

Examination of the Practice Shift from Plain Film Mammography to Digital Mammography: A Scoping Review

Presented by

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A RESEARCH COLLABORATION FOR REDUCING
OVERDIAGNOSIS AND OVERTREATMENT

Breast Cancer Screening

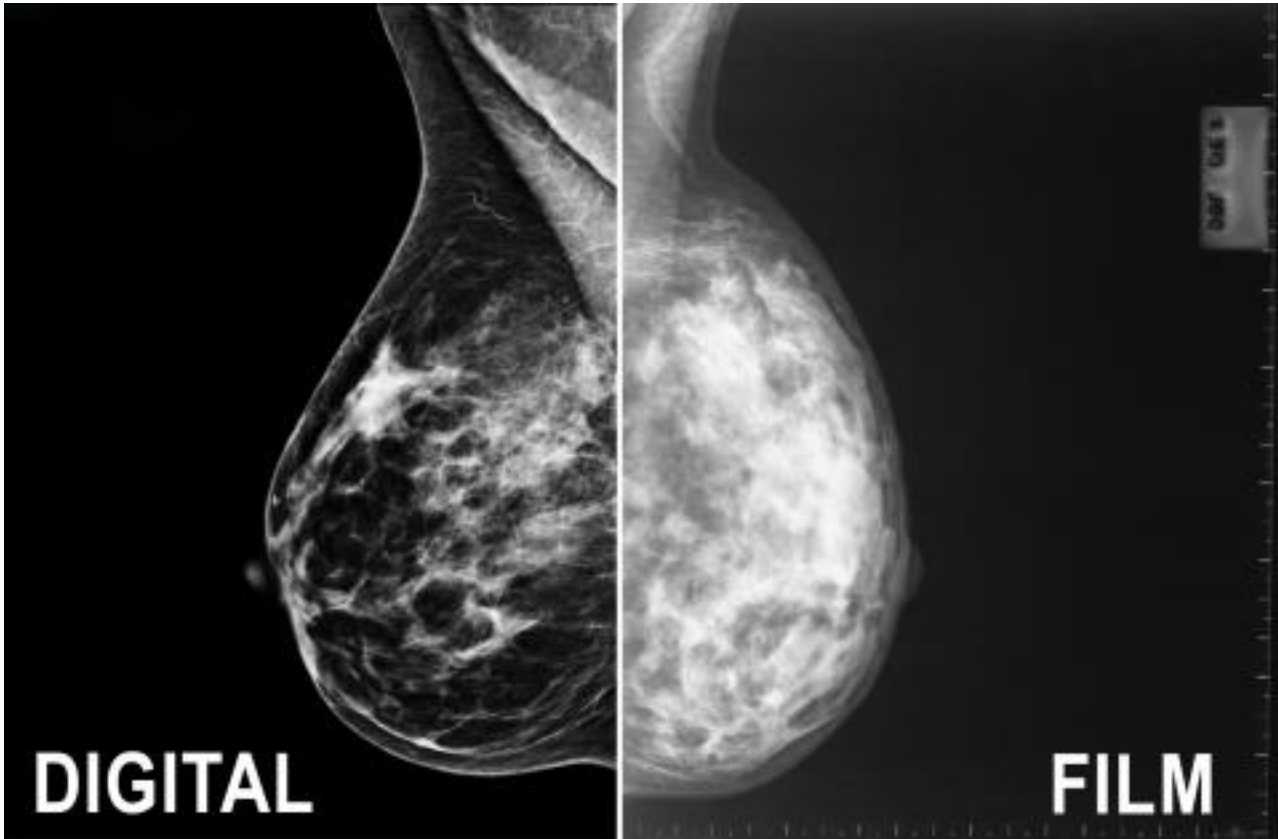
- Breast cancer is the most common cancer in women
- Population wide mammography screening programs have been implemented throughout many countries
- Mammography screening uses X-ray to try to find breast cancer before clinical symptoms develop
- Breast cancer screening programs are done at a population level on asymptomatic women
- If screening mammography shows an abnormality women are either recalled or referred for further assessment
 - This may include imaging, needle biopsy, and/or referral for surgical biopsy/intervention

Breast Screening Benefits and Harms

- Screening programs aim to reduce breast cancer mortality
 - Through earlier detection and treatment of breast malignancies
 - To benefit, these must be cancers which would have progressed to an advanced stage if they were left undetected and untreated
 - Breast screening is estimated to reduce breast cancer mortality by 20% in women invited for screening compared to women not offered screening
- A potential harm from breast cancer screening is overdiagnosis
 - Detection of cancers which would not have presented clinically if they were left undetected and untreated
 - Of the cancers diagnosed during screening, about 19% are overdiagnosed
- For every 10,000 women invited for screening over 20 years about
 - 681 cancers will be diagnosed
 - 129 of which will be over diagnosed cancers
 - 43 deaths from breast cancer will be prevented

Film Mammography to Digital Mammography

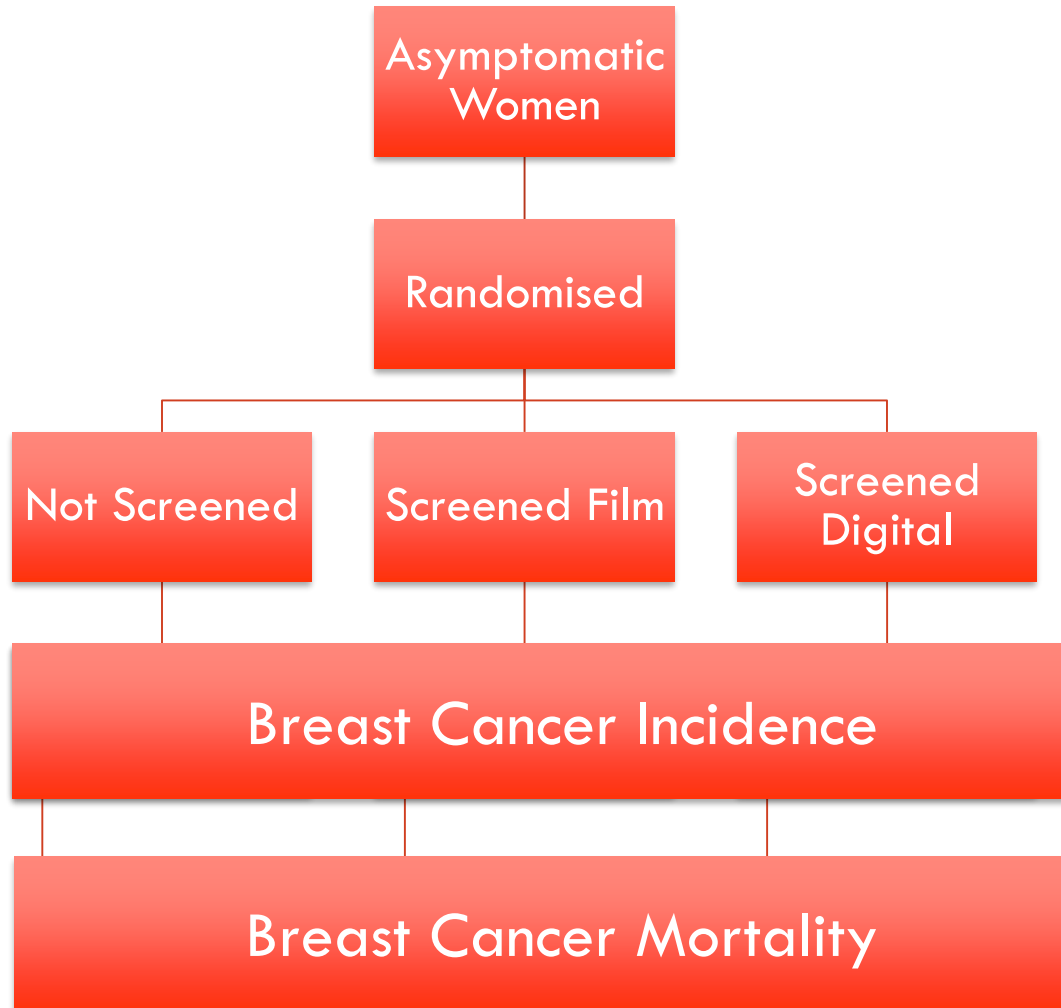
- Most breast screening programmes worldwide have replaced the use of screen-film mammography with full-field digital mammography
- Digital mammography
 - Takes an electronic image of the breast
 - Allows images to be stored and transmitted electronically
 - Potentially decrease time between screen and results
- Before rollout, early studies showed:
 - no overall difference in accuracy between digital and film mammography
 - Increased accuracy for women who
 - Had dense breasts
 - Were under age 50 years
 - Were pre- or perimenopausal



Evaluating Long-term Effects of Change in Technology

- Expectation of technical, clinical and economic advantages
- Only recently become possible to examine the long term effects of the change
- For this scoping review:
 - We aimed to identify published evaluations on the effects of the practice shift on women's health outcomes
 - Included studies reporting on both detection and interval cancer rates

In an ideal world...



Screen-detected vs Interval Cancers

– Screen-detected cancers

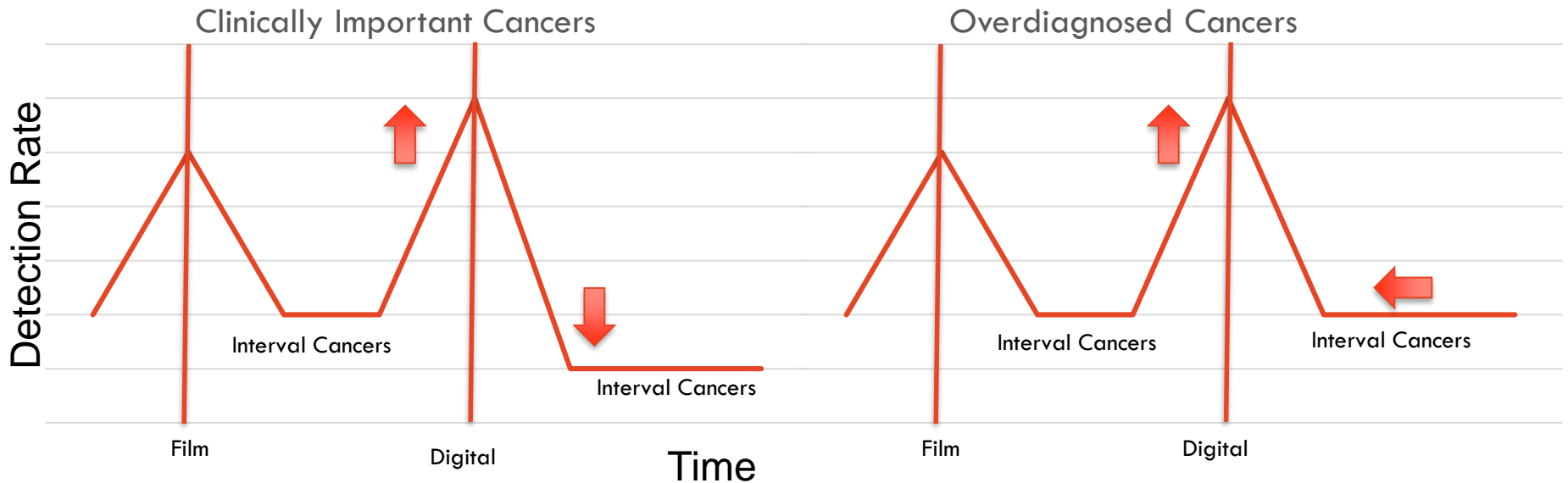
- Diagnosed by a positive screening result in asymptomatic women
- Detection rates
 - number of women diagnosed with screen-detected breast cancer per 1000 screened women

– Interval cancers

- Diagnosed after a negative screening result and before the subsequent scheduled screening
- Typically present clinically
- Interval rates
 - number of interval cancers per 1000 screen negative women

Indications of Benefits and Harms

- Detection of clinically important and rapidly progressing cancers
 - Increase in the detection rate ↑
 - Decrease in the interval cancer rate ↓
- Detection of overdiagnosed or slow progressing cancers
 - Increase in the detection rate ↑
 - No, or minimal, change in the interval cancer rate



Scoping Results

Country	Film Detection /1,000	Digital Detection /1,000		P value	Film interval /1,000	Digital interval /1,000		P value
Netherlands	5.2	6.9	↑	<0.001	2.0	1.7	↓	0.02
Norway	3.8	5.9	↑	0.02	1.7	2.4	↔	0.35
Spain	4.2	4.3	↔	0.685	1.4	1.4	↔	0.816
Canada	8.0	8.0	↔	0.49	1.3	1.4	↔	0.50

Weber (2016), Skaane (2007), Sala (2015), Prummel (2016)

Conclusion

- Scoping review indicates conflicting evidence on effects of change in screening technology
- We are now undertaking a systematic review of breast screening studies reporting on both film and digital mammography
- We will collate all published data of screening populations that report screen detection cancer and/or interval cancer rates
- We will also assess the studies' quality and risk of bias
 - This may explain some of the differing results that we have found thus far
- These results are likely to have important implications for consideration of new technologies in breast cancer screening practice and policy

Thank you

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