

Breast cancer risk level assessed by age, genetics, estrogen exposure

October 7 2010, By Melissa Healy

Assessing a woman's odds of getting breast cancer is a tricky, imprecise and evolving business. Yet for all its imperfection, it is Step 1 in any decision a woman makes about prevention measures.

Three factors overwhelmingly influence a woman's risk of developing a solid tumor that invades her [breast tissue](#) and threatens to spread, says UCLA oncologist Patricia Ganz: her age, [genetic makeup](#) and lifetime exposure to estrogen.

Age is straightforward enough -- as it advances, a woman becomes more likely to develop breast cancer. Research suggests that breast cancer is largely a disease of aging. If something else doesn't kill women first, common precancerous changes in the breast will progress down the path of uncontrolled growth and invade healthy breast tissue.

The contribution of genes to a woman's breast cancer vulnerability is more complex. But physicians can look to DNA to identify women whose risk is extreme enough to justify radical preventive measures.

Finally, estrogen plays a pivotal role in breast cancer risk. It is made by the ovaries and several other organs in the body. Exposure is heavily influenced by inheritance: Her mother's genes are key in determining when a woman begins to menstruate and when she enters menopause, which dictates how long she is exposed to [estrogen](#) of her own making. But that exposure can be dialed up or down by various factors, such as food, drink and medication.

Physicians use the Breast Cancer Risk Assessment Tool -- better known as the Gail Model -- to tote up these factors and gauge a woman's personal breast cancer risk.

Published in 1989 and named after Dr. Mitchell Gail of the National Cancer Institute's Cancer Epidemiology and Genetics Division, the model considers:

A woman's age, the age at which she began menstruating and, if applicable, the age at which she completed the transition to menopause.

Whether she has children and the age at which her first child was born.

Any family history of breast or ovarian cancer.

Any personal history of breast changes that are frequently precancerous, such as ductal carcinoma in situ, lobular carcinoma in situ or atypical hyperplasia.

Answers to these questions are used to calculate her risk of developing breast cancer in the next four to five years. "Normal risk" measured by the model moves upward as a woman ages. But unless a woman is at least 60, her five-year risk should fall below 1.67 percent. A 40-year-old with that number is at "very high" risk, and a 50-year-old is at "high" risk.

The more elevated her risk score, the more serious the measures a woman might consider to reduce her odds of breast cancer. A slightly elevated score might justify more frequent breast checks by a clinician. Women with particular variants of the BRCA1 and BRCA2 genes that are known to boost cancer risk are increasingly having their ovaries and often their breasts removed as a preventive measure. And for women in between, options include lifestyle changes and medications.

The Gail Model has been found accurate for white women and has been updated -- most recently in 2007 -- to better reflect risk for African American women. But in Latinas and Asians, its precision has not been widely tested.

Researchers continue to look for ways they can improve estimates of [breast cancer risk](#) and make them easier to understand and communicate. One alternative risk calculator, called Wisdom, considers [breast cancer](#) risk in the broader context of how a woman manages her health as she enters menopause.

The Gail Model is rough and inflexible because it relies on broad population studies, not the fine details of a woman's life, says Dr. Nancy Davidson, director of the University of Pittsburgh's Cancer Center. "But it's the best one we have for the vast majority of women, and it's the only one that's linked to something we can do."

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