtra ketone meter** is an FDA approved fingerstick blood ketone meter. This meter will be used for all ketone measurements during the study to manage hyperglycemia.

5. The **InPen** is a reusable "smart" insulin injector pen that makes it easier to keep track of how much insulin you take. The InPen is used to treat adults and children with diabetes usually use injections to manage their diabetes will use the InPen during the Usual Care period.

The iLet bionic pancreas will use **insulin** to lower your blood glucose. The iLet can be used with either insulin lispro (Humalog), or insulin aspart (Novolog). You will fill the iLet with the same type of insulin you currently use. If you use Apidra or Fiasp, we will provide you with Humalog or Novolog. Humalog and Novolog are approved by the FDA to prevent and treat hyperglycemia (high blood sugar), but not for use in the iLet bionic pancreas.

Additionally, blood glucose control may affect the microbiome (organisms) in the sputum of people living with cystic fibrosis. Studying the microbiome of sputum may help researchers understand more about organisms living in a person's body and patterns of disease these organisms create. Because of this, we will also collect sputum samples from subjects in this study to examine the microbiology and genetics of their sputum.

Who will take part in this research?

We are asking you to take part in this study because you have been diagnosed with cystic fibrosis related diabetes and are using either an insulin pump or multiple daily injections of insulin.

Up to 60 subjects with CFRD will be enrolled in the study at Massachusetts General Hospital (MGH). After screening, the first 20 adults and 10 children that qualify for the study will be scheduled to participate.

It will take you up to 6 months to complete this research study. You will make at least 4 visits to our office during that time. These visits can also be done via videoconferencing instead of occurring in our office. There will also be 4 scheduled phone call check-ins.

The National Institutes of Health (NIH), the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), and the Cystic Fibrosis Foundation are paying for this research study to be done.

What will happen in this research study?

There will be at least 4 visits and 4 check-ins over the phone in this study. Each of these visits can occur in person in our office, or remotely using a video conferencing platform. If you do not have the equipment at home to allow for video conferencing, we may be able to provide some to you for use during the study.

Screening Visit (Visit 1)
The screening visit will take up to 2 hours to complete. At this visit we will review your medical history and do some procedures to see if you qualify for this study. The study doctor (MD) or nurse practitioner (NP) will review your medical history and screening forms to make sure you are eligible to take part in this study. If you are not eligible, the study MD or NP will tell you why.

During this visit, we will:

- Ask you some questions about your personal medical history, family medical history, medications, and other personal history that is important to your health.

- If you are a female who can become pregnant, we will test your urine to see if you are pregnant. If the visit is happening over a video call, we will send you the pregnancy test in advance and ask you to take the test at home the day of the study visit.
    - You cannot take part in this study if you are pregnant, or plan to become pregnant within the next 6 months. If you are pregnant, we will tell you (and your parent/or guardian, if applicable). If you are <18 years old and do not want to have the tests or you do not want the study doctor to talk to you and your parents about the test results, then you do not have to be in the study. If you are not okay with being in this study, then do not sign this form. If you sign this form, then you are saying that it is okay to do the pregnancy tests and to talk to you and your parents about the test results. You do not have to be in the study if you don't want to.

- Measure your height and weight. If the visit is happening over a video call, we will ask you to weigh and measure yourself at home.

If you do not start the study within 12 months of your screening visit, this visit will have to be repeated.

Assignment to a Study Schedule
If you qualify to take part in the study and choose to take part, we will assign you by chance (like a coin toss) to a schedule of visits. Each study schedule will include both study periods, but the order that they occur will be random.

You and the study doctor cannot choose your study schedule. You will have an equal chance of being assigned to any schedule. No matter what schedule you get assigned to, you will still be able to participate in each of the study periods.

There are 2 different study periods that can happen in any order:

1. *Usual Care*

You will follow your usual diabetes management routine. You will control your own insulin dosing using your own insulin pump or injections (or the InPen). You may use your own CGM if it is part of your normal routine.

If you use a Dexcom G6 CGM, you will need to wear it for the whole study period, and we will use that to collect your blood glucose data.
If you do not use a Dexcom G6 CGM, we will provide you with a Dexcom G6 Pro CGM that you will need to wear for the whole study arm. This CGM allows us to collect your blood glucose data, but you will not be able to see the glucose readings or get glucose related alarms.

2. *iLet Bionic Pancreas*

You will wear the iLet bionic pancreas. The iLet will use Humalog or Novolog to control your blood sugar. You will not wear your own pump or control any of the insulin dosing.

Study Start Visit (Visit 2)
This visit will take place on the first day of the study. This visit will last about 3 hours. If the study visit will happen over a video call, study staff will mail you all the supplies you will need ahead of time. They will confirm you have your supplies and are able to access the video call.

During this visit, we will:

- Ask you (and/or your parents or guardian, if applicable) to complete questionnaires about your general health and well-being, quality of life, diabetes management, and dietary habits.

- Measure your weight. If the visit is happening over a video call, we will ask you to weigh and measure yourself at home.
- Test your urine for pregnancy if you are a female that can become pregnant. If you are pregnant, we will tell you (and/or your parent or guardian, if applicable). Females who are pregnant cannot participate in the study. If the visit is happening over a video call, we will send you the pregnancy test in advance and ask you to take the test at home the day of the study visit.
- Ask you to provide a sputum sample. We will collect ~½ teaspoon of sputum.
- Ask you about your medical history and any events that have occurred since the last visit.

For subjects in the Usual Care period, we will also:

- Ask you to insert a Dexcom G6 or G6 Pro CGM sensor and start a session.
- Review training on the Dexcom G6 CGM system, Contour Next One glucometer, Precision Xtra ketone meter, study policies and schedule.
- Review how to use the InPen if you use MDI as your usual diabetes care
- Provide you with enough study supplies for the next week.

For subjects in the bionic pancreas period, we will also:

- Ask you to insert a Dexcom G6 CGM sensor and start a session.
- Review training on the iLet bionic pancreas, Dexcom G6 CGM system, Contour Next One glucometer, Precision Xtra ketone meter, study policies and schedule.
    - iLet training will include filling the pump, understanding the information on the iLet display, and using the meal announcement feature.
- Ask you to fill the iLet with insulin and prime it and place up iLet infusion sets on the skin of your belly.
- Ask you to remove your own insulin pump if you use one just before we start the iLet. If you use long-acting insulin, a study MD or NP will help you transition to the iLet.
- The iLet will start infusing insulin when started by study staff.
- Study staff may follow up with you before the end of your first day with the iLet to make sure everything is working and you are comfortable.

Phone Call Follow Up Visits (Visits 3 &4)

Study staff will call you 2 (±1) days and 5 (±1) days after starting the study period. They will ask how your BG has been and if the iLet bionic pancreas has been working (if applicable). They will answer any questions you may have. You can always contact study staff if you have questions or need assistance and it is not time for this phone call.

Crossover Visit (Visit 5)

This visit will take place 14 (+2) days from the start of the first study period. During this visit, the study period you just completed will end, and the next study period will begin. This visit will last about 1-2 hours. If you have a break between study periods, this visit will happen twice: one to

stop the study period and one to start the next one. If the study visit will happen over a video call, study staff will mail you all the supplies you will need ahead of time. They will confirm you have your supplies and are able to access the video call.

During this visit, we will:

- Ask you to complete questionnaires.
- Measure your weight. If the visit is happening over a video call, we will ask you to weigh and measure yourself at home.
- Download your study devices. This may include your personal insulin pump, the iLet bionic pancreas, the InPen, any CGMs used, and the glucometer. If the visit is happening virtually, we may ask you to mail study devices back to us at this time.
- Ask you about your medical history and any events that have occurred since the last visit.
- Ask you to replace the G6/G6 Pro CGM sensor for the new study period if necessary.
- Give you any extra supplies you need for the next week.
- Review training on study devices, study policies and study schedule as needed.

If you are switching from the Bionic Pancreas period to the Usual Care period, a study MD or NP will review the last several hours of insulin dosing and your glucose trend information and help you switch back to your usual diabetes care.

If you are switching from the Usual Care period to the Bionic Pancreas period, you will stop taking your own insulin injections or remove your infusion pump and study staff will help you transition to the iLet.

Phone Call Follow Up Visits (Visits 6 & 7)
Study staff will call you 2 (±1) days and 5 (±1) days after starting the study period. They will ask how your BG has been and if the iLet bionic pancreas has been working (if applicable). They will answer any questions you may have. You can always contact study staff if you have questions or need assistance and it is not time for this phone call.

Study Stop Visit (Visit 8)
This visit will take place once, 14 (+2) days from the start of the second study period, after both study periods have been completed. This visit will last about 1-2 hours. If the study visit will happen over a video call, study staff will mail you all the supplies you will need ahead of time. They will confirm you have your supplies and are able to access the video call.

During this visit, we will:

- Ask you to complete questionnaires.
- Measure your weight. If the visit is happening over a video call, we will ask you to weigh and measure yourself at home.

- Ask you to return all study equipment. If this visit is happening over a video call, we will ask you to mail all the study equipment back to us at this time.
- Ask you about your medical history and any events that have occurred since the last visit.
- Download your study devices. This may include your personal insulin pump, the iLet bionic pancreas, the InPen, any CGMs used, and the glucometer.
- Ask you to remove the G6/G6 Pro CGM sensor sites and all infusion sets.

If you are completing the Bionic Pancreas period, a study MD or NP will review the last several hours of insulin dosing and your glucose trend information and help you switch back to your usual diabetes care.

Instructions and Policies for the Study

We will ask you to agree to the following policies during each of your study periods. These policies are important for your safety during the study, for the integrity of the study results, and they are requirements for taking part in the study. If you cannot follow any of these policies, please tell the study provider immediately, as you may no longer be able to participate in the study.

- You will keep the Contour Next One glucometer nearby at all times and use it for all BG checks during the study. You can check your BG as many times as you want.
- Dexcom G6 CGM sensors need to be replaced every 10 days throughout the study.
- If you become sick during the study, you should contact your regular doctor and tell a study staff member. You will continue to seek medical care as usual from your own doctors for any sickness or medical advice not related to study procedures.
    - If you are sick and unable to eat for more than one day, you must tell study staff so that they can assess the safety of continuing the study.
    - If you are sick and need to be admitted to the hospital, we may stop your study period. We may have you continue or redo the study arm once you are well enough, depending on how much data was collected before your hospitalization.
- We will encourage you to keep your diet, activity level, work and sleep schedule as similar as possible during each study period.
- Every day, we will e-mail you a survey to complete. We ask that you complete daily surveys in a timely fashion to reduce the chance of you forgetting something. Some of the things we may ask about are:
    - How many episodes of hypoglycemia you had and what treatment you used
    - Roughly how long and how hard you exercised
    - How much alcohol you drank
    - Insulin dosing
    - Any other issues you had throughout your day

Instructions and Policies for the Usual Care period

- You will follow your usual diabetes routine. The study team will not make any changes to your care. You are allowed to wear your own CGM if you normally do for your diabetes care.
- If you do not normally use a Dexcom G6 CGM, we will ask you to wear the blinded G6 Pro CGM during this period. This means that you will not be able to see the BG values. These BG values will be used for data collection only and will not be seen by study staff until the end of the study period.
- If you use MDI to manage your diabetes, we will ask you to use the InPen during your usual care arm. We will train you on how to use the InPen and download the data gathered at the end of you study arm.

Instructions and Policies for the Bionic Pancreas period

- You will be trained how to respond to iLet alarms and troubleshoot any issues that come up with the device. The iLet will sound an alarm if your CGM glucose is:
    - above 300 mg/dl for 90 minutes
    - less than 70 mg/dl
    - less than 55 mg/dl
    - less than 100 mg/dl and falling rapidly
- You will keep the Precision Xtra ketone meter nearby at all times and use it for all ketone checks during the study. You will check your ketones whenever your CGM glucose is above 300 mg/dl for 90 minutes and will call study staff if your ketones are 0.6 mmol/l or higher.
    - You will keep extra infusion sets and insulin vials and syringes or pens nearby at all times in case they are needed to manage hyperglycemia.
- You will not tamper with the iLet or change any of its settings other than what the study team instructs you to change.
- You will keep the iLet charged using the charging pad we will provide to you.
- The iLet is **not** waterproof and must be removed for water related activities.
    - You will disconnect the iLet for showering and swimming but will not be disconnected for more than 1 hour at a time or 2 hours in one day.
    - The infusion sets and the Dexcom G6 CGM sensor are water resistant and can be worn while swimming and showering.
- While on the bionic pancreas, you will announce the 3 major meals of the day with the estimated number of carbohydrates (usual, less than usual or more than usual) to the iLet. It will learn what you mean by that and give part of the insulin it thinks you will need for that meal at the beginning. We expect this to lower your average BG compared to what the iLet would reach if you did not announce meals. You will not announce any snacks between meals.

- We will ask you to change your insulin infusion sets and reservoirs every 3 days, or if there is any doubt that your infusion set may not be working. Your infusion set may not be working if your CGM is greater than 300 mg/dl for 90 minutes, or greater than 400 mg/dl. Study staff will make sure you have enough supplies to change your infusion sets whenever it may be needed. Call study staff for any assistance related to infusion sets.

Treating Low Blood Glucose on the iLet bionic pancreas
We will ask you to confirm any symptoms of hypoglycemia or any CGM glucose alarms with a fingerstick BG using the study meter. You will receive alarms from the iLet for CGM glucose below 55 mg/dl, CGM glucose below 70 mg/dl and if your CGM glucose is below 100 mg/dl and is dropping rapidly.

You should take carbohydrates to treat hypoglycemia at any time as you choose. We suggest that you use the "rule of 15s": give 15g of carbs for BG below 70 mg/dl and retest BG in 15 minutes. When you are on the iLet, you may need to treat with less carbohydrates than typical because insulin dosing would have automatically been suspended.

If you experience a lot of hypoglycemia, or a have a severe low blood sugar, call study staff. You may contact the study staff at any time for assistance troubleshooting any problems.

Treating High Blood Glucose on the iLet bionic pancreas
You will receive an alarm from the iLet for CGM glucose above 300 mg/dl for 90 minutes. You should check a fingerstick BG using the study meter, and fingerstick ketones using the study ketone meter.

If your BG is high, you should check your insulin infusion site and the iLet to make sure they are working. If there is any sign of insulin set failure, the set should be replaced. If your BG is over 300 mg/dl for more than 90 minutes, you should check your for ketones using the ketone meter. If ketones are 0.6 mmol/l or higher, please call study staff for additional guidance on how to manage your high BG. You may contact the study staff at any time for ketones or high blood sugar.

Do not take any additional insulin outside of the iLet, as this could be very dangerous. If you need additional insulin, study staff will help you to do it safely.

What happens if my iLet bionic pancreas isn't working?

- You may contact study staff as necessary for help troubleshooting any issues that may arise. They will help troubleshoot the problem over the phone.
    - If it can't be resolved over the phone, a study staff member will be dispatched to meet you in a public place to help resolve the problem. Study staff may not enter your home and will follow all infection control procedures.

- If a problem requiring in person assistance to resolve happens at night, study staff may wait until the next morning to meet you.
- If a problem with the iLet cannot be resolved quickly, you may have to disconnect the iLet and connect your own pump or give yourself injections until the problem is resolved.

- If the study staff cannot reach you about a technical problem, they will try other numbers they have for you (such as your house or office phone).

Treating Other Medical Needs
If you have a non-urgent medical issue or concern, not related to your diabetes care, you should follow up with your primary care physician or usual medical provider. If you have an emergency medical issue or concern, you should seek care at a medical walk-in, emergency room or call 911, if necessary. You should notify the study staff of any medical care received during the study, even if it is not related to your diabetes.

Text Messaging During the Study
Text messages by mobile/cell phones are a common form of communication. This study involves sending you text messages that are relevant to the research study. Texting over mobile/cell phones carries security risks because text messages to mobile/cell phones are not encrypted. This means that information you send or receive by text message could be intercepted or viewed by an unintended recipient, or by your mobile/cell phone provider or carrier. If you want to receive communications by unencrypted texts despite these risks, MGB/Partners HealthCare will not be held responsible for any interception of messages sent through unencrypted text message communications.

You will be responsible for all fees charged by your carrier's service plan for text messaging. This research study and MGB/Partners Healthcare are not responsible for any increased charges, data usage against plan limits or changes to data fees from the research texts.

Text messages will only be read during regular business hours. Texts sent on nights or weekends will not be read until the next business day. Text messaging should not be used in case of an emergency. If you experience a medical emergency, call 911 or go to the nearest hospital emergency department.

You may decide to not send or receive text messages with staff associated with this research study at any time. You can do this in person or by sending the research number a text message that says "Stop Research Text." Your agreement to the use of text messaging applies to this research study only. Agreeing to other texts from MGB/Partners Healthcare, for example appointment reminders, is a separate process. Opting out of other texts from MGB/Partners Healthcare is a separate process as well.

It is your responsibility to update your mobile/cell phone number with this research study in the event of a change.

Please select one of the following options:
Do you consent to text messages for this study?

YES NO Initials _____

Stopping the Study Early
You may choose to withdraw from the study at any time. If you choose to withdraw from the study while wearing the iLet bionic pancreas, a study provider will help you switch back to your usual diabetes care. The study staff may stop the study without your permission. This could happen because:

- The iLet bionic pancreas is not controlling your blood glucose well enough (too low or too high)
- You become ill, cannot eat, or start vomiting during the study.
- You don't follow the study instructions
- The study is stopped by a committee that monitors the safety and scientific results of the study

Study information included in your medical record
Partners has an electronic system that lets your study doctors know if you are admitted to a Partners Hospital, or if you visit a Partners Hospital Emergency Department. We want to make sure the study doctors know about any possible problems or side effects you experience while you are taking part in this study.

A notation that you are taking part in this research study may be made in your electronic medical record. Information from the research that relates to your general medical care may be included in the record (for example: list of allergies, results of standard blood tests done at the hospital labs).

Please ask your study doctor if you have any questions about what information will be included in your electronic medical record.

Sending Samples/Data to Research Collaborators Outside Partners
We will send your study information and/or samples to research collaborators. We will label all your study materials with a code instead of your name. The key to the code connects your name to your study information and samples. The study doctor will keep the key to the code here at Partners and will not share it with our research collaborators. No one outside of Partners will know which study information or samples are yours.

Research involving biospecimens will or might include whole genome sequencing
We may also perform a whole genome analysis on your DNA sample. Usually researchers study just a few areas of your genetic code that are linked to a disease or condition. In whole genome analyses, all or most of your genes are looked at and used by researchers to study links to cystic fibrosis and diabetes.

Tissue/data will be sent to NIH dbGAP or other tissue/data repositories
In order to allow researchers to share test results, the National Institutes of Health (NIH) and other central repositories have developed special data (information) banks that analyze data and collect the results of whole genome studies. These banks may also analyze and store DNA samples, as well. These central banks will store your genetic information and samples and give them to other researchers to do more studies. We do not think that there will be further risks to your privacy and confidentiality by sharing your samples and whole genome information with these banks. However, we cannot predict how genetic information will be used in the future. The samples and data will be sent with only your code number attached. Your name or other directly identifiable information will not be given to central banks. There are many safeguards in place to protect your information and samples while they are stored in repositories and used for research.

How may we use and share your samples and health information for other research?

The samples and information we collect in this study may help advance other research. If you join this study, we may remove all information that identifies you (for example your name, medical record number, and date of birth) and use these de-identified samples and data in other research. It won't be possible to link the information or samples back to you. Information and/or samples may be shared with investigators at our hospitals, at other academic institutions or at for-profit, commercial entities. You will not be asked to provide additional informed consent for these uses.

Storing, Using and Sharing Identifiable Information and Identifiable Samples
At the completion of this research study, we would like to store and be able to use and share your identifiable samples and health information with researchers at Partners for other research related to cystic fibrosis and diabetes. If we share your samples and/or health information with other researchers outside of Partners, we will label the samples and information with a code instead of your name or other directly identifying information. The key to the code connects your name or other identifiers to your sample and/or information. We will keep the code in a password protected file.

Because these samples and/or health information are identifiable, we are asking your permission to store, use and share them for other research. You can still take part in the research study whether

or not you give permission for the storage, use, and sharing of the samples and health information for other research.

Please select one of the following options:
Do you agree to let us store and use your samples and health information for other research related to cystic fibrosis and diabetes?

YES NO Initials _____

Will you get the results of this research study?

You and your doctor should not expect to get information about the results of the research study or the results of your individual participation in the research study. We will study samples and information from many people. It could take many years before anyone knows whether the results have any meaning. There is a small chance that we could find out something from the study that might be important to your health. If this happens, we may contact you to find out if you would like to learn more. However, even if we find something important to your health, we cannot guarantee that you will be contacted.

What are the risks and possible discomforts from being in this research study?

Risks of the iLet Bionic Pancreas
The iLet bionic pancreas may not control your glucose levels well. You might develop low or high glucose levels.

The symptoms of low glucose may include:
- Feeling anxious or nervous
- Sweating
- Rapid heart rate
- Confusion
- Unconsciousness (passing out)
- Seizure.

The symptoms of high glucose may include:
- Blurry vision
- Increased urination.

Risks of Inserting Infusion Sets and Dexcom CGM Sensors

You may feel some pain (like a pinprick) when the infusion sets or Dexcom CGM sensors are placed under your skin. In very rare cases, the skin at the injection locations can become irritated or infected. If there is any sign of irritation or infection, we will ask you to remove the infusion sets or sensors and put them in another place on your body. Sensors tips may break off under the skin on very rare occasions.

Risks of Insulin
Whenever insulin is injected into the body, there is a risk of getting a low glucose level.

Risks of an Allergic Reaction
With any drug, an allergic reaction can occur. Allergic reactions can be mild or more serious and can even result in death. Common symptoms of an allergic reaction are rash, itching, skin problems, swelling of the face and throat, or trouble breathing. If you think you are having an allergic reaction, call the study doctor right away. If you are having trouble breathing, call 911 immediately.

Risks to Pregnant Females
High or low glucose levels can be harmful to an embryo or fetus (developing baby still in the womb) or on a breastfeeding infant. Because of these risks, women cannot take part in this study if they are:

- Pregnant
- Trying to become pregnant
- Breastfeeding

Women who are able to become pregnant will have a pregnancy test performed from their urine sample at the screening visit.

If you are a menopausal woman and have not had a period for the past 12 months or more, you will not need to have a pregnancy test. Also, if you have had any well-documented method of surgical sterilization, you will not need to have a pregnancy test. The documented methods of surgical sterilization include having had a:

- Hysterectomy (removal of the uterus with or without the ovaries)
- Bilateral oophorectomy (removal of both ovaries)
- A tubal ligation (having your tubes tied)
- Transvaginal occlusion (plugging the opening of the tubes with a coil).

If you are a female who is sexually active and able to become pregnant, you must agree to use one of the birth control methods listed below. You must use birth control for at least 2 weeks prior to the start of the study, for the entire study, and for at least 2 weeks after your last dose of study drug.

- Acceptable birth control methods for use in this study are:

- Oral contraceptive pill (OCP)
- Intrauterine Device (IUD, hormonal or copper)
- Male condoms
- Female condoms
- Diaphragm or cervical cap with spermicide
- Cervical sponge with spermicide
- Contraceptive patch (such as OrthoEvra)
- Contraceptive implant (such as Implanon, Nexplanon)
- Vaginal ring (such as NuvaRing)
- Progestin shot (such as Depo-Provera)

Risk of Providing Sputum Sample
There is a very small risk of feeling light-headed from coughing to provide a sputum sample. Microbiome genetic information that results from this study does not have medical or treatment importance at this time, meaning that this information cannot be used for medical diagnosis or care.

Infectious Disease Transmission Risk
People with cystic fibrosis are frequently infected by bacteria and other infectious organisms, which can cause disease. Therefore, we will take steps to reduce the risk of transmission of any infectious organisms during the study. We will follow all standard Contact Precaution guidelines used at MGH. We will also try to avoid any contact between subjects with CF. All study visits can take place virtually using video calling as well.

Unknown Risks
There may be other risks and side effects that are not known at this time.

What are the possible benefits from being in this research study?

You may or may not benefit by taking part in this research. The bionic pancreas may help you maintain a lower blood glucose average with less hypoglycemia while in the study. The low glucose alarm and monitor contact for prolonged low glucose may reduce your risk of severe hypoglycemia during both the usual care and bionic pancreas periods.

Others with CFRD may benefit in the future from what we learn in this study.

What other treatments or procedures are available for your condition?

You do not have to take part in this research study to be treated for CFRD. You could continue to treat your diabetes as you usually do, per your doctor's recommendations.

Can you still get medical care within Partners if you don't take part in this research study, or if you stop taking part?

Yes. Your decision won't change the medical care you get within Partners now or in the future. There will be no penalty, and you won't lose any benefits you receive now or have a right to receive.

We will tell you if we learn new information that could make you change your mind about taking part in this research study.

What should you do if you want to stop taking part in the study?

If you take part in this research study, and want to drop out, you should tell us. We will make sure that you stop the study safely. We will also talk to you about follow-up care, if needed.

Also, it is possible that we will have to ask you to drop out of the study before you finish it. If this happens, we will tell you why. We will also help arrange other care for you, if needed.

Will you be paid to take part in this research study?

We will pay you $250 for completing the entire research study.

You will receive:

- $25 for the screening visit
- $75 for each study visit (visits 2, 5, and 8), for a total of $225

We may use your samples and information to develop a new product or medical test to be sold. The Sponsor, hospital, and researchers may benefit if this happens. There are no plans to pay you if your samples or information are used for this purpose.

What will you have to pay for if you take part in this research study?

Study funds will pay for certain study-related items and services, including screening procedures, study devices and BG testing supplies. We may bill your health insurer for, among other things, routine items and services you would have received even if you did not take part in the research. You will be responsible for payment of any deductibles and co-payments required by your insurer for this routine care or other billed care. If you have any questions about costs to you that may result from taking part in the research, please speak with the study doctors and study staff. If necessary, we will arrange for you to speak with someone in Patient Financial Services about these costs."

What happens if you are injured as a result of taking part in this research study?

We will offer you the care needed to treat any injury that directly results from taking part in this research study. We reserve the right to bill your insurance company or other third parties, if appropriate, for the care you get for the injury. We will try to have these costs paid for, but you may be responsible for some of them. For example, if the care is billed to your insurer, you will be responsible for payment of any deductibles and co-payments required by your insurer.

Injuries sometimes happen in research even when no one is at fault. There are no plans to pay you or give you other compensation for an injury, should one occur. However, you are not giving up any of your legal rights by signing this form.

If you think you have been injured or have experienced a medical problem as a result of taking part in this research study, tell the person in charge of this study as soon as possible. The researcher's name and phone number are listed in the beginning of this consent form.

If you take part in this research study, how will we protect your privacy?

Federal law requires Partners to protect the privacy of health information and related information that identifies you. We refer to this information as "identifiable information."

In this study, we may collect identifiable information about you from:

- Past, present, and future medical records
- Research procedures, including research office visits, tests, interviews, and questionnaires

Who may see, use, and share your identifiable information and why:

- Partners researchers and staff involved in this study
- The sponsor(s) of the study, and people or groups it hires to help perform this research or to audit the research
- Other researchers and medical centers that are part of this study
- The Partners ethics board or an ethics board outside Partners that oversees the research
- A group that oversees the data (study information) and safety of this study
- Non-research staff within Partners who need identifiable information to do their jobs, such as for treatment, payment (billing), or hospital operations (such as assessing the quality of care or research)
- People or groups that we hire to do certain work for us, such as data storage companies, accreditors, insurers, and lawyers
- Federal agencies (such as the U.S. Department of Health and Human Services (DHHS) and agencies within DHHS like the Food and Drug Administration, the National Institutes of Health, and the Office for Human Research Protections), state agencies, and foreign government bodies that oversee, evaluate, and audit research, which may include inspection of your records
- Public health and safety authorities, if we learn information that could mean harm to you or others (such as to make required reports about communicable diseases or about child or elder abuse)
- Other researchers within or outside Partners, for use in other research as allowed by law.

Certificate of Confidentiality

A federal Certificate of Confidentiality (Certificate) has been issued for this research to add special protection for information and specimens that may identify you. With a Certificate, unless you give permission (such as in this form) and except as described above, the researchers are not allowed to share your identifiable information or identifiable specimens, including for a court order or subpoena.

Certain information from the research will be put into your medical record and will not be covered by the Certificate. This includes records of medical tests or procedures done at the hospitals and clinics, and information that treating health care providers may need to care for you. Please ask your study doctor if you have any questions about what information will be included in your medical record. Other researchers receiving your identifiable information or specimens are expected to comply with the privacy protections of the Certificate. The Certificate does not stop you from voluntarily releasing information about yourself or your participation in this study.

Even with these measures to protect your privacy, once your identifiable information is shared outside Partners, we cannot control all the ways that others use or share it and cannot promise that it will remain completely private.

Because research is an ongoing process, we cannot give you an exact date when we will either destroy or stop using or sharing your identifiable information. Your permission to use and share your identifiable information does not expire.

The results of this research may be published in a medical book or journal, or used to teach others. However, your name or other identifiable information **will not** be used for these purposes without your specific permission.

Your Privacy Rights

You have the right **not** to sign this form that allows us to use and share your identifiable information for research; however, if you don't sign it, you can't take part in this research study.

You have the right to withdraw your permission for us to use or share your identifiable information for this research study. If you want to withdraw your permission, you must notify the person in charge of this research study in writing. Once permission is withdrawn, you cannot continue to take part in the study.

If you withdraw your permission, we will not be able to take back information that has already been used or shared with others, and such information may continue to be used for certain purposes, such as to comply with the law or maintain the reliability of the study.

You have the right to see and get a copy of your identifiable information that is used or shared for treatment or for payment. To ask for this information, please contact the person in charge of this research study. You may only get such information after the research is finished.

Informed Consent and Authorization

Statement of Person Giving Informed Consent and Authorization

- I have read this consent form.
- This research study has been explained to me, including risks and possible benefits (if any), other possible treatments or procedures, and other important things about the study.
- I have had the opportunity to ask questions.

- I understand the information given to me.

Signature of Subject:

I give my consent to take part in this research study and agree to allow my identifiable information to be used and shared as described above.

Subject	Date	Time

Signature of Parent(s)/Guardian for Child:

I give my consent for my child to take part in this research study and agree to allow his/her identifiable information to be used and shared as described above.

Parent(s)/Guardian for Child	Date	Time

Assent

Statement of Person Giving Assent

- This research study has been explained to me, including risks and possible benefits (if any), other possible treatments or procedures, and other important things about the study.
- I have had the opportunity to ask questions, and my questions have been answered.

Signature of Child:

I agree to take part in this research study and agree to allow my identifiable information to be used and shared as described above.

Child, Ages 14-17	Date	Time

Signature of Study Doctor or Person Obtaining Consent:

Statement of Study Doctor or Person Obtaining Consent

- I have explained the research to the study subject.
- I have answered all questions about this research study to the best of my ability.

Study Doctor or Person Obtaining Consent	Date	Time

Consent Form Version Date: 11/3/2022