



Mayo Mammography Health Study (MMHS) Update

April 2018

With Much Thanks

The Mayo Mammography Health Study, or MMHS, enrolled approximately 20,000 women having a screening mammogram between 2003 and 2006 at the Mayo Clinic campus in Rochester, Minnesota. As a member of this study, you helped us to better understand many risk factors for breast cancer. The study's primary goal was to understand how breast density assessed on the mammogram influences breast cancer. We also planned to identify markers in the blood that increase a woman's breast cancer risk. In this study update, we describe the major findings from 10 years of study and provide some additional information for you about current breast screening practices. Most importantly, we want to take this time to thank you for your participation, which allows us to perform these studies. Like many of you, I have daughters and other family members who will hopefully benefit from this information.



*Celine Vachon, Ph.D.
Principal Investigator*

Study Findings

Several studies have been performed on the MMHS cohort over the past years. Findings include:

- We confirmed breast density as a strong risk factor for breast cancer. Importantly, we found breast density is a risk factor for all kinds of breast cancer, including cancers with positive and negative estrogen receptors, and cancers that are aggressive at diagnosis.
- We found that breast density can mask cancers at time of mammogram, resulting in increased interval cancers (those diagnosed between mammograms).
- We learned that, in most women, breast density decreases when women take tamoxifen, and possibly, aromatase inhibitors for prevention or treatment of cancer. However, this does not happen in all women. Breast density may be a marker of treatment efficacy (how well a treatment works).
- We also found that common genetic markers are independent risk factors for breast cancer. Breast density and common genetic markers both provide independent information for future breast cancer risk.
- We showed that current breast cancer risk models can be improved by including measures of breast density and common genetic markers.
- We also showed that having dense breasts may be associated with high-risk benign changes in the breast tissue.

Current Projects within MMHS

- We are currently working with a larger team of studies to develop new breast cancer risk models that can be used in the clinic. To do this, we need updated information on all of our MMHS members. You may be contacted by one of the MMHS study team for these updates.
 - This update may include asking you questions about any new cancers or prior breast biopsies.
- We are examining how changes in weight over time can influence breast density, and together, how these changes may be associated with breast cancer risk.

Related Studies

Mayo Clinic is participating in the STRIVE Study to gather clinical information, and blood samples from up to 120,000 women undergoing screening mammography that will help to support development of a new blood test for detecting breast cancer early. The test, being developed by GRAIL, Inc. will use advanced technology to look for small pieces of genetic material released into the blood by tumors. You may be asked to participate around the time of your breast screening appointment.

Recommendations for women with dense breasts

Dense breasts on mammography are a fairly common finding and reported in more than 40% of women who have a mammogram. Many states now notify women who have dense breasts. Having dense tissue on a mammogram may make it more difficult to identify breast cancer on a mammogram as both dense tissue and cancer appear white. Also, our studies and others have shown that dense breasts on mammograms are associated with an increased risk of developing breast cancer in the future. If you have dense breasts on mammogram, here are some things you can do:

- Discuss with your treating provider to decide which type of screening is best for you. Based on your individual risk factors and your breast exam, supplemental breast imaging tests may be suggested (See information on MBI below).
- Follow healthy lifestyle measures such as low-fat diet, regular exercise, maintaining a healthy weight, and limiting alcohol intake, as these measures can help lower breast cancer risk.
- If you notice a breast lump and your mammogram is reported as normal, you will still need to seek medical attention for further testing.

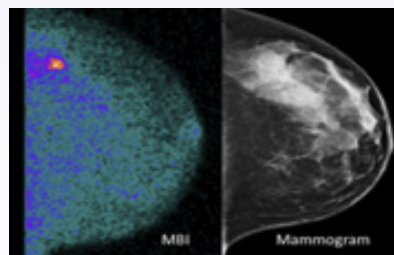
What is 3D mammography or tomosynthesis, and how is it different from 2D mammography?

3D mammography, also called tomosynthesis or digital breast tomosynthesis (DBT), addresses some of the limitations of conventional 2D mammography by taking multiple, thin-sliced images of the breast. This screening method reduces the effect of superimposed structures that lead to both false positive and false negative results at breast cancer screening. This means that with 3D mammography, more cancers will be detected and fewer women will be called back unnecessarily for additional testing.

If you have a 3D mammogram, you may notice that the x-ray tube moves in an arc above the breast rather than remaining stationary as it does for a 2D mammogram. This allows the machine to take multiple pictures from different angles. A computer processes these pictures and reformats them into the “3D” examination. The positioning for a 3D mammogram is the same as a 2D mammogram, but it takes a few seconds longer to acquire all of the pictures.

Molecular Breast Imaging: a novel imaging method for women with dense breasts

A novel breast imaging method that has been developed by Mayo researchers for use in women with dense breasts is molecular breast imaging, or MBI. MBI is a fundamentally different approach to breast imaging that can detect differences in biochemical behavior of breast tissues rather than just their anatomical appearance, as pictured on the mammogram (See figure below). Because of this difference, MBI has been found to be a particularly useful test for finding breast cancer in women with dense breasts. An MBI exam involves injection of a small amount of a radiotracer, technetium-99m sestamibi, which has been safely used in medicine for decades, primarily in cardiac imaging. MBI is now FDA-approved and available as a clinical test at Mayo Clinic in Rochester, Arizona, Florida, and Mayo Clinic Health System in La Crosse, WI.



Picture of MBI (left) and mammogram (right) from the same patient. Due to the large area of dense tissue in the breast, which appears white on the mammogram, the tumor was difficult to identify on the mammogram but seen on MBI.



Keep us informed!

We would appreciate hearing of any changes that may have occurred in your life. Changes we are interested in include:

- Change of address or phone number
- New development of cancer or relapse in existing cancer

If you have any changes to report, or have any questions about the study, please contact us using one of the methods below.

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