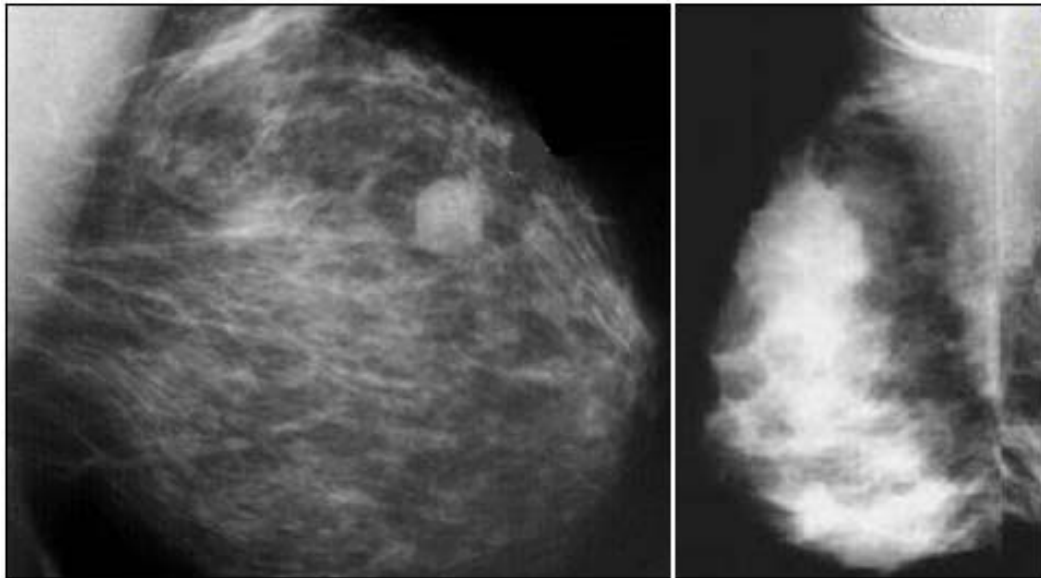


**International Breast Screening
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Mammographic screening performance over time: influence of breast density and hormone replacement therapy



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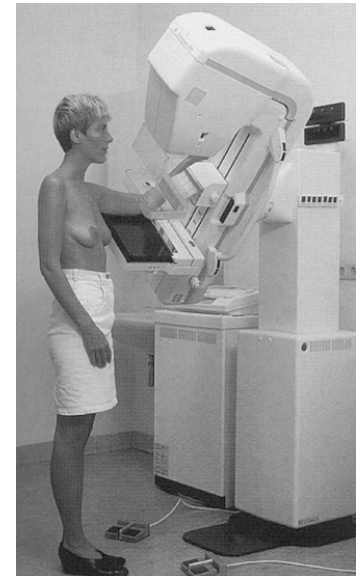
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Background

- Mammographic imaging techniques have improved considerably over time
- Screening performance in dense vs. lucent breast patterns
- Increased use of HRT associated with:
 - increased breast cancer incidence
 - higher breast density → lower Se, Sp
 - breast pain → inadequate compression (Kavanagh)

Study objectives

- To compare screening performance in women aged 49–69 years with dense and lucent breast patterns in two time periods
- To study the possible interaction with use of HRT



Setting

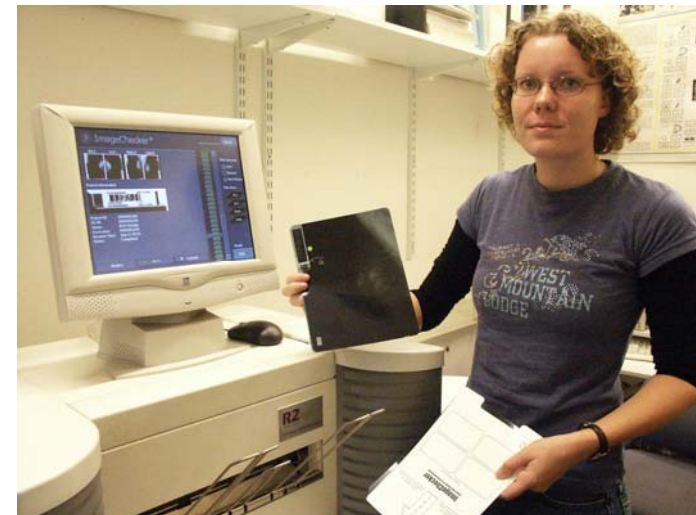
- Nationwide screening programme since 1989
 - target group: 50–74 (50–69 until 1998)
 - biennial screening mammography
 - personal invitation (with reminder)
 - double reading
 - referral to GP (no recall)
- National co-ordination—regional execution
- Nine screening regions

Study populations (1)

- Women aged 49–69 years
- Period 1994–1995: regional screening programme
- Period 2001–2002: Nijmegen

Data collection

- HRT— questionnaire at screening
- Breast density
 - mammograms digitised
 - computer-assisted methods
 - dense > 25%
- Screening outcomes



Study populations (2)

	1994–1995	2001–2002
Women referred (TP + FP)	642	107
Interval cancers (FN)	164	25
Control women (TN)	106.898	11.927
→ 2% sample	1.927	212

Screening performance

Breast cancer					Screening Performance	
Referral		<i>Yes</i>	<i>No</i>	<i>Total</i>	RefR	$(a+b) / N$
	<i>Yes</i>	a	b	a+b	Se	$a / (a+c)$
	<i>No</i>	c	d	c+d	Sp	$d / (b+d)$
	<i>Total</i>	a+c	b+d	N	PPV	$a / (a+b)$
					DetR	a / N
					OR	$(a*d) / (b*c)$

Screening performance over time

	1994–1995 Svokon	2001–2002 Nijmegen
	N = 106.898 - Ref = 642	N = 11.927 - Ref = 107
<i>Referral</i>	6,0 ‰	9,0 ‰
<i>Se</i>	67,8 %	69,1 %
<i>Sp</i>	99,7 %	99,6 %
<i>PPV</i>	53,9 %	52,3 %
<i>Detection</i>	3,2 ‰	4,7 ‰
<i>Prevalence</i>	4,8 ‰	6,8 ‰
<i>OR</i>	756 (608–940)	518 (300–894)

Screening performance over time, breast pattern

	1994–1995		2001–2002	
	<i>Dense</i>	<i>Lucent</i>	<i>Dense</i>	<i>Lucent</i>
<i>Referral</i>	7,2 ‰	5,6 ‰	9,6 ‰	8,4 ‰
<i>Se</i>	60,0 %	72,9 %	62,2 %	77,8 %
<i>Sp</i>	99,7 %	99,7 %	99,5 %	99,6 %
<i>PPV</i>	55,8 %	52,9 %	50,0 %	54,9 %
<i>Detection</i>	4,0 ‰	2,9 ‰	4,8 ‰	4,6 ‰
<i>Prevalence</i>	6,7 ‰	4,0 ‰	7,7 ‰	5,9 ‰
<i>OR</i>	469	1022	339	915

Screening performance 1994–1995, HRT

	No HRT		HRT	
	<i>Dense</i>	<i>Lucent</i>	<i>Dense</i>	<i>Lucent</i>
<i>N</i>	24020	67453	4921	6264
<i>Referral</i>	7,3 ‰	5,5 ‰	6,6 ‰	6,5 ‰
<i>Se</i>	65,8 %	74,9 %	48,4 %	62,1%
<i>Sp</i>	99,7 %	99,7 %	99,6 %	99,6 %
<i>PPV</i>	57,1 %	53,1 %	46,9 %	43,9 %
<i>Detection</i>	4,2 ‰	2,9 ‰	3,1 ‰	2,9 ‰
<i>Prevalence</i>	6,3 ‰	3,9 ‰	6,4 ‰	4,6 ‰
<i>OR</i>	610	1149	267	441

Screening performance 2001–2002, HRT

	No HRT		HRT	
	<i>Dense</i>	<i>Lucent</i>	<i>Dense</i>	<i>Lucent</i>
<i>N</i>	4388	5633	1462	394
<i>Referral</i>	9,8 ‰	7,6 ‰	6,8 ‰	15,2 ‰
<i>Se</i>	73,3 %	80,0 %	38,5 %	80,0 %
<i>Sp</i>	99,5 %	99,6 %	99,6 %	99,5 %
<i>PPV</i>	46,8 %	55,8 %	50,0 %	66,6 %
<i>Detection</i>	4,6 ‰	4,2 ‰	3,4 ‰	10,2 ‰
<i>Prevalence</i>	6,4 ‰	5,3 ‰	8,9 ‰	12,7 ‰
<i>OR</i>	471	1186	180	774

Summary

- Screening performance:
 - improved slightly over time
 - difference dense – lucent still exists
 - worse in women on HRT, especially with dense patterns
- However: 2001–2002 → small group with few women on HRT

Discussion

- Other factors:
 - age
 - BMI
 - first / subsequent screening
- Future research:
 - increase control group 2001–2002
 - measure direct influence of HRT on technical quality
 - transition to digital screening (baseline)

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