

Updating the Gail model for Predicting Absolute Risk of Breast Cancer

Jinbo Chen and Mitchell H. Gail

Biostatistics Branch, Division of Cancer Epidemiology and Genetics, NCI

The Gail model (Gail et al., 1989) for predicting individualized breast cancer risk, as modified for the Breast Cancer Prevention Trial (Costantino et al., 1999), has been widely used for counseling women and designing clinical studies. This model has been found to predict satisfactorily at the group level but only modestly well at the individual level (Costantino et al., 1999; Rockhill et al., 2001). Recent research has shown that the percentage dense area on a mammographic image (mammographic density) is strongly associated with breast cancer risk (e.g., Byrne et al, 1995). Since high mammographic density is fairly prevalent in the female population and, thus, may convey high attributable risk, we proposed to study whether the model discriminatory accuracy can be improved by adding density into the model. Toward this goal, we developed a new relative risk model of breast cancer using data from the Breast Cancer Detection and Demonstration Project (BCDDP), and the new absolute risk predictions were calculated accordingly. The updated and original models were compared via ROC curves regarding their discriminatory accuracy.