IRB#2000035846

COMPOUND AUTHORIZATION AND CONSENT FOR PARTICIPATION IN A RESEARCH STUDY

YALE UNIVERSITY
YALE UNIVERSITY SCHOOL OF MEDICINE
YALE-NEW HAVEN HOSPITAL

Study Title: Informatics-Based Digital Application to Promote Safe Exercise in Middle-Aged Adults with Type 1 Diabetes or Other Absolute Insulin Deficiency Diabetes.
Principal Investigator (the person who is responsible for this research): Garrett Ash, PhD, Yale School of Medicine, Section of General Internal Medicine, PO Box 208025, New Haven, CT, 06520-8025
Phone Number: 203-444-3079
Funding Source: National Institutes of Health

Research Study Summary:

- We are asking you to join a research study.
- The first purpose of this research study is to develop a smartphone app that guides exercise for type 1 diabetes and other absolute insulin deficiency diabetes. The second purpose is to test the link among exercise, blood sugar, and feelings.
- The 9-week study includes the following procedures: (1) using a fitness wristwatch, continuous glucose monitor (CGM), fingerstick ketone and glucose meter, and insulin smartpen (or your own insulin pump) for 8 weeks; (2) using a second, blinded watch that you transfer between your hip during the day and wrist during the night for 4 weeks; (3) using the app for 4 weeks; (4) attending 9 weekly 1hr videocalls with surveys, interviews, and measurement of blood pressure; (5) completing 1min phone surveys 5 times per day for 2 weeks.
- You will make an account on the exercise app with your own contact details. For the other devices, you will use an anonymous account provided by the research team. If you already use any of the devices, you may keep using your own account.
- We will contact your primary diabetes care provider to inform them you are in the study, how to access your data, and that we will contact them if you have signs of diabetic ketoacidosis (DKA) or other health risks from exercise.
- These procedures will take a total of 27 hours.
- There are some risks from participating in this study. Physical activity can cause low or high blood sugar, muscle soreness, or injury. There is a chance that some people may find the survey questions a little upsetting. CGM and watches can rarely irritate some people's skin. Finally, we take multiple steps to protect your confidentiality, but no study can guarantee that your information will remain confidential.
- The study may or may not benefit you.
- The study is testing whether an app can help increase physical activity. This study will help to improve the app to benefit other people with type 1 diabetes or other absolute insulin deficiency diabetes in the future.
- There are other choices available to you outside of this research. For example, you can purchase other exercise apps, hire a personal trainer, or read about physical activity on the American Diabetes Association homepage.
- Taking part in this study is your choice. You can choose to take part, or you can choose not to take part in this study. You can also change your mind at any time. Whatever choice you make, you will not lose access to your medical care or give up any legal rights or benefits.

- If you are interested in learning more about the study, please continue reading, or have someone read to you, the rest of this document. Take as much time as you need before you make your decision. Ask the study staff questions about anything you do not understand. Once you understand the study, we will ask you if you wish to participate; if so, you will have to sign this form.

Why is this study being offered to me?
We are asking you to take part in a research study because you have type 1 diabetes, latent autoimmune diabetes of adulthood, or diabetes secondary to pancreatitis. We are looking for 24 people to be part of this research study.

Who is paying for the study?
The study is funded by the National Institutes of Health.

What is the study about?
The first purpose of this research study is to test a smartphone app that guides exercise based on blood sugar, insulin, heart rate, and sleep. It will not choose exercise for you, but it will provide you encouragement and information to help you choose your own exercise. It runs by analyzing data from devices you wear and surveys you receive, tracking your exercise, and identifying factors that predict when you exercise. The second purpose is to test the link among exercise, blood sugar, and feelings.

What are you asking me to do and how long will it take?
If you agree to take part in this study, this is what will happen over the next 9 weeks. All appointments occur remotely over Zoom

Week #1 Visit (today)
- Survey of basic medical and demographic information like age, race, ethnicity, type of diabetes, date of diabetes diagnosis, number of medical visits, latest A1c, height, weight. A1c reflects your average blood glucose over the past 3 months.
- We will access your medical record to verify this information. If you are not a Yale patient, you will send us a share code through Share Everywhere to give us one hour of access to collect the information.
- Check-in with study doctor.

Week #2 Visit
- Receive shipment of devices and learn to use any you are not familiar with. They include
    - Fitness wristwatch. It tells you how active you have been and how you have slept each day.
    - CGM. It is a piece of plastic about the size of a quarter attached to a tiny wire that you insert just under the skin. It measures sugar in the fluid under your skin then calculates your blood sugar. You will be trained on how to use it if you don't already use one. After the study the sensor portions will be expired, but you can keep the transmitter portion until the end of its 6-month lifespan then discard it.
    - Insulin smartpen (if you normally use an insulin pen instead of a pump). The smartpen works like a regular insulin pen except the doses are transmitted to an app using Bluetooth. You will continue using the type and dosing of insulin prescribed by your routine diabetes care provider.
    - Blinded watch. It looks just like a wristwatch but it is worn on a hip belt clip during the day and wristband while you sleep.

    - Blood pressure monitor
    - Smartphone (if you do not own one).
- Please contact the research team at 203-444-3079 if you encounter any difficulties or malfunctions with any of the devices
- Blood pressure with device we ship you.
- Check-in with study doctor.
- Survey about feelings. For example, rate on a scale of 1 to 5 how much you agree with statements like
    - In the past week, I have wanted/desired to expend some energy.
    - In the past week, I worried about feeling dizzy or passing out in public from low blood sugar.

Week #3 Visit

- Blood pressure with home devices we ship you.
- Check-in with study doctor.
- Survey about feelings

Week #4 Visit

- Remove blinded watch because it will be done measuring your baseline data.
- Download and orient to the smartphone exercise app which includes
    - Guidance to check and interpret your blood sugar level before each time you exercise.
    - A library with ~200 exercise videos
    - Supportive messages. For example: “Sometimes blood glucose can go up and down. You can still be active using the strategies you and your provider have discussed.”
    - Information about the relationship among your insulin, carbohydrates, exercise, sleep, and blood sugar.
    - A digital coach experienced in diabetes exercise who will introduce you to the app and add tips to the information.
- Blood pressure
- Check-in with study doctor
- Survey about feelings

Weeks #5-#7 Visits

- Blood pressure
- Check-in with study doctor
- Survey about feelings
- Interview about the exercise app (likes and dislikes)

Week #8 Visit

- Blood pressure
- Check-in with study doctor
- Survey about feelings
- Interview about the exercise app
- Uninstall the exercise app
- Start 5x/day 1min smartphone surveys about feelings. For example, rate on a scale of 1 to 5 how much you agree with statements like
    - Right now, I want/desire to be physically active
    - I am worried that I may have low blood sugar in the next 3 hours
- Restart blinded watch (hip during day, wrist during night) to measure your end-of-study physical activity and sleep

Week #9 Visit

- Blood pressure
- Check-in with study doctor

- Survey about feelings

Week #10 Visit

- Blood pressure
- Check-in with study doctor
- Survey and interview about feelings

We request consent to audio record the orientation at **visit #4** and interviews at **visits #5-8, #10** over Zoom so that your answers can be transcribed for better analysis. No other parts of the study will be audio recorded. The recordings will be converted to a written transcript as soon as a research team member is available to do so, and then the recording will be immediately destroyed. The transcript will be stripped of all information that could identify you such as your name and places you mention.

__Yes, I agree to have my interviews recorded

__No, I decline to have my interviews recorded

What are the risks and discomforts of participating?

If you decide to take part in this study, you may experience low or high blood sugar around physical activity. To decrease the chance of this, we ask that you follow your medical provider's instructions regarding checking blood sugar, blood ketones, and adjusting what you eat, what you drink, and how you take insulin. For instance, if blood glucose is less than 90 mg/dL, you can consume 10-20g of fast-acting carbohydrates (eg, 4 oz of orange juice or 3 glucose tablets) and wait to commence with exercise until blood glucose is confirmed to be above 90 mg/dL. If blood glucose is greater than 270 mg/dL and not associated with a recent meal, you must check your blood for ketones and avoid exercise if you have ketones ≥1.0 mmol/L. If at any point during or after exercise, you do not feel well and you have any signs or symptoms of low or high blood sugar, you should recheck your blood sugar and treat with fast-acting sugar like orange juice or glucose tabs if you are low. Common symptoms of low blood sugar are cold, clammy skin, pallor, difficulty concentrating, shakiness, lack of coordination, changes in behavior like irritability, a staggering gait, fatigue, nervousness, excessive hunger, headache, blurred vision and dizziness, and abdominal pain or nausea. Common symptoms of high blood sugar are dry mouth, headache, heaviness, pressure behind the eyes, or unusual increase in thirst. You should contact your medical provider for insulin dose adjustments if assistance is needed, using their 24-hour number you provided us during screening. Your medical provider has prescribed the type of insulin best for you. Any changes in insulin should be made only under medical supervision. There are also study doctors. One of them will review your CGM data every 2 weeks and notify you if there are any physical activity-related concerns. As well, if your data show any signs of diabetic ketoacidosis or other health risks resulting from exercise during the first 2 weeks, we will notify a study doctor and your medical provider by the next day. They must work out a preventive strategy with you before you can exercise again.

Please call 911 if you have any of the following

- Diabetic ketoacidosis (DKA) to the point that you cannot bring down your blood sugar, your breath smells fruity, you are vomiting and can't keep food or drinks down, or you're having trouble breathing
- Blood sugar low to the point you cannot fix it yourself
- Other acute medical emergency

You may experience muscle soreness or injury from physical activity. If you have a bone, joint, or soft tissue (muscle, ligament, or tendon) problem that has been or could be made worse by physical activity, please contact the study team immediately.

There is a low risk of heart injury from physical activity, experienced by about 3 in 100,000 people your age each year. We minimize this risk by a thorough screening and monitoring process. Additionally, please watch for the following symptoms during and after physical activity:

- Pain or discomfort in the chest, neck, jaw, or arms
- Shortness of breath beyond what is reasonable for the activity. Ask the study team if you are not sure what is reasonable.
- Dizziness, fainting, blackouts
- Ankle swelling
- Unpleasant awareness of a forceful, rapid or irregular heart rate
- Burning or cramping sensations in your lower legs when walking short distances

If you experience any of these symptoms, please contact the study team immediately.

There is a low risk that the skin where you insert the continuous glucose monitor will develop a local infection, itchiness, redness, mild bleeding, and/or bruising. The adhesive used to secure the monitor may also develop localized reactions. If you have not used the sensor previously, we will train you to use it, including cleaning the skin site prior to insertion.
There is also a low risk that the fitness wrist smartwatch will contribute to skin irritation or allergies. We will show you how to keep the device dry, not wear it too tight, and remove it for an hour every couple of days.

There is also the possible risk of loss of confidentiality. This risk is extremely rare when our standard steps to protect your confidentiality are taken, as described further down (“how will you keep my data safe and private”).

How will I know about new risks or important information about the study?
We will tell you if we learn any new information that could change your mind about taking part in this study.

How can the study possibly benefit me?
Physical activity may or may not help with controlling your blood sugar and preventing other conditions such as heart disease and high blood pressure. Thus, you may or may not benefit from taking part in this study.

How can the study possibly benefit other people?
The benefits to science and other people may include a better understanding of physical activity programs that benefit other people with type 1 diabetes and other absolute insulin deficiency diabetes.

Are there any costs to participation?
You will not have to pay for taking part in this study. The only costs may include your time to complete assessments, and the mobile application will consume your smartphone data just like any other mobile application.

In the event of lost or damaged items, you will not be responsible for the cost, and we will provide up to one replacement of some items (blood pressure monitor, CGM, insulin smartpen, ketone meter, blinded hip and wrist watch). We do not have replacement fitness smartwatches

or smartphones. But if you lose these items you can still do everything else in the study. For example, if you lose the smartwatch you can still use the exercise app with feedback missing the heart rate, steps, and sleep. Or if you lose the smartphone, you can still attend the weekly visits and complete the surveys and blood pressure readings.

Will I be paid for participation?

First, you will be paid for each weekly visit. These payments start at $5, increase by $3 for each week in a row that you complete, and returning to $5 if you miss a week. Second, you will be paid $1 for each day you wear the CGM, each day you wear the Fitbit, each day you complete the daily survey, each day you wear the blinded watch on your hip, and each night you wear it on your wrist. Third, you will be paid $100 if you complete 50%-79% of the 5x daily surveys, and $200 if you complete 80%-100% of them. This third payment is released once you mail back the study supplies using a prepaid label. Therefore, the total possible compensation is $577.

We will use a bank pre-paid debit card to provide the payment. We will have to share your name, address, and telephone number with the bank for ePayments. You will receive a card in the mail with the payment. You will need to activate the card over the phone.

You may be responsible for paying state, federal, or other taxes for the payments you receive for being in this study. Taxes are not withheld from your payments.

What are my choices if I decide not to take part in this study?

Instead of participating in this study, you have some other choices.
You could:

- Get physical activity support without being in a study. For example, you can purchase other exercise apps, hire a personal trainer, or read about physical activity on the American Diabetes Association homepage.
- Take part in another study.

How will you keep my data safe and private?

We will keep information we collect about you confidential. We will share it with others if you agree to it or when we have to do it because U.S. or State law requires it. For example, we will tell somebody if you we learn that you are hurting a child or an older person.

In the course of your participation in this study, a research record will be established for you. The research record includes all questionnaires, physical assessments, mobile application usage, blood sugar, insulin use, physical activity, GPS location, and interview recordings and transcriptions you will provide us to help us develop the intervention. This research record will be treated as confidential, and it will be kept in a locked cabinet. Some of it will be kept electronically on a secure computer server, protected by a password. Only Dr. Ash and members of the research team will have access to the cabinet key and/or the computer server password. If you use your own continuous glucose monitor, insulin smartpen, and/or fitness smartwatch then we will capture copy of the data from these device(s) for the research record, but the data will also remain on your device(s) and any software you normally use with them unless you choose to delete it after we capture a copy.

In order to strictly protect your confidentiality, your research record will be coded by number rather than your name. Your name will not be included in these data and questionnaires will be maintained according to your coded study number. No items in the research record require that you provide information (e.g., name, address) that would identify you, except GPS location. We will keep a master list that connects coded study numbers to participant names and contact

information. We will also keep a record that connects coded study numbers to participant GPS data. These are the only two documents that will link coded study numbers to information that would identify you, and they will be kept on a separate secure computer server from the research record, where it can be accessed by Dr. Ash and members of the research team. You may be contacted via email by study staff. At no time will any private health information about you be transmitted via email. The master lists with participant names, contact information, and GPS locations will be destroyed at the earliest possible opportunity upon completion of the study.

This research is covered by a Certificate of Confidentiality from the National Institutes of Health. The researchers with this Certificate may not disclose or use information, documents, or biospecimens that may identify you in any federal, state, or local civil, criminal, administrative, legislative, or other action, suit, or proceeding, or be used as evidence, for example, if there is a court subpoena, unless you have consented for this use. Information or documents protected by this Certificate cannot be disclosed to anyone else who is not connected with the research except, if there is a federal, state, or local law that requires disclosure (such as to report child abuse or communicable diseases but not for federal, state, or local civil, criminal, administrative, legislative, or other proceedings, see below); if you have consented to the disclosure, including for your medical treatment; or if it is used for other scientific research, as allowed by federal regulations protecting research subjects.

The Certificate cannot be used to refuse a request for information from personnel of the United States federal or state government agency sponsoring the project that is needed for auditing or program evaluation by the National Institutes of Health which is funding this project or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA). You should understand that a Certificate of Confidentiality does not prevent you from voluntarily releasing information about yourself or your involvement in this research. If you want your research information released to an insurer, medical care provider, or any other person not connected with the research, you must provide consent to allow the researchers to release it.

When we publish the results of the research or talk about it in conferences, we will not use your name. If we want to use your name, we would ask you for your permission.

We will also share information about you with other researchers for future research but we will not use your name, GPS location, or other identifiers. We will not ask you for any additional permission.

Representatives from the Yale Human Investigation Committee (the committee that reviews, approves, and monitors research on human subjects) may inspect study records during internal auditing procedures. However, these individuals are required to keep all information confidential.

What Information Will You Collect About Me in this Study?

The information we are asking to use and share is called “Protected Health Information.” It is protected by a federal law called the Privacy Rule of the Health Insurance Portability and Accountability Act (HIPAA). In general, we cannot use or share your health information for research without your permission. If you want, we can give you more information about the Privacy Rule. Also, if you have any questions about the Privacy Rule and your rights, you can speak to the Yale Privacy Officer at 203-432-5919.

The specific information about you and your health that we will collect, use, and share includes:

- Research study records
- Records about phone calls made as part of this research
- Records documenting that your study televideo visits occurred
- Information obtained during this research regarding
    - Surveys
    - Weight and blood pressure assessments
    - Mobile application usage
    - Blood sugar, insulin use, and movement recorded by the continuous glucose monitor, insulin smartpen, and activity watches respectively
    - GPS location
    - Interview recordings and transcriptions

How will you use and share my information?

We will use your information to conduct the study described in this consent form.
We may share your information with:

- The U.S. Department of Health and Human Services (DHHS) agencies
- Representatives from Yale University, the Yale Human Research Protection Program and the Institutional Review Board (the committee that reviews, approves, and monitors research on human participants), who are responsible for ensuring research compliance. These individuals are required to keep all information confidential.
- The U.S. Food and Drug Administration (FDA) This is done so that the FDA can review information about the device involved in this research. The information may also be used to meet the reporting requirements of regulatory agencies.
- Principal Investigator, Co-Investigators and other investigators
- Study Coordinator and Members of the Research Team

We will do our best to make sure your information stays private. But, if we share information with people who do not have to follow the Privacy Rule, your information will no longer be protected by the Privacy Rule. Let us know if you have questions about this. However, to better protect your health information, agreements are in place with these individuals that require that they keep your information confidential.

Why must I sign this document?

By signing this form, you will allow researchers to use and disclose your information described above for this research study. This is to ensure that the information related to this research is available to all parties who may need it for research purposes. You always have the right to review and copy your health information in your medical record.

What if I change my mind?

The authorization to use and disclose your health information collected during your participation in this study will never expire. However, you may withdraw or take away your permission at any time. You may withdraw your permission by telling the study staff or by writing to Garrett Ash, PhD, Yale School of Medicine, Section of General Internal Medicine, PO Box 208025, New Haven, CT, 06520-8025

If you withdraw your permission, you will not be able to stay in this study but the care you get from your doctor outside this study will not change. No new health information identifying you will be gathered after the date you withdraw. Information that has already been collected may still be used and given to others until the end of the research study to ensure the integrity of the study and/or study oversight.

Who will pay for treatment if I am injured or become ill due to participation in the study?
If you are injured while on study, seek treatment from your diabetes care provider or your regular doctor. In addition, contact Dr. Ash as soon as you are able at (203) 444-3079 to notify him of your injury. You and your insurance carrier will be expected to pay the costs of treatment. There are no plans to pay you for such things as lost wages, disability, or discomfort as part of this study. You do not give up any of your legal rights by signing this consent form.

What if I want to refuse or end participation before the study is over?
Taking part in this study is your choice. You can choose to take part, or you can choose not to take part in this study. You also can change your mind at any time. Whatever choice you make, you will not lose access to your medical care or give up any legal rights or benefits.

You would still be treated with standard therapy or, at your request, we can refer you to a clinic or doctor who can offer this treatment. Not participating or withdrawing later will not harm your relationship with your own doctors or with this institution.

To withdraw from the study, you can call a member of the research team at any time and tell them that you no longer want to take part.

The researchers may withdraw you from participating in the research if necessary. This could be because you have not followed our instructions or because the entire study has been stopped, or if we believe that it is not in your best interest.

If exercise makes your blood sugar low to the point that you need help from another person to fix it, and this happens more than one time, you will have to stop the study for your safety. If exercise gives you diabetic ketoacidosis (DKA) to the point that you cannot bring down your blood sugar, your breath smells fruity, you are vomiting and can't keep food or drinks down, you're having trouble breathing, or you have multiple other symptoms, you will have to go to the emergency room and stop the study for your safety. If you develop very high blood pressure (>145 mmHg top or >90 mmHg diastolic bottom number) confirmed on two different days, or develop another chronic disease or physical disability that prevents exercise with the app (e.g., heart attack), you will have to stop the study for your safety.

What will happen with my data if I stop participating?
If you withdraw from the study, you do not have the right to withdraw the research data obtained from you during your participation.

Who should I contact if I have questions?
Please feel free to ask about anything you don't understand.

If you have questions later or if you have a research-related problem, you can call the Principal Investigator Dr. Ash at (203) 444-3079.

If you have questions about your rights as a research participant, or you have complaints about this research, you call the Yale Institutional Review Boards at (203) 785-4688 or email hrpp@yale.edu.

Authorization and Permission

Your signature below indicates that you have read this consent document and that you agree to be in this study.

We will give you a copy of this form.

Participant Printed Name	Participant Signature	Date
Person Obtaining Consent Printed Name	Person Obtaining Consent Signature	Date