

# Lack of nationwide Danish guidelines on mammography before non-oncological breast surgery

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## ABSTRACT

**INTRODUCTION:** Non-oncological breast surgery like breast reduction and mastopexy are often performed in younger patients, i.e. in women who have not yet had mammography. Breast cancer is, however, a very frequent disease that is increasingly prevalent in women below 50 years of age. Occult breast cancer may not be recognised before breast surgery, which may result in several disadvantages for the women. Therefore, detecting a breast cancer before a woman undergoes non-oncological breast surgery is of paramount importance.

**METHODS:** All public plastic surgery and breast surgery departments and all private clinics or hospitals providing plastic surgery were asked two questions: 1) When do you recommend a mammography prior to non-oncological breast surgery? 2) How old must a mammogram be before it needs to be repeated?

**RESULTS:** Answers were received from all plastic surgery and breast surgery departments, and all but three of the private clinics and hospitals. Overall, information was obtained from 95.5% of the respondents (n = 63).

**CONCLUSION:** Currently, there are no Danish guidelines on mammography before non-oncological breast surgery. A national guideline could recommend a preoperative mammogram from the age of 40 years stipulating that the mammogram should have been made within the past 12 months; however, the final recommendation should be prepared by a multidisciplinary working group counting experts from plastic surgery, breast surgery, pathology and radiology.

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In approximately 60% of cases, non-oncological breast surgery such as breast reduction and mastopexy are done at younger ages, i.e. in women who have not yet been offered mammography. Breast cancer is a frequent disease in women below 50 years of age [1], **Figure 1**. The patients therefore risk having an occult breast cancer when undergoing non-oncological breast surgery.

Estimates from the NORDCAN curve, **Figure 1**, show that the incidence of breast cancer in 35-year-old women is 0.5% in Denmark. Previous studies have found invasive breast cancer in 0.08-0.33% of breast reduction specimens and ductal carcinoma in situ in 0.04-0.36% [2-

5]. It should be noted that women with known breast cancer were excluded from the above study. The percentage of invasive breast cancer detected in breast reduction specimens and ductal carcinoma depends on age, the population-specific prevalence of breast cancer and the thoroughness of the pathologic examination.

Not recognising an occult cancer before breast surgery may result in several disadvantages for the patient. Women who have a breast reduction performed, who have occult carcinoma in the surgical specimen of the breast risk losing breast-conserving surgery as a treatment option as the exact location of the tumour frequently cannot be determined. Furthermore, the sentinel lymph node procedure may be unreliable or fail due to interrupted lymph vessels [6]. Instead, these women will be offered axillary clearance, which is associated with an increased risk of complications. Furthermore, if the occult cancer is not excised or diagnosed during the breast reduction or mastopexy, post-surgical scar formation may blur the usual symptoms of cancer. This introduces a risk of prolonging the time to recognition and treatment of the cancer. Therefore, detecting a breast cancer before a woman undergoes non-oncological breast surgery is of paramount importance.

In Denmark, non-oncological breast procedures are performed by plastic surgeons. There are no national Danish guidelines on when to perform preoperative mammography before non-oncological breast surgery. Therefore, recommendations differ among centres and surgeons. The present study was conducted to illuminate the practice of recommending a preoperative mammography among plastic surgeons in Denmark and to study if this recommendation is in line with recommendations from the breast surgeons.

## METHODS

The study populations of the present study comprised: 1) the eight public plastic surgery departments in Denmark, 2) the twelve public breast surgery departments in Denmark and, 3) all Danish private clinics or hospitals providing plastic surgery. The public departments have remained unchanged throughout the past decades and contact addresses on the head director or the head of the breast section were easily identified. Private clinics and hospitals are less stable.

## ORIGINAL ARTICLE

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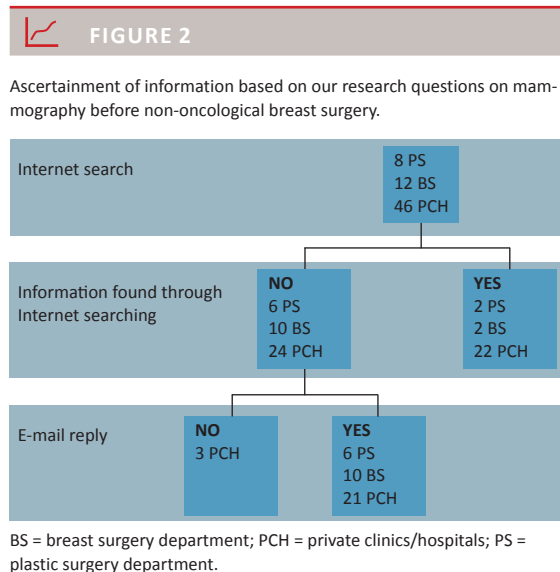
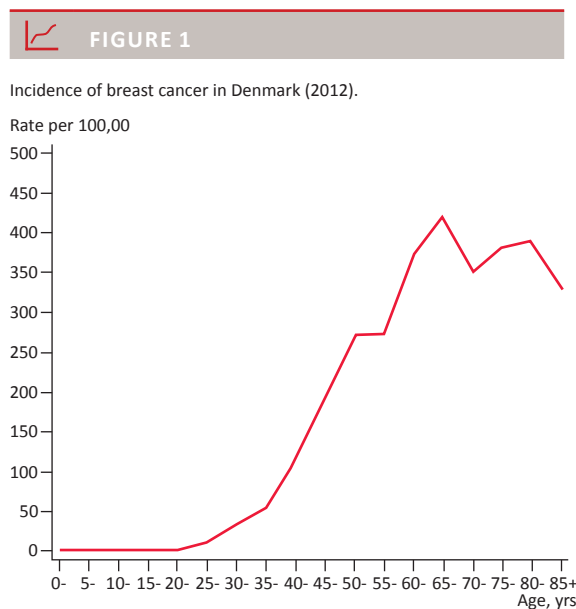
By searching the Internet in January 2014, we found 50 private clinics or hospitals in Denmark that provide plastic surgery. Four of these clinics provide consultation in Denmark while the operation takes place outside Denmark. These clinics were excluded. A total of 66 medical centres were thus identified.

The web sites of all 66 centres were evaluated thoroughly to find information on the relevant research questions. The research questions were: 1) When do you recommend a mammogram prior to non-oncological breast surgery? The following age groups were possible: 30+, 35+, 40+, 45+, 50+ years or Other. 2) How old may a mammography be before it needs to be repeated? Age

categories of the mammography were: < 6, < 12, < 24 months or Other.

The answers for these questions were available on the websites of 26 of the medical centres, and these were therefore not contacted. The information on the website was simply used as the answer. The remaining 40 medical centres were contacted by e-mail. If they failed to reply, a reminder was sent twice before registering the centre as “no reply”. All but three private clinics responded corresponding to a 95.5% response rate among the identified centres, see **Figure 2**.

*Trial registration:* not relevant.



## RESULTS

The results related to question one, the age of the women who require mammography prior to non-oncological breast surgery, is shown in **Figure 3**. Pre-surgical mammography was generally recommended by 88% (n = 58) of the respondents. The distribution of recommendations according to the five-year age categories is shown stratified into public plastic surgery departments, public breast surgery departments and private plastic surgery clinics and in total. Figure 3 shows that 51% recommended pre-surgical mammography from the age of 40 years, 21% from the age of 35 years and 9% from the age of 30 years. Very few used ages higher than 40 years as their threshold for recommending mammography. The plastic surgery departments chose either 35+ years (37.5%, n = 3) or 40+ years (62.5%, n = 5) while there was a tendency for the breast surgery departments to recommend mammography from a younger age; 17% (n = 2), 33% (n = 4) and 42% (n = 5) for the age categories 30+, 35+ and 40+, respectively; one department did not answer. Between private clinics, there was a somewhat larger spread between answers as these ranged from 30+ to 50+, with a predominance of 40+ (52%, n = 24); three clinics did not answer and four clinics did not have any local guideline, see Figure 3.

Regarding question two, the acceptable age of a mammogram before repeating it prior to non-oncological breast surgery, a larger variation was seen among the answers, especially among the breast surgery departments. However, only 55% (n = 36) responded to this question or had the information available on their websites. The answers ranged from two to 24 months as can be seen in Figure 4, but the majority answered 12 months (35%, n = 23). The plastic surgery departments responded either six months (12.5%, n = 1) or 12 months (75%, n = 6). The private clinics and hospitals responded six (9%, n = 4), 12 (28%, n = 13) or 24 months (4%, n = 2), but a large proportion chose not to answer the question (59%, n = 27). Among the breast surgery departments, we found the greatest diversity of responses. One-third

of the breast surgery departments recommended 12 months (33%,  $n = 4$ ), while the other departments were distributed evenly between two, three, six, nine or 24 months, see **Figure 4**.

## DISCUSSION

The present study focused on the practice of recommending preoperative mammography before non-oncological breast surgery. Two issues were evaluated. The response rate was very high, about 95%, although less than half commented on the second issue of how old a mammography could be before it needed to be repeated. Our study showed that regardless of affiliation, approximately 50% of the plastic surgery and breast surgery centres would recommend mammography performed in women aged 40 years or older, and that about 35% would repeat mammography if it had not been performed within the past 12 months.

### Guidelines in other countries prior to non-oncological breast surgery

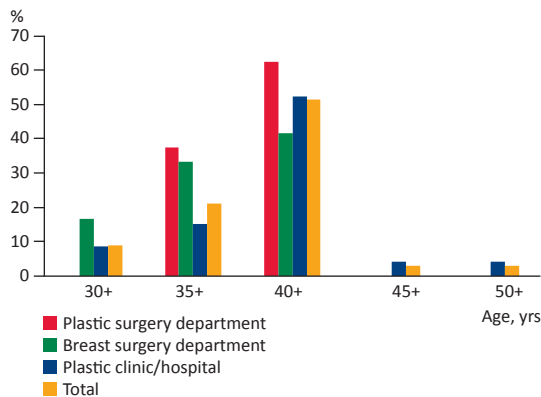
The Swedish national guideline [7] recommends that women over 40 years should have a mammography performed within six months before breast reduction. However, the evidence on which this recommendation is based is not presented in the published guideline.

Reviewing the literature, we found very few studies on guidelines. In France, Carloni et al [8] proposed a national guideline regarding preoperative imaging prior to breast reconstruction surgery and non-oncological breast surgery. The authors asked 50 plastic surgeons and 50 breast radiologists about their practise of recommending preoperative and post-operative imaging in relation to non-oncological breast surgery in patients not presenting any particular risk factors of breast cancer. The plastic surgeons largely referred women to mammography with no indication of age (57%), while the breast radiologists recommended mammography in women who were 40 years or older (50%). This was very similar to our result and furthermore in line with a US study by Selber et al [9]. They asked 4,520 members of the American Society of Plastic Surgeons at which age routine preoperative mammography was initiated. Approximately 50% answered at 40 years (response rate 24%). This is in line with the guideline on breast screening from the America Cancer Society. However, another US organisation, the U. S. Preventive Services Task Force, recommends mammography screening as from the age of 50.

A recent UK study by Henedige et al [10] involving 434 breast surgeons and 335 plastic surgeons also focused on mammography recommendations stratified by patient age (response rate 68%). The breast surgeons responded that they would recommend preoperative

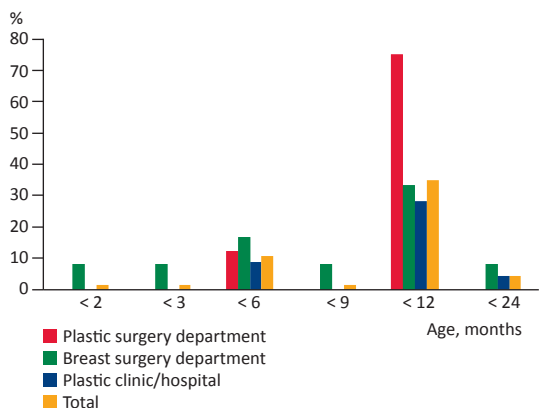
**FIGURE 3**

Selection criteria for preoperative breast imaging prior to mammoplasty (age of patient).



**FIGURE 4**

Selection criteria for preoperative breast imaging prior to mammoplasty (age of mammogram).



mammography in women at the age of 30 (41%), whereas the plastic surgeons recommended mammography from 40 years of age (53%). The same trend is observed in our study, where we have also asked both breast and plastic surgeons.

Regarding the age of the mammogram, most respondents in our study recommended a mammogram that was not older than 12 months (64% of those who answered the question;  $n = 23$ ). Selber et al also found this; hence, approximately 80% recommended 12 months as the threshold. In the study by Carloni et al, breast radiologists and plastic surgeons recommended 12 months (40%) and 6 months (46%), respectively. The Swedish national guideline recommends six months. The American Society of Plastic Surgeons recommends a baseline mammogram before breast reduction surgery

and another one after surgery to help detect any future changes in the breast tissue. The timing of the pre- or post-operative mammogram is not specified in the recommendations [11].

Only few publications similar to the present study were found. The existing differences in practice across borders can be explained by many variables including local opportunities, insurance and health-care systems.

#### Preoperative mammography

The Danish Mammography Screening Programme is offered every second year to all women aged 50-69 years. Women with an increased risk of breast cancer are, however, offered a special screening programme.

A large proportion of the women who are treated for non-oncological breast disorders, e.g. hypertrophic breasts, are younger than 50 years. According to The Danish Breast Cancer Cooperative Group (DBCG) [12], women may be referred to a clinical mammography prior to planned breast surgery. This includes a clinical examination, mammography and ultrasound imaging. A Danish study by Jensen et al [13] showed that the sensitivity and specificity of a clinical mammography is 75% and 99%, respectively. The risk of false-positive findings was reported to be 0.75%.

Increased breast density can make it more difficult to detect small tumours with mammography. As expected, the sensitivity of mammography decreases with increasing breast density. Almost entirely fatty breasts and extremely dense breasts have a sensitivity of 88% and 62%, respectively [14]. According to the guidelines from the DBCG, ultrasound is recommended as a first-line investigation in women who are younger than 30 years [12]. The sensitivity of ultrasound and mammography in women who are 30-39 years of age and who present with focal breast signs or symptoms is 95.7% and 60.9%, respectively [15].

#### Pathology

No national Danish guideline exists on routine histological examination of the resected breast tissue after breast reduction. Often the specimen is only examined macroscopically after sectioning. This may be due to a very low incidence of occult breast cancer, as mentioned in the introduction. A prospective study by Ambaye et al [16] evaluated the hypothesis that increased tissue sampling from reduction mammoplasty specimens would identify more significant pathologic findings. Carcinoma and atypical hyperplasia were present in 4% (n = 8) and 12% (n = 25), respectively, of the 202 examined patients. Increased sampling was associated with statistically significantly increased pathologic findings in patients aged 40 years or above. None of the lesions were identified on preoperative mammogram. In all, 60% (n = 15) had a

screening mammography performed within 6 months prior to surgery.

A retrospective study by Merkkola-von Schantz et al [17] with 100 cases with symptomatic macromastia also found significant pathologic findings (in situ carcinoma or hyperplasia) in 14.6% (n = 13) of the 89% who had a pathology report. Ductal carcinoma in situ was found in one patient and no carcinomas were found. Preoperative mammograms were normal in 92% (n = 12) of the cases with pathologic findings.

A study by Kerrigan et al [18] recommended macroscopic and microscopic evaluation of reduction specimens in women older than 40 years of age. Specimens from women with a history of breast cancer should always be studied microscopically. Specimens from women between 30 and 40 years or even younger women who have BRCA genes or family histories may be studied microscopically. Specimens from women who are younger than 30 years without other risk factors may warrant macroscopic examination only. These recommendations are similar to the conclusions in the study by Ambaye et al.

The above studies show that a normal preoperative mammography cannot stand alone. It is also necessary to routinely examine the breast tissue macroscopically and, in selected patients, to make a microscopic evaluation.

#### CONCLUSION

Currently, there are no national Danish guidelines on mammography before non-oncological breast surgery. In our study, Danish breast and plastic surgeons seem to agree on recommending a preoperative mammography within the past 12 months before surgery from the age of 40 years. This is in line with the recommendations in other countries; it is also in line with studies regarding post-operative pathologic examination of specimens from breast reductions and with the incidence curve of breast cancer in Denmark.

We would recommend the establishment of a multidisciplinary working group counting experts from plastic surgery, breast surgery, pathology and radiology. The group should prepare a proposal for a national guideline on mammography and pathology assessment in relation to non-oncological breast surgery.

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**CONFLICTS OF INTEREST:** Disclosure forms provided by the authors are available with the full text of this article at [www.danmedj.dk](http://www.danmedj.dk)

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