# 'Statistical Blitz' Tackles Mammography Issue

Kathy Cronin and Eric J. Feuer, National Cancer Institute

"Statistical Blitz" and "Unprecedented Statistical Attack" were terms used in the media to portray an effort by seven research groups comprised of 42 statisticians to determine if the introduction of mammography has anything to do with the *24%* decline in breast cancer mortality that has occurred since 1990. The results, titled "Effect of Screening and Adjuvant Therapy on Mortality from Breast Cancer," were published in the Oct. 27 issuc of The ***New England Journal of Medicine*** and reported on the front page of The New ***York Times***

The effort was undertaken by a consortium, called Cancer Intervention and Modeling Network (CISNET), which is funded by the National Cancer Institute. It represents a relatively rare occurrence when statisticians take the lead role in an artide for a major medical journal and get large headlines in papers across the nation. The approach used population data to describe the dissemination and usage patterns of mammography and adjuvant therapy that occurred throughout time in the United States. The usage patterns were then coupled with seven independent modelers' synrhesis of all available information on the benefits of these advances. Seven modelers plying their trades independently to the same problem and publishing their results simultaneously is unique, and it is imporcant for understanding and quantifying the uncertainty associated with this type of modeling effort.

'The authors make the case that each factor accounts for half of the historic 24% decrease in mortality actually observed between 1770 and 2000. The displayed graphic demonstrates the variabiliry between the modeled results and suggests one way to combinc them. hide from its importance in addressing a substantive issue, the article provides an informative case study for understanding the modeling process itself.

While statisticians, like everyone else, like to get publicity for thcir work in high-profile places, the national media coverage this article received made it necessary to simplify the message to its essence. 'There is not a lot of space for all of the qualifying conditions carefulstatisticians like ro put on thcir results.

"The first question reporters asked is why these results are important to the average American woman, and exactly how marly

Figure 1a

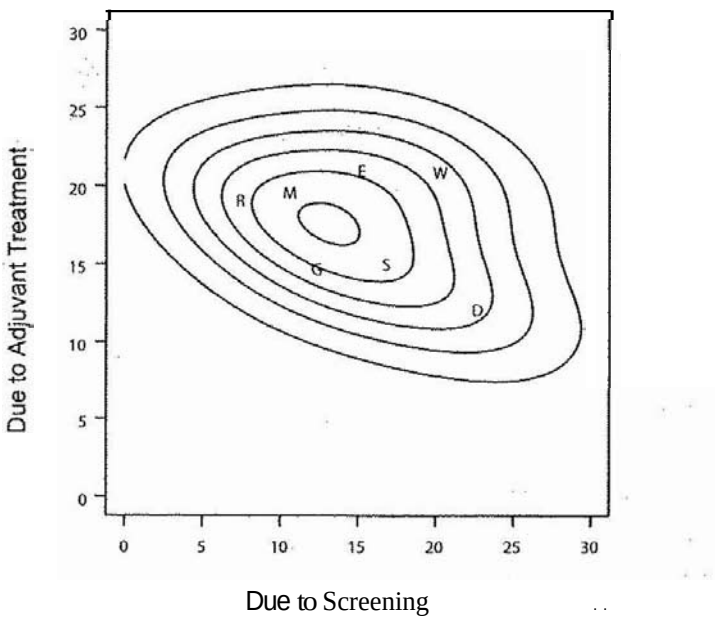


Figure 1b

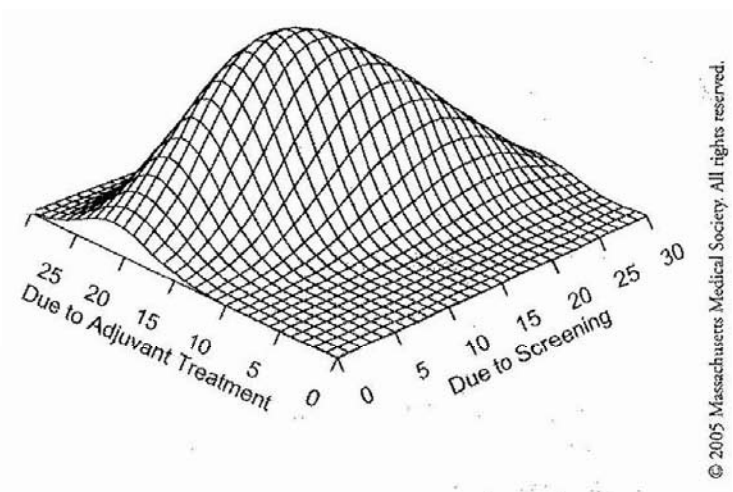




Figure 1a. Estimated joint distribution of percent reduction in breast cancer morlality for U.S. worrlen aged *30-79* due to adjuvant treatment, Comparisons are made to morta!ny in year *2000* in the absence of both screening and treatment. Figure 1a shows the estimates from the individual modelr in the tiible. She distribution contours for the combined rnodel results are derived by kernel density estimation: each contour shows the focus of points having constant density. Each model's point estimate is assumed to be at the mean of its own bivariate normal density having covariance structure estimated from that of the seven model estimates. These seven densities were then averaged with equal weights to obtain estimated posterior joint distribution. The "hill" in Figure 1b is a three-dimensional rendering of the contour plot.