

**“Is too much cancer screening hazardous to your health? The example of breast cancer”**

A speech by **Peter Gøtzsche**, researcher and director of the Nordic Cochrane Centre, author of the work “Mammography screening. Truth, lies and controversy” (Radcliffe Publishing, 2012).

## Is too much cancer screening hazardous to your health? The example of breast cancer

Breast cancer screening with mammography has been studied in nine randomized trials. Four of the trials are more reliable than others and these trials showed a reduction in breast cancer mortality after 13 years of 10%. The less reliable trials showed a much bigger reduction in breast cancer mortality, namely 25%. It is therefore uncertain what the true effect of screening is.

### **Reduction in breast cancer mortality when screening is ineffective**

The trials that have reported the largest reductions in breast cancer mortality have used poor equipment, had long intervals between screenings, screened the whole control group early, already after 3-5 years, and used only one view mammography. This surprising observation means that the trials must be biased. What you would expect is that those trials that were most effective in reducing the number of advanced cancers (the cancers that had metastasized), should also be those trials that found the greatest reduction in breast cancer mortality.

I studied whether this was true. In this graph (slide), you have the logarithm of the relative risk for number of so called node-positive cancers, that is cancers that have spread to the lymph nodes. On the other axis, you have log relative risk for breast cancer mortality. What you can see is that we find an expected relation, the better the trials are in reducing the number of metastasized cancers, the larger is the effect on breast cancer mortality.

However, if you look carefully at the graph you will notice that when screening is completely ineffective, which means that it does not reduce the occurrence of advanced cancers, corresponding to zero on the x-axis, then there is a reduction in breast cancer mortality of

16%. This is impossible. When screening does not work it cannot reduce breast cancer mortality. This proves that the screening trials are heavily biased, on average.

What you would have expected to find when screening has no effect on advanced cancers is indicated by the line up here, namely no effect on breast cancer mortality. One of the biases is that the researchers misclassify the cause of death. When screened women with breast cancer die, the researchers may say that they died from another cancer than breast cancer. It is therefore instructive to see whether screening reduces total cancer mortality, including breast cancer mortality. Quite many of these women have more than one cancer, and it is therefore difficult to say, which cancer killed the woman.

What you can see is that screening does not reduce total cancer mortality including breast cancer, although this would be expected if screening had a positive effect.

### **Denmark: similar reduction in breast cancer mortality, with or without screening**

Denmark is a unique country for studying the effect of screening, as we have a non-screened control group. We only screened women in two regions in Denmark throughout 17 years. In the rest of Denmark, women were not invited to screening for these 17 years. What you can see is that, after screening had been introduced in the two regions, breast cancer mortality declined in the age group that could benefit from screening. But it declined to a similar extent in the regions that had not had screening. Therefore, the reduction cannot be caused by screening.

Here are the numbers. In the screened areas, there was an annual reduction in breast cancer mortality of 1% in the age

group that could benefit from screening, and the reduction was 2% in the control areas without screening. The reductions were larger among young women who could not benefit from screening and there was little change in the older women. These reductions must therefore be due to improved treatment, and also greater breast cancer awareness and possible changes in risk factors, but not to screening mammography.

### **No link between reduction in breast cancer mortality and when screening started**

Philippe Autier and co-workers from the International Prevention Research Institute in Lyon has studied neighbouring countries that introduced screening 10 to 15 years apart and these results are also very revealing. Here is a compilation of his results done by the American Archie Bleyer. Sweden and Norway introduced screening very much apart and so did Northern Ireland and the Republic of Ireland, and the Netherlands and Belgium. But the decline in breast cancer mortality had nothing to do with when screening was introduced.

Philippe Autier and co-workers have done another important study where they used data from Australia, Italy, Norway, Switzerland, the Netherlands, the UK and the United States. They found that the rate of advanced cancers, which were those that were bigger than 20 mm, was not reduced with screening. Researchers that analysed the Norwegian screening programme found that the rate of advanced cancers, defined at stage 3 or stage 4 disease, was exactly the same in screened and non-screened areas. Results like these show that screening does not reduce the occurrence of advanced cancers. Even the most staunch screening advocates acknowledge that if this does not happen, screening cannot have an effect on the mortality from breast cancer.

## Harms of screening: overdiagnosis and mastectomies

Overdiagnosis is the most serious harm. It means the detection of cancers that would not have been detected because of symptoms in the remaining lifetime of the people. Finding such cancers can only harm screened people. Screening for cancer will always cause overdiagnosis, and it is the main reason why we do not screen men for prostate cancer.

In the randomized trials of breast cancer, there were about 30% more cancers in the screened groups than in the control groups. There were also more mastectomies, about 20% more mastectomies. Screening advocates often argue that screening leads to fewer mastectomies because the cancers are detected earlier when they are smaller, but this is wrong. Screening leads to more mastectomies because of the overdiagnosis.

We have shown this also for Denmark. When screening was introduced in the two regions in Denmark, the number of mastectomies skyrocketed and it never fell below what it was in the rest of the country that had not had screening. This is a clear indication once again that screening increases mastectomies.

We have studied in a systematic review the level of overdiagnosis in countries with organized screening programmes and we found about 50% overdiagnosis. This means that the number of women with a breast cancer diagnosis is 50% larger when women are screened than if they are not screened.

## Misleading information for women

The propaganda you hear about breast cancer screening is wrong, e.g. catch it early, it is better to find a small tumour than a big one, by finding the tumours early more women will avoid mastectomy, mammography screening saves lives – these slogans come from cancer charities, information materials from screening centres or national boards of health, and they are all wrong, misleading or doubtful. The average woman has harboured the cancer for 21 years before it can be detected by screening and tumours detected by screening are generally harmless. There has not been a re-

duction in metastasized tumours as I have just shown, and more women will get a mastectomy, and we do not know whether mammography screening saves lives, but it is not likely, e.g. total cancer mortality is the same and the total mortality is also the same.

Women have a very different perception of screening. 68% believe screening reduces their risk of contracting breast cancer which it cannot do, it can just detect breast cancer, 62% that screening at least halves the mortality, 75% that 10 years of screening saves 10 out of 1,000 participants which is an overestimate of 20 times, only 8% were aware that participation can harm healthy women, and 15% believe their lifetime risk of contracting the disease is more than 50%, an overestimate of 5 times.

We have reviewed the information materials presented to women and here is the leaflet used in the UK (slide). We published our observations in the British Medical Journal, which said on the front page “What the leaflets don’t tell patients” (but please be aware that it is not patients, it is healthy women, let us not forget that).

## Well-balanced information for women is possible

The UK leaflet doesn’t say a word about the most important harm of screening, overdiagnosis and overtreatment. We therefore concluded that the responsibility for the screening programmes must be separated from the responsibility for the information material, and the title of our paper was: ‘Breast screening: the facts - or maybe not’. Other leaflets have similar problems, the review of European leaflets including the French one showed that they did not mention overdiagnosis and 4 of them recommended breast self-examination although this is harmful, and the brochures attempted to directly influence women with suggestive phrases to pressurize them into participation. We have published our leaflet in French on our website and we have just updated it; it is currently available in 13 languages.

What we say in the summary is:  
*Lorsque nous avons publié cette brochure en 2008, le résumé était le suivant:*

• *Il peut être raisonnable de participer au dépistage du cancer du sein par mammographie, mais il peut être tout aussi raisonnable de ne pas s’y soumettre, parce que ce dépistage présente à la fois des bienfaits et des dommages.*

• *Si 2000 femmes sont examinées régulièrement pendant 10 ans, une seule d’entre elles bénéficiera réellement du dépistage par le fait qu’elle évitera ainsi la mort par cancer du sein.*

• *Dans le même temps, 10 femmes en bonne santé deviendront, à cause de ce dépistage, des patientes cancéreuses et seront traitées inutilement. Ces femmes perdront une partie ou la totalité de leur sein et elles recevront souvent une radiothérapie et parfois une chimiothérapie.*

• *En outre, environ 200 femmes en bonne santé seront victimes d’une fausse alerte. Le stress psychologique de l’attente du résultat pour savoir si elles ont vraiment un cancer et celui de la suite des soins, peut être sévère.*

• *Ces chiffres proviennent d’essais randomisés de dépistage par mammographie. Cependant, depuis que ces essais ont été effectués, le traitement du cancer du sein s’est considérablement amélioré. Les études les plus récentes suggèrent que le dépistage par mammographie peut ne plus être efficace pour réduire le risque de mourir du cancer du sein.*

• *Le dépistage produit des patientes atteintes d’un cancer du sein à partir de femmes en bonne santé qui n’auraient jamais développé de symptômes de cancer du sein. Le traitement de ces femmes en bonne santé augmente leur risque de mourir, par exemple d’une maladie cardiaque et de cancer.*

• *Il ne semble donc plus aussi raisonnable de participer au dépistage du cancer du sein. En fait, en évitant de participer au dépistage, une femme va diminuer son risque de recevoir un diagnostic de cancer du sein. Cependant, malgré cela, certaines femmes peuvent encore souhaiter participer au dépistage.*

I will finish by drawing your attention to the similarities between screening for prostate cancer and breast cancer. Both screenings have a small effect on specific cancer mortality if any, and there is huge overdiagnosis that harms many healthy men and women. We do not screen for prostate cancer for these two reasons. Can you please tell me then why so many people wish to screen for breast cancer?

Peter C. Gøtzsche

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