Subject Identification

Certificate of Confidentiality Template
Version Date: January 2019

Protocol Title: Comparison across multiple types of sleep deprivation

Principal Investigator: Elizabeth B. Klerman, M.D., Ph.D.

Site Principal Investigator:

Description of Subject Population: Research: Healthy volunteers (20-45 years old)

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.

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?

In this research study we want to learn more about how different sleep patterns affect your health, cognitive performance, mood, circadian rhythms, sleep, and related physiology and aviation safety, including how you feel and perform on tests and how chemicals in your body change when your sleep and wake timing is controlled in a laboratory.

This consent form is for the 10-day inpatient portion of this study. You have already signed a separate consent form for the screening procedures for this study.

How long will you take part in this research study?

If you decide to join this research study, we will ask you to live in our laboratory at Brigham and Women's Hospital for 10 days**.**

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

If you decide to join this research study, the following things will happen:

- We will ask you to live in our laboratory for 10 days in a room with no windows, clocks, phone, or internet. You will not be able to have outside visitors.
- We may test you for COVID-19.
- We will tell you when you can sleep and when you need to stay awake. You may get less sleep than you get at home.
- We will plan all your meals and serve them to you at times we decide.
- We will take blood samples multiple times through an IV that is inserted into your arm.
- We will record your sleep using electrodes attached to your scalp and chest.
- We may collect saliva, urine, and fecal samples from you. Up to two saliva samples will be collected for DNA and other genetic information.
- We will ask you to take multiple tests on the computer.
- You will not be able to leave your room unless you choose to end the study.

Why might you choose to take part in this study?

You will not benefit from taking part in this research study. Others who experience problems with sleep 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 bruising or pain from taking blood samples, sleep loss, and skin irritation from the electrodes. You may also find it inconvenient not to know the time of day or have outside visitors. You may feel frustrated with the computer tests.

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?"

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.

Elizabeth B. Klerman, M.D., Ph.D. is the person in charge of this research study. You can call her at 617-732-8145 M-F 9-5. You can also call Melissa A. St. Hilaire, Ph.D. at 978-828-0491 24/7 with questions about this research study.

If you have questions about the scheduling of appointments or study visits, call Abigail Benz at 617-732-4311.

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* (ClinicalTrials identification number: NCT04211506), 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?

We are doing this research to learn how different sleep patterns affect your health, cognitive performance, mood, circadian rhythms, sleep, and related physiology and aviation safety, including how you feel and perform on tests when your sleep and wake timing is controlled in a laboratory.

The Federal Aviation Administration is paying for this research to be done. They are interested in discovering biomarkers associated with neurobehavioral or cognitive impairment during sleep loss and mistimed sleep.

Who will take part in this research?

We are asking you to take part in this research study because you are a healthy volunteer between the ages of 20 and 45 years old. About 200 people will start screening for this study, and 80 people will complete all parts of the study, including the 10-day inpatient stay.

What will happen in this research study?

If you choose to take part in this study, we will ask you to sign this consent form before you come in for the 10-day inpatient study. You will come to the BWH and spend the next 10 days and nights in the BWH Center for Clinical Investigation (CCI) facility. You will need to stay in the CCI the entire time, unless you want to drop out of the study.

You can only come in for the 10-day inpatient study if you qualify based on all the screening procedures that you have completed.

Study Information Included in Your Medical Record

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).

Urine Tests

Before you begin the 10-day inpatient study, we will test your urine for pregnancy, if you are a woman able to become pregnant. Pregnant women cannot take part in this research study. We will also test your urine to check that you have continued to avoid caffeine, nicotine, alcohol, recreational drugs, supplements, and prescription and over the counter medications. We will collect small samples of blood or urine from you during the study to check that you are not still using these substances. We will not put the results of these tests in your medical records.
We will not pay you for taking part in the study if you test positive for any of these substances, and you will be disqualified from the study.

COVID-19 Test

You may be tested for COVID-19 at least once during your 10-day inpatient stay. If you test positive for COVID-19, you will need to leave the study. You will not be able to take public transportation or a rideshare service home if you test positive. Before you come to the lab, we will ask you to identify someone who can pick you up from the hospital in the event that you test positive for COVID.

Typical Day at the CCI

You will live in a special suite of rooms without windows and very controlled lighting. You will have no information about what time or day it is. There are no clocks in the room. You cannot bring anything with you that has a clock on it or could allow you to tell what time it is (such as a watch, cell phone, television, radio). You will be able to bring your own CDs, books, study material, and movies. During some parts of the inpatient study, you may notice that the lighting in the suite is dim, similar to the light in a poorly lit room.

Throughout the time in the CCI, you will be monitored by study staff on a closed circuit television. The study staff will be able to hear you through an audio/intercom system. We will watch and listen to you to make sure you are safe in the room. We will not make any video or audiotape recordings of you. There are no cameras in the bathroom.

During the time you are living in the CCI, we will schedule all your daily activities (eating, sleeping, etc.). We will also do some study procedures, like:

- Taking tests of learning, mood, and performance on the computer or on paper.

- Drawing blood samples through an IV catheter (a very thin plastic tube inserted into your vein) several times throughout the day. We may run a sterile salt solution with small amounts of a drug that prevents clotting (heparin) through the line between blood draws.
- We may take saliva samples by asking you to spit into a tube. Up to two saliva samples will be collected for DNA and other genetic information.
- We may collect all the urine that you produce and at times we may ask you to provide a urine sample.
- Monitoring and recording your brain waves (EEG), eye movement (EOG), muscle activity (EMG), and your heart rhythm (ECG) monitored when you are asleep. To prepare for the recordings, we will ask you to wash your face with special soap and then cleanse your skin with an alcohol swab. We will place small electrodes (wires with little pads attached) on the skin of your scalp, face, and chin. The electrodes will be held in place by a special glue.

All the data we collect from you will be assigned an alphanumeric study code. We will not put your name or any other information that could identify you on any data that is collected for research.

Sleep-wake schedule

During the study, you will be put on a sleep-wake schedule that may be different from the schedule you kept at home. During some parts of the study, you may have to stay awake for up to 72 hours. During some parts of the study you may get less sleep than you are used to, and this may happen over several days. We may be able to have someone in the room with you during these times to help you stay awake, if you request it or if we think it is necessary to help you remain awake. We may also give you additional brief tests on the computer during these times.

We cannot tell you the exact sleep schedule that you will be on, because your knowledge of how long you have been awake, how long you have slept or what time you went to sleep can affect the data we are collecting.

Activity Monitoring

We will keep track of your activity and light exposure patterns with an actigraph, like in the weeks before you entered this part of the study. We may ask you to wear more than one actigraph on the same arm. We also will give you a post-sleep questionnaire every time you wake up.

Study Diet

During the study, we will control your calories and fluids. You will fill out a form to tell us the foods that you like. We will ask you to eat all your food and drink all your liquids (beverages and water). You may get the same meal several times during the study.

Study Rules

- You are not allowed to have visitors, and you are not allowed to make or receive telephone calls.
- You will have access to our library of recorded movies, books, magazines and newspapers; however, current materials (e.g., newspapers) will be at least a few days old.
- You can receive and send paper mail.
- We will give you a telephone number through which you can be reached in an emergency. A member of the study staff will be available 24-hours per day, seven days per week at that phone number to help you respond to any emergency calls.
- During your scheduled sleep sessions you will need to stay in bed in the dark for the entire time. We will give you a bedpan or urinal during that time, if you need it.
- Exercise will be limited to light stretching only during your wake times.

Stopping the Study Early

The study doctor may take you out of the study without your permission. This may happen because:

- The study doctor thinks it is best for you
- You are not following the study rules
- We find a prohibited substance during a blood test
- We stop doing the study for other reasons

If this happens, the study doctor will explain why you need to stop taking part in the study.

You may also choose to leave the study at any time. However, if you tell us that you want to leave the study but then change your mind, you may no longer be eligible to participate in the study due to missing study procedures. If you decide to leave the study, we will stop all study procedures and arrange for you to leave the study safely.

Genetic Information

The saliva and blood samples that we take may be used to get genetic information and study your genes. This may include a whole genome analysis on your samples. Some samples (e.g., fecal)

may also be used to assess your microbiome – the genetic information of the microbes inside you. 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 or their products are looked at and used by researchers to study links to many diseases and conditions. We and the sponsor of this study plan to look at this genetic information in relationship to sleep, circadian rhythms, cognitive performance, mood, aviation safety and related physiology.

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 studies, including studies of genes and their products. As part of this study, your samples and data including your genetic information may be stored in one or more of these databases. These central banks may store your genetic information and samples and may 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 genetic 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.

Research using your samples, including your genes and their products, is important for the study of virtually all diseases and conditions. Therefore, the sample/data banks may provide study data for researchers working on any disease or condition.

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

Your samples and information will be used mainly to study the effects of sleep loss on health, cognitive performance, mood, circadian rhythms, sleep, and related physiology and aviation safety. Your samples and data, including genetic information, will be stored in databases and will be available to us, the study sponsor, and other researchers. As we learn more, there are new research questions and new types of research that may be done. It is not possible to list every research project. Also, we cannot predict all of the research questions that will be important over the next years. 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.

At the completion of this research study, we will store and may share your identifiable samples and health information with researchers at Partners and the sponsor of this study, the FAA, for other research. If we share your samples and/or health information with other researchers outside of Partners or the FAA, then 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 on a password protected computer that only study staff can access.

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.

If we find any abnormal medical results during the study, we will share this information with you, and ask you to see your doctor for follow up.

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

A BWH medical doctor for the Division of Sleep and Circadian Disorders or for the CCI will be available on-call to handle any medical emergency arising during this study.

Risks of Blood Draws and IV

- You may have a bruise or pain where we insert the IV and take the blood samples.
- There is also a small risk of infection, lightheadedness, blood clot, and fainting. Rarely, a small scar may remain permanently at the place where the needle enters your vein.
- Having the IV should not be painful. Occasionally, mild discomfort may occur from having the IV catheter in your vein. If this happens, we will either move it to a new location or remove the catheter entirely. You will have to give your permission before we move the catheter to a new location. To help keep the needle site clean, we may need to shave part of your forearm hair off.
- If we are not able to draw blood through the IV, then we may need to draw your blood through a needle stick (venipuncture).
- You may get a rash from the tape we use to attach the IV catheter to your arm.
- We will draw up to 2 cups of blood in many small collections over the course of this study. By comparison, the Red Cross allows a healthy adult to donate this amount of

blood over 10 minutes every 8 weeks. A healthy person will normally replace this amount of blood in that time period.

Risks of Heparin

The medicine that we may use to flush out the catheter and prevent clotting, Heparin, can cause bleeding and, as 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, tell the study staff right away.

Risk of Study Measurements (EEG, EMG, EOG, ECG)

The tape and special paste used to attach the electrodes may cause some minor discomfort and skin irritation. The glue used to hold electrodes to the scalp may leave some flaky patches for several days. We will move the electrodes if they irritate your skin.

Risks of COVID-19 Test

The test for COVID-19 may be uncomfortable. If you test positive, you will not be able to continue in the study. You will be referred to your primary care physician and will have to isolate at home.

Risks of Activity Monitors

There are no risks associated with the actigraph(s) that we may ask you to wear.

Risks of Study Sleep Schedule

- You will probably become sleepy during some parts of the study when you are asked to stay awake. This experience is similar to working a night shift or staying awake later than usual. There may be times during these parts of the study when you will be asked not to read or watch TV. During such times, we may ask you to chat with a study staff member.
- You may also experience headache, nausea, upset stomach and general irritability from not getting enough sleep.
- Should you feel that you cannot stay awake during one of these sessions, you are free to drop out of this study and then go to sleep. There are no known lasting bad effects from missing some nighttime sleep over 10 days.
- By the end of the study, you may find that you no longer go to sleep and wake up at the same time that you did before. It may take you several days to get back to normal. It may

feel like "jet lag." Jet lag affects people who travel rapidly across time zones. Commonly reported symptoms include upset stomach and digestive disorders (bowel problems), difficulty falling or staying asleep, irritability, or extreme daytime sleepiness. These symptoms may last for up to 1-2 weeks, although most people adjust after only a few days.

- If you are a woman who is taking birth control pills, you can continue to take them during the study. However, the study schedule may make the birth control pills not work for the rest of your monthly cycle following the end of the study. You should also use a barrier method of birth control (such as a condom or diaphragm) for the rest of the monthly cycle (until your next period) after you complete the study.

Risk of Weight Loss

You may lose weight over the course of this study. This happens to many subjects. It is typically due to a loss of body water as a result of differences in the salt content between the laboratory diet and your regular diet. However, it is also possible that you may experience a slight loss in actual body mass (muscle and/or fat) and in muscle tone. This is unlikely to happen over 10 days.

Risk of Genetic Information and Biological Samples

The main risk of allowing us to store and use your samples and genetic information for research is a potential loss of privacy. We will protect your privacy by labeling your samples and information only with a code, and keeping the key to the code in a password-protected database. Directly identifiable information will only be shared with the investigators of this study at Partners.

Genetic information that results from this study is not anticipated to have medical or treatment importance at this time. Regulations such as the Genetic Information Nondiscrimination Act (GINA) are designed to prevent insurance companies and/or employers to discriminate on the basis of your genetic information. If you do not share information about taking part in this study, you will reduce this risk.

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

You will not benefit from taking part in the study.

If we find any important medical information during your participation in this study, we will share it with you. If you do not have a physician, we will help you find one

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 a maximum of $4000 if you complete this study. This includes:

- Payment for all screening procedures you completed, as described in the screening consent form you already signed (up to $300, depending on how long you wear the actigraph and keep a consistent sleep-wake schedule).
- $300 per day for each day of the 10-day inpatient study that you complete. If you do not complete all 10 days, we will pay you for the parts you did complete.
- A $700 bonus if you complete all parts of the study.

You will be paid by check. It will take about 4-6 weeks from the time the study ends for you to receive your check.

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. 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 (optional)

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 (optional)

Consent Form Version Date: 06/03/2022

Partners HealthCare System
Research Consent Form

Subject Identification

Certificate of Confidentiality Template
Version Date: January 2019

Protocol Title: Comparison across multiple types of sleep deprivation

Principal Investigator: Elizabeth B. Klerman, M.D., Ph.D.

Site Principal Investigator:

Description of Subject Population: Screening: Healthy volunteers (20-45 years old)

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.

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?

In this research study we want to learn more about how different sleep patterns affect your health, cognitive performance, mood, circadian rhythms, sleep, and related physiology and aviation safety, including how you feel and perform on tests when your sleep and wake timing is controlled in a laboratory.

This consent form is for the screening part of this study only. You will sign a separate consent form if you qualify for the 10-day inpatient study.

How long will you take part in this research study?

If you decide to screen for this study, it will take you about 3-4 weeks to complete all screening procedures. During this time, we will ask you to make up to 4 study visits to our office at Brigham and Women's Hospital. We may also ask you to visit with our study psychologist, who is located in Brookline. We may also ask you to complete an at home sleep screen.

If you qualify for the study after we complete all our screening procedures, we will ask you to sign a separate consent form for the 10-day inpatient sleep study.

The overall study will last about 1 ½ months. The study begins when you sign this Screening Consent Form and start the screening procedures.

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

If you decide to screen for this study, the following things will happen:

- We will ask you to fill in several questionnaires on paper or the computer that ask about your personality, mental health, quality of life, and medical history.
- We will ask you to keep a consistent sleep-wake schedule for at least 3 weeks, which we will confirm by asking you to keep a sleep diary, wear one or more activity trackers, and call into our voicemail system.
- We will perform a physical exam, draw a blood sample and collect urine from you to check that you are healthy.
- We will ask you to stop using caffeine, nicotine, alcohol, recreational drugs, supplements, and prescription and over the counter medications once you start screening for the study. We will collect small samples of blood or urine to check that you are not still using these substances.
- We will ask you to meet with a study psychologist.

- We may ask you to have an at home overnight sleep screen, if we suspect that you may have a sleep disorder.
- We will ask you to keep a diet diary for at least one week prior to the inpatient stay.
- If you qualify for the study after all these screening procedures are complete, then we will ask you to meet with a study investigator to talk about the inpatient part of the study.

Text Messages

Text messages by mobile/cell phones are a common form of communication. If you agree, this research study may involve 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.

Below are some important points about texting in this research study.

- Text messages are not encrypted, and therefore carry security risks. This research study and Mass General Brigham are not 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 Mass General Brigham are not responsible for any increased charges, data usage against plan limits or changes to data fees from the research texts (Include language if participants are paid/given stipends to cover potential charges).
- Text messages received by Mass General Brigham study staff 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 stating "Stop Research Text."
- Your agreement applies to this research study only. Agreeing to other texts from Mass General Brigham, for example appointment reminders, is a separate process. Opting out of other texts from Mass General Brigham 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 initial: _____ I have had the chance to ask questions about texting with staff associated with this research study. I have been informed of the risks and other information covered above and consent to the use of unencrypted text communications associated with this research study.

_____ I do not want to receive text messages.

Why might you choose to take part in this study?

You will not benefit from taking part in these screening procedures. However, you will need to complete all screening procedures in order for us to determine whether you qualify for the rest of the study.

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

Taking part in the screening procedures for this study has some risks and requirements that you should consider carefully.

Important risks and possible discomforts to know about include bruising or pain where we insert the needle to draw blood and minor discomfort or skin irritation from the wires that are attached to your scalp and body during the overnight sleep screen. You may also be uncomfortable with some of the questions that we ask you on questionnaires or in your meeting with the study psychologist.

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?"

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.

Elizabeth B. Klerman, M.D., Ph.D. is the person in charge of this research study. You can call her at 617-732-8145 M-F 9-5. You can also call Melissa A. St. Hilaire, Ph.D. at 978-828-0491 24/7 with questions about this research study.

If you have questions about the scheduling of appointments or study visits, call Abigail Benz at 617-732-4311.
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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* (ClinicalTrials identification number: NCT04211506), 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?

We are doing this research to learn how different sleep patterns affect your health, including how you feel and perform on tests when your sleep and wake timing is controlled in a laboratory.

The Federal Aviation Administration is paying for this research to be done. They are interested in discovering biomarkers associated with neurobehavioral or cognitive impairment during sleep loss and mistimed sleep.

Who will take part in this research?

We are asking you to take part in this research study because you are a healthy volunteer between the ages of 20 and 45 years old. About 200 people will start screening for this study, and 80 people will complete all parts of the study, including the 10-day inpatient stay.

What will happen in this research study?

If you choose to take part in this study, we will ask you to sign this consent form before we do any study procedures. During the Screening Period, we will do some tests and procedures to see if you qualify to take part in this research study. The study doctor will review the results of these tests and procedures, and let you know if you qualify for the inpatient part of this study.

Study Information Included in Your Medical Record

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).

Screening Visit 1

This visit will take about 3-4 hours**.** At this visit, we will:

- Ask about your medical history
- Ask you to complete several questionnaires about your personality, mental health, and quality of life.

Sleep-Wake and Diet Logs, Phone Calls, and Sleep Schedule

After Screening Visit 1, we will ask you to keep a consistent sleep-wake schedule in which we expect you to be in bed and sleeping for 8-10 hours per night at the same time every night. We will ask you to keep a log of when you go to bed and when you wake up. You will also need to call into our voicemail system every time you go to sleep and every time you wake up.

We will also ask you to keep a log of when and what you ate and drank for at least one week prior to the inpatient stay.

Screening Visits 2-4

Your remaining screening visits will be scheduled once you start keeping a consistent sleep-wake schedule. At these visits, we may:

- Give you a physical examination
- Draw a blood sample
- Ask you for a urine sample for routine testing
- Test your urine for pregnancy, if you are a female able to become pregnant. Pregnant women cannot take part in this research study.
- Do an electrocardiogram (ECG), a painless test of the electrical activity of your heart. We will put sticky pads with wires attached on your chest, arms, and legs. The wires are connected to a machine that will measure your heart rhythm
- Ask you to have an interview with a psychologist.

- Ask you to meet with a study investigator to discuss the inpatient part of this study.

The physical exam, blood and urine tests, and ECG will take approximately 1 hour. The interview with the psychologist will take approximately 1 hour. The meeting with the study investigator will take approximately 1 hour. We may be able to schedule some of these visits on the same day.

Overnight Sleep Screen

During the screening period, we may ask you to complete an at home sleep study. Instructions for your home sleep study will be provided to you if this is needed.

Activity Monitoring

We will give you an actigraph. This is a small device that you wear on your wrist. It monitors your activity and the amount of light exposure you have. You will wear this for at least one week before the inpatient part of the study. You will wear this device in addition to completing the sleep-wake diary and voicemail call-ins. We may ask you to wear more than one actigraph on the same wrist.

Testing for Prohibited Substances

Once you start screening for this study, we will ask you to stop using caffeine, nicotine, alcohol, recreational drugs, supplements, and prescription and over the counter medications. We will collect small samples of blood or urine from you during the study to check that you are not still using these substances. We will not put the results of these tests in your medical records.
We will not pay you for taking part in the study if you test positive for any of these substances, and you will be disqualified from the study.

Genetic Information

If you participate in the 10-day inpatient study, we may be taking saliva and blood samples that will be used to get genetic information and study your genes. This may include a whole genome analysis on your samples. Some samples (e.g., fecal) may also be used to assess your microbiome – the genetic information of the microbes inside you. 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 or their products are looked at and used by researchers to study links to many diseases and conditions. We and the sponsor of this study plan to look at this genetic information in relationship to sleep, circadian rhythms, cognitive performance, mood, aviation safety and related physiology.

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 studies, including studies of genes and their products. As part of this study, your samples and data including your genetic information may be stored in one or more of these databases. These central banks may store your genetic information and samples and may 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 genetic 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.

Research using your samples, including your genes and their products, is important for the study of virtually all diseases and conditions. Therefore, the sample/data banks may provide study data for researchers working on any disease or condition.

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

Your samples and information will be used mainly to study the effects of sleep loss on health, cognitive performance, mood, circadian rhythms, sleep, and related physiology and aviation safety. Your samples and data, including genetic information, will be stored in databases and will be available to us, the study sponsor, and other researchers. As we learn more, there are new research questions and new types of research that may be done. It is not possible to list every research project. Also, we cannot predict all of the research questions that will be important over the next years. 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.

At the completion of this research study, we will store and may share your identifiable samples and health information with researchers at Partners and with the sponsor of this study, the FAA, for other research. If we share your samples and/or health information with other researchers outside of Partners or the FAA, 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 on a password protected computer that only study staff can access.

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.

If we find any abnormal medical results during the study, we will share this information with you, and ask you to see your doctor for follow up.

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

Risk of Blood Draws
You may have a bruise (a black and blue mark) or pain where we insert the needle and take the blood samples. There is also a small risk of infection, lightheadedness, and/or fainting.
We will draw a total of up to 2 cups of blood during the entire study, including both the screening period and inpatient study. In comparison, a standard blood donation is about 2 cups.

Risk of Sleep Test
The tape and special paste used to attach the electrodes to your skin during the sleep testing may cause some minor discomfort and skin irritation. The glue used to hold electrodes to the scalp may leave a flaky patch for several days.

Risks of Procedures, Questionnaires and Interview
The psychological questionnaires or the interview may include some questions that make you feel uncomfortable. We hope that you answer all of the questions, which will help us tell if you qualify for the study. You can skip over any questions you don't want to answer. You can also refuse to participate in any of the screening procedures. Please be aware that skipping some questions or procedures may prevent us from being able to decide that you can participate in the study.

Risk of Genetic Information and Biological Samples

If you qualify for the inpatient study, we will store and use your samples and genetic information for research. The main risk of this is a potential loss of privacy. We will protect your privacy by labeling your samples and information only with a code, and keeping the key to the code in a password-protected database. Directly identifiable information will only be shared with the investigators of this study at Partners.

Genetic information that results from this study is not anticipated to have medical or treatment importance at this time. Regulations such as the Genetic Information Nondiscrimination Act (GINA) are designed to prevent insurance companies and/or employers to discriminate on the basis of your genetic information. If you do not share information about taking part in this study, you will reduce this risk.

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

You are not expected to benefit from taking part in the screening procedures for this study.

If we find any important medical information during your participation in this study, we will share it with you. If you do not have a physician, we will help you find one.

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 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?

We will pay up to $300 to complete screening for this study. This includes:

- $25 if you complete the physical exam.
- $25 if you meet with the study psychologist.
- $25 for each week you keep a consistent sleep-wake schedule, calling us before and after you sleep, and writing in your sleep log each day. We expect this period to last for no longer than a maximum of 4 weeks. However, for scheduling reasons it may be necessary to continue the call-ins and sleep log for longer than 4 weeks before entering the inpatient study; if so, you will receive $25 for each additional week.
- $25 per week for each week you wear the actigraph device(s).
- $25 bonus for returning the actigraph(s) at the end of study.
- $25 if you are asked to complete a home sleep study.

We also will reimburse you for approved transportation, including parking.

You will be paid by check. It will take about 4-6 weeks from the time the study ends for you to receive your check.

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 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 (optional)

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 (optional)

Consent Form Version Date: 12/15/2022