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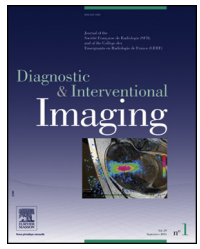

REVIEW / *Breast imaging*

Organized breast screening: Answers to recurring controversies

L. Ceugnart[a,*], **M. Deghaye**[b], **P. Vennin**[c], **S. Haber**[d], **S. Taieb**[a]

[a] *Imaging Department, Oscar-Lambret Regional Cancer Center, 3, rue Frederic-Combemale, 59000 Lille, France*
[b] *Medical Imaging Center, 89, rue du General-de-Gaulle, 77230 Dammartin en Goele, France*
[c] *Breast Department, Oscar-Lambret Regional Cancer Center, 59000 Lille, France*
[d] *135, avenue Vauban, 93190 Livry-Gargan, France*

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Abstract The reduction in mortality specifically from breast cancer, demonstrated in the major meta-analyses in the 1980s resulted in public health breast cancer screening programs being set up in many countries, including France. Recent publications have challenged the usefulness of screening, by insisting in particular on the negative effects of overdiagnosis and the lack of any significant impact on mortality. From analysis of the literature and particularly independent reviews published in 2012, we provide some answers for doctors faced with the legitimate concerns of women. These studies confirm that screening in the right age group reduces specific mortality by at least 20% at a cost of overdiagnosis estimated at between 1 and 15%.

Organized mammography screening for breast cancer next year celebrates 10 years of use throughout French territory. The organization, conceived in the 1980s and unique in the world among other things for being decentralized and providing the possibility of producing an immediate diagnostic assessment (IDA), has been proved to be effective, particularly according to the European early evaluation criteria of the quality of the program [1]. The rate of participation alone is not as high as was expected since at the present time it is on average only 52%, instead of the recommended minimum of 70% (Table 1). The objective of 65% participation hoped for in the second cancer plan will not be reached by the end of 2013. The recurring controversies on the inefficiency and pernicious effects of this screening do not by themselves explain the low participation, but doubtless contribute to slowing the rise in the participation rate which has been seen since 2004. Indeed, despite the very positive results of randomized trials of the 1980s on the reduction in mortality specifically due to breast cancer resulting from setting up screening campaigns,

* Corresponding author.
E-mail address: scientifique@o-lambret.fr (L. Ceugnart).

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Table 1 Early indicators of the efficacy of a screening program.

Indicators	European	French (2008)
Rate of cancers detected	Prevalence > 5/1000 Incidence > 3/1000	7.7/1000 5.8/1000
Rate of cancer in situ	< 20%	14%
Rate of cancer < 10 mm	> 20%	38%
Rate of N0 cancers	> 70%	77%
Participation rate	> 70%	52% (2011)

French Institute for Public Health Surveillance results 2011.

studies and publications on the negative effects of screening (lack of impact on mortality, overdiagnosis, false positives) have been discussed by the media and again quite recently by the monthly consumer magazine *Que Choisir* [2]. The health profession had not waited for these articles to question the possible undesirable effects of this public health program and its consequences, as was illustrated by the subject of the French Breast Disease Society congress in Marseilles in 2011 which focused on *overdiagnosis and overtreatment*. In 2012, the results of two independent working groups [3,4] were published in answer to the detractors of mammography screening. These data need to be known in order to provide clear answers, firstly to women who, justifiably, are questioning the advantages and disadvantages of this public health measure, but also to all those involved in healthcare.

The controversy over screening is centered on three main points — the impact on specific mortality, overdiagnosis and false positives.

Organized screening and mortality

The Cochrane Collaboration meta-analyses published for the first time in 2001 and updated several times since [5—7] report a reduction in the relative risk of mortality of approximately 10%, i.e., one life saved for 2000 women at the cost of 200 false positives and 10 cases of overdiagnosis. These estimates are therefore very different from the results of the large multicenter, prospective, randomized trials and the meta-analysis published in 1995, which had reported a reduction in the relative risk of mortality from breast cancer of approximately 30% [8]. In a recent paper, from analyzing the incidence and mortality in a Danish database, Jorgensen et al. even concluded that the reduction in mortality was greater in the non-screened group than in the screened group, respectively 2 and 1% [9]. A Norwegian study has shown that the reduction in the number of deaths recorded between two counties, one with and the other without a screening program, was estimated to be around 18%, 10% of which was put down to improvements in treatment and management [11].

We have known for a long time that it is illusory to look for an overall reduction in mortality since death due to breast cancer only represents, at the worst, 15% of female mortality according to national data published by the French National Cancer Institute (INCa) [10].

As regards specific mortality, the data quoted by supporters of the Cochrane Collaboration need to be examined very carefully, since they are not derived from the results of randomized trials but from 'reasonable estimates' that the authors have made, as the excellent update provided by Duffy and Paci in the *Bulletin Epidémiologique Hebdomadaire* in September 2012 indicates [12]. Moreover, the number of deaths avoided is always related in the studies included to the number of women invited to take part in the program, rather than the number of women actually screened [13]. Because the rates of participation fluctuate between 50 and 80%, the figures are totally different, varying from one death avoided for 2000 women invited according to the Cochrane Collaboration estimates, to one death avoided for 455, 303 or 426 women having a mammogram every 2 years between the age of 50 and 59, 60 and 69, and 70 and 79 respectively, according to Hendricks and Helvie [13]. Finally, in the large majority of cases, death from breast cancer occurs many years after the disease is detected, but most of the work casting doubt on the effect of screening lacks the necessary period of follow-up (6 years in the paper by Zahl et al. [14]. Analysis of specific mortality in the Swedish study of two counties indeed shows that the positive impact increases in the long-term, changing from 26% at 10 years to 31% with 29 years follow-up. Out of the group of 65,518 women who actually participated (85% of the 77,080 invited), 158 deaths were avoided, corresponding to a reduction in mortality equivalent to one life spared for 300 women screened for 10 years [15].

Overdiagnosis

Definition

The definition of overdiagnosis varies from one author to another. For some, it is the discovery by screening of a cancer which will not be responsible for the death of the individual, for others it is the discovery of a cancer which would not have been diagnosed during the individual's lifetime if there had been no screening. This latter less restrictive definition takes into account all the negative (personal, familial or social) effects of the discovery and treatment of a cancer.

Overdiagnosis is a problem which has to be taken into account essentially because of the treatments which follow from it. Overtreatment is treatment of 'overdiagnosed' cancers and is obviously the most important undesirable effect. Indeed, in the present state of French and international guidelines, in the absence of exceptional clinical situations or objective evidence (from imaging, histology, laboratory tests, etc.) allowing a potentially evolutive cancer to be differentiated from one which would remain stable, therapeutic management is systematically offered for any proven case of breast cancer.

Overdiagnosis is not specific to breast cancer but has also been reported for the lungs, thyroid, kidneys and above