

## The Canadian Screening Program: A Different Perspective

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Despite the marked increase in mammographic screening to detect clinically occult, earlier-stage breast cancers, controversies remain concerning the efficacy of screening [1]. The questions center on who should be screened, at what age screening should begin, what is the appropriate interval between screenings, and what is the relative contribution of physical examination vs mammography. It had been hoped that the Canadian screening trial would settle many of these issues. The results of the audit, summarized in the preceding article [2], unfortunately raise significant questions concerning the quality of the mammography in the Canadian trial and place the validity of the ultimate conclusions from that trial in doubt. The structure of the presentation of the data is used to show that the quality of mammography improved over time. As one of the independent reviewers, I can attest that this was indeed the case. What is not as obvious, but nevertheless is evident in the tabular summaries, is the discouraging fact that almost 50% of the mammograms obtained during the first 2 years of screening were judged to be *unsatisfactory*, and it is not until the final 2 years that satisfactory image quality was achieved in over 70% of the screenings. The paper suggests that the initial low scores were primarily due to the failure to use the then "new" mediolateral oblique projection [3]. Two of the reviewers, in fact, felt that it was the sharpness, contrast, and overall quality of the mammograms that was judged to be poor.

The results of this audit do show that in a study of this magnitude the quality of the test being evaluated should be assured from the outset. The Canadian sites were not required to have "state-of-the-art" equipment, and there was little or no training for the radiologists or technologists. As stated in the article, second-hand, suboptimal units were

permitted in several sites. The argument was made that this reflected the conditions in Canada and the United States at the time. This was an unfortunate decision. The issue that needs resolution is not whether poor quality mammography is useful, but rather whether appropriate equipment and skilled screeners can have an impact on breast cancer mortality.

The paper expresses satisfaction in the fact that external advisors were asked to objectively evaluate the program, and it is to the credit of the program organizers that they permitted outside monitoring of the trial. What has not been revealed, however, is that at least two of these advisors, recruited during the early years of the trial, resigned because one was not even permitted to view the images, and the other's recommendation to improve image quality was not heeded earlier (W. Logan and S. Feig, personal communication).

Unfortunately enormous amounts of time, effort, and expense have gone into the Canadian trial. The fact is that because of poor mammography the results of this trial will always be suspect. Any data from this trial must be carefully considered in the light of this audit, because the power of the study may be sufficiently compromised to be insufficient to provide reliable results. When the data are published, we must all look carefully at the size of the invasive tumors diagnosed in both study and control groups, their histologic grade, nodal status, and overall stage. Early mortality effects will be influenced by the percentage, number, size, and overall stage [4] of the invasive cancers detected by screening compared with controls. The percentage missed by screening, as expressed as interval cancers, will give additional information on the sensitivity of the threshold for detecting small cancers with the poor quality mammography available.

This article is a commentary on the preceding article by Baines et al.

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As the detection of ductal carcinoma in situ is likely to affect long-term mortality, these lesions should be considered separately.

As was done in assessing the results of the Breast Cancer Detection Demonstration Project [5] and the Swedish two-county study [6], we should look for clues to future mortality reduction in the proportion of invasive cancers smaller than 1 cm that were detected. Studies have shown that this is an achievable goal (in the same time encompassed by the Canadian trial). In our own screening series collected between 1978 and 1989, 58% of the invasive cancers detected by mammography alone were diagnosed while less than 1 cm (Massachusetts General Hospital Breast Imaging Division, unpublished data). Sickles et al. [7] have detected a similar proportion of small invasive cancers as did the Swedish two-county study. It is against these numbers that the Canadian trial must be measured. This will give additional information concerning the ability of the suboptimal mammography used in this trial to detect small invasive cancers and thus affect mortality.

The decision to use the then "current" level of mammographic quality as a measure of efficacy was ill conceived. It is clear to those performing mammography that image quality can be improved in all mammography settings. Such programs as the American College of Radiology's accreditation program and the numerous postgraduate education efforts in breast imaging have already had a marked impact on improving the general quality of mammography in the United States and Canada. The study should have been designed to test

the efficacy of high-quality mammography. It may be that the Canadian trial will provide some unexpected benefit. On the basis of the assessment presented in the accompanying article, it is likely that the Canadian data may ultimately confirm the fact that poor-quality mammography, performed and interpreted by technologists and radiologists learning as they go along, may not have significant impact on cancer mortality and, therefore, will reinforce the need to perform high-quality studies.

#### REFERENCES

1. Eddy DM, Hasselblad V, McGivney W, Hendee W. The value of mammography screening in women under 50 years. *JAMA* 1988;259:1512-1549
2. Baines CJ, Miller AB, Kopans DB, et al. Canadian National Breast Screening Study: assessment of technical quality by external review. *AJR* 1990;155:743-747
3. Lundgren B. The oblique view at mammography. *Br J Radiol* 1977;50:626-628
4. Tabar L, Gad A, Holmberg L, Ljungquist U. Significant reduction in advanced breast cancer, results of the first seven years of mammography screening in Kopparberg, Sweden. *Diag Imag Clin Med* 1985;54:158-164
5. Morrison AS, Brisson J, Khalid N. Breast cancer incidence and mortality in the Breast Cancer Detection Demonstration Project. *J Natl Cancer Inst* 1988;80:17-24
6. Tabar L, Duffy SW, Krusemo UB. Detection method, tumor size and node metastases in breast cancers diagnosed during a trial of breast cancer screening. *Eur J Cancer Clin Oncol* 1987;23:959-962
7. Sickles EA, Ominsky SH, Sollitto RA, Galvin HB, Monticciolo DL. Medical audit of a rapid-throughput mammography screening practice: methodology and results of 27,114 examinations. *Radiology* 1990;175:323-327