Comparison of available breast cancer risk assessment tools shows room for improvement

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All the breast cancer risk assessment tools now available have serious limitations when it comes to discriminating between individuals who will and will not develop breast cancer, according to an article published online April 28 in the *Journal of the National Cancer Institute.*

Assessing a woman's risk of breast cancer is an essential first step in deciding on prevention strategies, which can range from lifestyle changes to removal of a breast. A number of risk assessment tools, or models, are now available. Those that estimate population risk are sufficient for policymakers and insurers, say the authors of this review, led by Eitan Amir, M.B. Ch.B., of Princess Margaret Hospital in Toronto.

"However, for clinicians, it is imperative that a risk assessment tool has a good ability to assess individual risks so that appropriate preventative treatment can be individually tailored," they write.

To provide practicing physicians with an overview of available tools, the authors reviewed the features of six risk assessment models. These include the well-established Gail model, which is based on six risk factors such as age, family history, and age at menopause. The Claus model, also widely used, places a strong emphasis on family history. The BRCAPRO, Jonke, IBIS, and BOADICEA models aim primarily to assess the likelihood of carrying a BRCA gene mutation that predisposes

a woman to breast cancer.

All of these models have major limitations, say the authors. Most important is their reliance on known risk factors. Studies have shown that up to 60% of breast cancers arise in the absence of any known risk factors. Also, except for the Gail model, none of the models has been extensively validated, and most do not include nonhereditary factors. The Gail model has limited ability to discriminate between individuals at risk, especially those in higher-risk groups, according to the authors.

Future improvements in risk models may take several directions. Studies are looking at additional risk factors, particularly breast density, weight gain, and hormone levels. The authors predict that genome-based research is also likely to yield new risk prediction methods.

To date, however, no existing model is "totally able to discriminate between families that do and do not have mutations or between women who will and will not develop breast cancer," they write. "Steady and incremental improvement in the models are being made, but these changes require revalidation."

In an accompanying editorial, Mitchell Gail, M.D., Ph.D., and Phuong Mai, M.D., of the National Cancer Institute, say that the review offers a useful and informative summary of the various models. They caution, however, that the various models differ in important details and that physicians need to be cognizant of these differences. They conclude that continuing efforts are needed to improve and assess risk models so that they can play a useful role, in concert with preventive interventions, in reducing the burden of breast cancer.

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