

Researchers develop automated breast density test linked to cancer risk

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Researchers at Moffitt Cancer Center and colleagues at the Mayo Clinic in Rochester, Minn., have developed a novel computer algorithm to easily quantify a major risk factor for breast cancer based on analysis of a screening mammogram. Increased levels of mammographic breast density have been shown in multiple studies to be correlated with elevated risk of breast cancer, but the approach to quantifying it has been limited to the laboratory setting where measurement requires highly skilled technicians. This new discovery opens the door for translation to the clinic where it can be used to identify high-risk women for tailored treatment.

"We recently developed an automated method to estimate mammographic breast density that assesses the variation in grayscale values in mammograms," explained study lead author J. Heine, Ph.D., associate member of the Cancer Epidemiology Program and [Cancer Imaging](#) and Metabolism Department at Moffitt.

According to the authors, mammographic breast density, or the proportion of fibroglandular tissue pictured on the mammogram, is an established risk factor for [breast cancer](#). Women with high mammographic breast density have a greater risk of developing breast cancer. However, mammographic breast density has not been used in clinical settings for risk assessments due in large part to the lack of an automated and standardized measurement.

Using their new method, the researchers compared the accuracy and

reliability of their measurements of variation in breast density with the performance of tests that use the degree of dense breast tissue in a mammogram to assess [breast cancer risk](#). A study describing their novel method and its utility was published in a recent issue of the *Journal of the [National Cancer Institute](#)*.

According to Heine, they found that the variation measure was a "viable, automated [mammographic density](#) measure that is consistent across film and digital imaging platforms" and "may be useful in the clinical setting for risk assessment."

In addition, they found that the association between variation and the risk of breast cancer was strong for mammograms carried out four years prior to diagnosis. The automated method also made clearer distinctions between breast cancer case subjects and controls who did not have breast cancer.

While many clinicians use the risk predictive value of percent of breast density seen on the mammogram as the amount or proportion of bright tissue in an image, Heine and his co-authors found the variation of dense tissue is also relevant to breast cancer, suggesting a relationship between percent of breast density and variation in breast density.

"The strengths of this study include the evaluation and validation of a novel breast density measure across three well-designed epidemiological studies," said study co-author Thomas A. Sellers, Ph.D., M.P.H., center director of Moffitt. "Because we were able to compare this novel [breast density](#) measure with an established percent density measure that was available four years before diagnosis, we were allowed to show that variation was present for at least four years, and in some cases, more than eight years. Offering clinicians and patients the advantage of more timely, reliable and accurate risk could open the door for interventions to lower risk and, hopefully, prevent the disease from occurring."

The researchers concluded that the simplicity of the measure, and the ability to standardize and automate the measure across sites, could hold promise for clinicians and their patients if the measurements were incorporated into clinical risk assessment practices.

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