

Mass General Brigham Biobank



**145,000
participants**



**1.3 million
stored samples**



**180,000
distributed
samples**



**500 studies
that received
samples or data**

2023 Update for the Mass General Brigham Biobank

The Mass General Brigham Biobank has grown to include 145,000 participants, including you! Thank you for your continued participation. The Biobank provides Mass General Brigham researchers with samples and information that help fuel their investigations of health and disease. Researchers use Biobank samples and information to study many diseases, such as cancer, diabetes, heart disease, brain aneurysms, and more.

One way that the Biobank collects information for research is through the use of surveys. The Biobank asks all participants to fill out a brief health information survey when they join the Biobank. The information in these surveys has contributed to research in many health areas, including sleep and Alzheimer's disease. In 2023, the Biobank is working on revamping this survey and will be asking all participants to fill out the new, updated version.

The Biobank will also be asking participants to fill out a new survey on social determinants of health (SDOH). SDOH are the conditions in which people are born, grow, live, work and age. They include aspects of everyday life, like neighborhood safety, experiences with discrimination, and experiences with isolation. SDOH have been shown to have a strong influence on health. This information will help researchers better understand the complex factors that contribute to health outcomes.

Over the next year, we hope to reach out to all Biobank participants via Patient Gateway or email to ask them to fill out these surveys.

Healthy Aging Translational Cohort

Alzheimer's disease is a brain disorder that slowly destroys memory and the ability to think. By 2050, approximately 13.8 million people in the U.S. are projected to have the disease, two thirds of whom will be women. Dr. Jill Goldstein, a clinical neuroscientist and professor of psychiatry and medicine who directs the Innovation Center on Sex Differences in Medicine at Massachusetts General Hospital, studies sex differences in the human brain and their implications for understanding various medical disorders, including Alzheimer's disease (AD).

She launched the Healthy Aging Translational Cohort (HATCH) in 2018 to create a clinical tool to predict who, in early midlife, is at highest risk for developing AD later in life, and how this may differ for women and men. HATCH consists of participants from the Mass General Brigham Biobank, some of whom are high risk for AD and others who are not. Participants undergo MRI scans at Massachusetts General Hospital and provide information about their clinical histories and a blood sample to assess immune, hormone, and other physiological factors.

The study then follows the participants for several years with both in-person and remote visits. Dr. Goldstein is inviting Biobank participants in part because there are banked samples and genomic data already available for those who are interested in participating. Over time, she hopes to create a large cohort of Biobank participants to study sex differences in other types of disorders of aging in order to develop sex-selective diagnostic tools and therapies for early intervention and prevention.

A Study of Severe COVID-19

COVID-19 is a disease caused by a virus that mostly affects the lungs. It started to spread in 2019 and has been a major health problem for the past four years. One thing we know about the virus is that it does not affect everyone in the same way. Some people do not have any symptoms when they test positive for COVID-19, while others must go to the hospital. Vaccines became widely available in 2021 and have helped stop the spread of this disease and reduce its symptoms. However, the vaccines have not helped everyone, and some people still have severe symptoms.

Dr. Jessica Lasky-Su and her team at Brigham and Women's Hospital wanted to find out why COVID-19 affects people in different ways. They started their research study in 2020 by collecting blood samples from the Mass General Brigham Biobank. They took blood samples that were collected before, during, and after Biobank participants had COVID-19. In these samples, they looked at small molecules that are related to COVID-19. They wanted to see if these molecules were different in people who did not have COVID-19 compared to those who did. This could help them figure out if specific molecules, or changes in molecules, might make people more likely to have severe COVID-19 symptoms.

Dr. Lasky-Su and her team learned about the severity of COVID-19 by studying these molecules. A few things they expected to be true were confirmed by their research. For example, people who are overweight or have diabetes are more likely to have severe COVID-19 symptoms. However, they also discovered some surprising results. They found out that an increase in certain proteins or carbohydrates can make COVID-19 symptoms worse. They also learned that toxic chemicals could make COVID-19 symptoms worse, too.

The work of Dr. Lasky-Su could help us understand how to prevent severe COVID-19 and how we can help those affected more seriously by COVID-19 symptoms. Research on COVID-19 is also a great way to learn about how other viruses work. Dr. Lasky-Su has been using Biobank samples in her research since 2017, looking at these small molecules and how they can influence various diseases.

Study Highlights

Environmental Toxins and Liver Health

Dr. Xuehong Zhang is a cancer researcher at Brigham and Women's Hospital who is studying the relationship between environmental toxins and liver cancer risk. His research compares the samples of people with liver disease and the samples of healthy individuals to test the hypothesis that higher exposure to PFAS, which is a toxin detected in most people's blood, is associated with developing liver cancer. Dr. Zhang hopes to advance our current understanding of liver cancer prevention and limit the production and consumption of products with PFAS.

The Genetics of Idiopathic Infertility

Dr. Stephanie Seminara, an endocrinologist at Massachusetts General Hospital, and her team are studying whether there is a genetic basis to unexplained infertility (sometimes called idiopathic infertility), which affects up to 30% of infertile couples. Biobank samples and surveys play an important role in this study by allowing the team to identify relevant samples for analysis. Once completed, this research will improve the understanding of the genetic features of idiopathic infertility and aid the development of better diagnostic and treatment approaches for infertility, contraception, and other aspects of reproductive health.

A Prospective Registry of Patients with Calcium Pyrophosphate Crystal Deposition (CPPD) Disease

Calcium pyrophosphate crystal deposition (CPPD) disease (also known as pseudogout) is a form of arthritis that causes joint pain, stiffness, tenderness, redness, warmth and swelling most often in the knees and wrists. CPPD affects both men and women and it becomes more common as people age. Dr. Sara Tedeschi and her team at Brigham and Women's Hospital want to learn more about the ways CPPD affects people and how it changes over time. Previously collected samples from about 100 Biobank participants with CPPD and about 100 Biobank participants without CPPD are being used to test for differences in inflammation and bone turnover markers in the blood. Dr. Tedeschi and her team are interested in learning more about symptoms, treatments, imaging findings, and biomarkers in blood and/or joint fluid. Critical biomarkers may help find and improve treatments.