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Gambling on breast scans

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A mathematical tool known as a Monte Carlo analysis could help improve the way X-rays are used for mammography and reduce the number of breast cancers missed by the technique as well as avoiding false positives, according to research published this month in the *International Journal of Low Radiation*.

Worldwide, breast cancer represents one in ten of all cancers among women, with the exception of skin cancer, making it the most common form of non-skin cancer. It is the fifth most common cause of cancer death accounting for more than half a million deaths worldwide. The main established strategies for breast cancer control are based on primary prevention along with early diagnosis and so breast imaging, mammography, plays an important role in screening and diagnosis.

Mauro Valente of the University of Cordoba, in Argentina, and colleagues German Tirao and Clara Quintana there and at the CONICET research center in Buenos Aires, have tested the different configurations used by radiographers to carry out X-ray mammography and analyzed the results statistically using the Monte Carlo technique. This approach uses repeated random sampling of the data to calculate the most likely results from a given set of parameters. By finding which parameters improve X-ray image quality and which reduce it, the team was able to find the optimal set-up for obtaining the best image with minimal radiation dose to the patient.

The team points out that factors such as the material used for the positive electrode, the anode, in the X-ray machine, are beyond the control of the radiographer. However, the accelerating voltage applied during mammography significantly affects image quality. The team points out that the algorithm they have developed from their Monte Carlo calculations might also be used to carry out reliable and consistent detection of cancerous tissue in the breast automatically.

More information: "Mammography image quality optimisation: a Monte Carlo study" in Int. J. Low Radiation, 2010, 7, 276-297

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