

Fatal and non-fatal breast cancers in women targeted by BreastScreen Norway: *a cohort study*

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ARTICLE

Epidemiology

Fatal and non-fatal breast cancers in women targeted by BreastScreen Norway: a cohort study

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<https://doi.org/10.1038/s41416-023-02512-7>

Study motivation

- BreastScreen Norway identified that GPs were seeing many patients who were concerned about dying from breast cancer
- Help offer reassurance to women about a diagnosis of screen-detected cancer
- Much research about outcomes based on “ever/never” screening histories, but not women’s individual screening history



Aims

Stratified by mode of detection (SDC, IC, OS):

1. Describe the histopathological tumour characteristics of fatal and non-fatal cancers
2. Describe 10-year breast cancer-specific survival

Methods

1

Population-based data about women invited to screening and diagnosed with invasive cancer, 1996–2011

2

Information about
Screening,
Histopathology,
Vital status and
cause of death

3

Fatal cancers
Death due to breast cancer within 10 years of diagnosis

4

Descriptive analysis
Machine learning algorithm and survival analysis

Table 1: Patient characteristics women in the target group of BreastScreen Norway and diagnosed with screen-detected breast cancer during 1996–2011, stratified by whether the cancer was non-fatal or fatal within 10 years of diagnosis.

	Screen-detected cancers		
	Non-fatal n = 9324 (93.7%)	Fatal n = 630 (6.3%)	
Age at diagnosis (years), Mean (SD)	60.1 (5.7)	60.2 (5.6)	Similar age distribution
Birthplace, n (%)			
Norway	8895 (93.7)	602 (6.3)	
Other	322 (93.9)	21 (6.1)	
Unknown	107 (93.9)	7 (6.1)	
Year of diagnosis, n (%)			
1996–1999	1040 (90.3)	112 (9.7)	Lower proportion of fatal cancers over time
2000–2004	2941 (92.9)	226 (7.1)	
2005–2009	3710 (94.5)	218 (5.5)	
2010–2011	1633 (95.7)	74 (4.3)	
Attendance prior to diagnosis, n (%)			
Prevalent screen	2995 (92.6)	238 (7.4)	Higher proportion of fatal cancers among prevalent and irregular screens
Regular screen	5789 (94.3)	352 (5.7)	
Irregular screen	540 (93.1)	40 (6.9)	

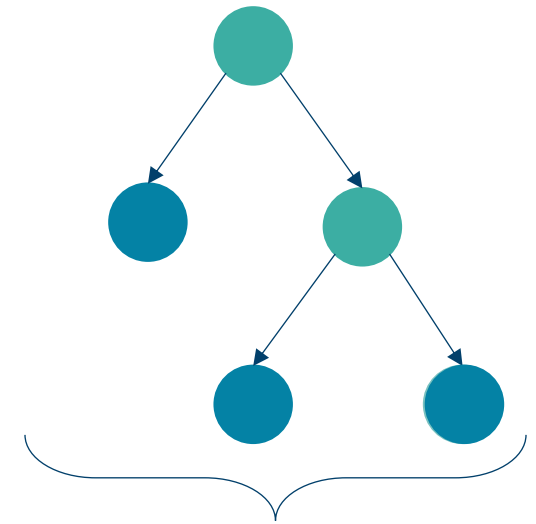
Table 2: Histopathology of breast cancers among women in the target group of BreastScreen Norway and diagnosed with fatal screen-detected breast cancer during 1996–2011,

	Fatal n = 630 (6.3%) n (%)	
Histologic type		
Invasive NST ^a	561	(6.6)
Lobular	61	(6.2)
Other	8	(1.6)
Not available	0	-
Histologic grade		
1	87	(2.6)
2	293	(6.3)
3	233	(13.1)
Not available	17	-
pT-category		
T1a/b: > 0–10 mm	81	(2.2)
T1c: 11–20 mm	239	(5.5)
T2: 21–50 mm	229	(14.4)
T3: > 50 mm	47	(21.1)
T4: Direct extension to chest wall	13	(23.6)
Not available	21	-

	Fatal n = 630 (6.3%) n %	
pN-category		
pN0	257	(3.5)
pN1	232	(11.5)
pN2	62	(23.6)
pN3	52	(47.3)
Not available	27	-
pM-category		
M0	542	(5.8)
M1	54	(71.1)
Not available	34	-
ER status		
Positive	449	(5.4)
Negative	148	(13.5)
Not available	33	-
PR status		
Positive	320	(4.9)
Negative	272	(9.7)
Not available	38	-

How we used machine learning

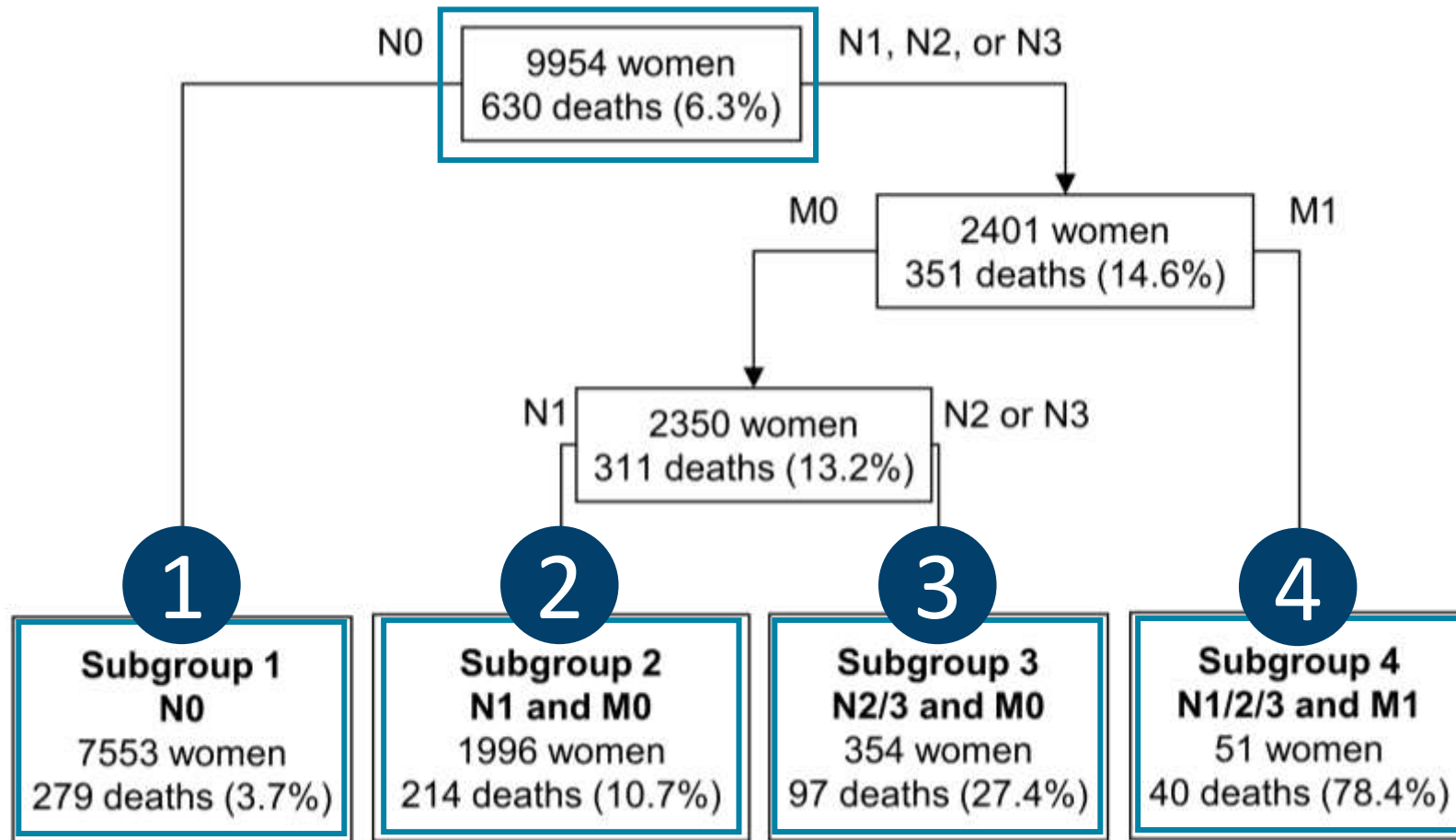
Birth country
Tumour size
Age at diagnosis
Histologic grade
Histologic type
Year of diagnosis
Attendance pattern
ER status
Nodal status
PR status pM
+ Survival outcomes



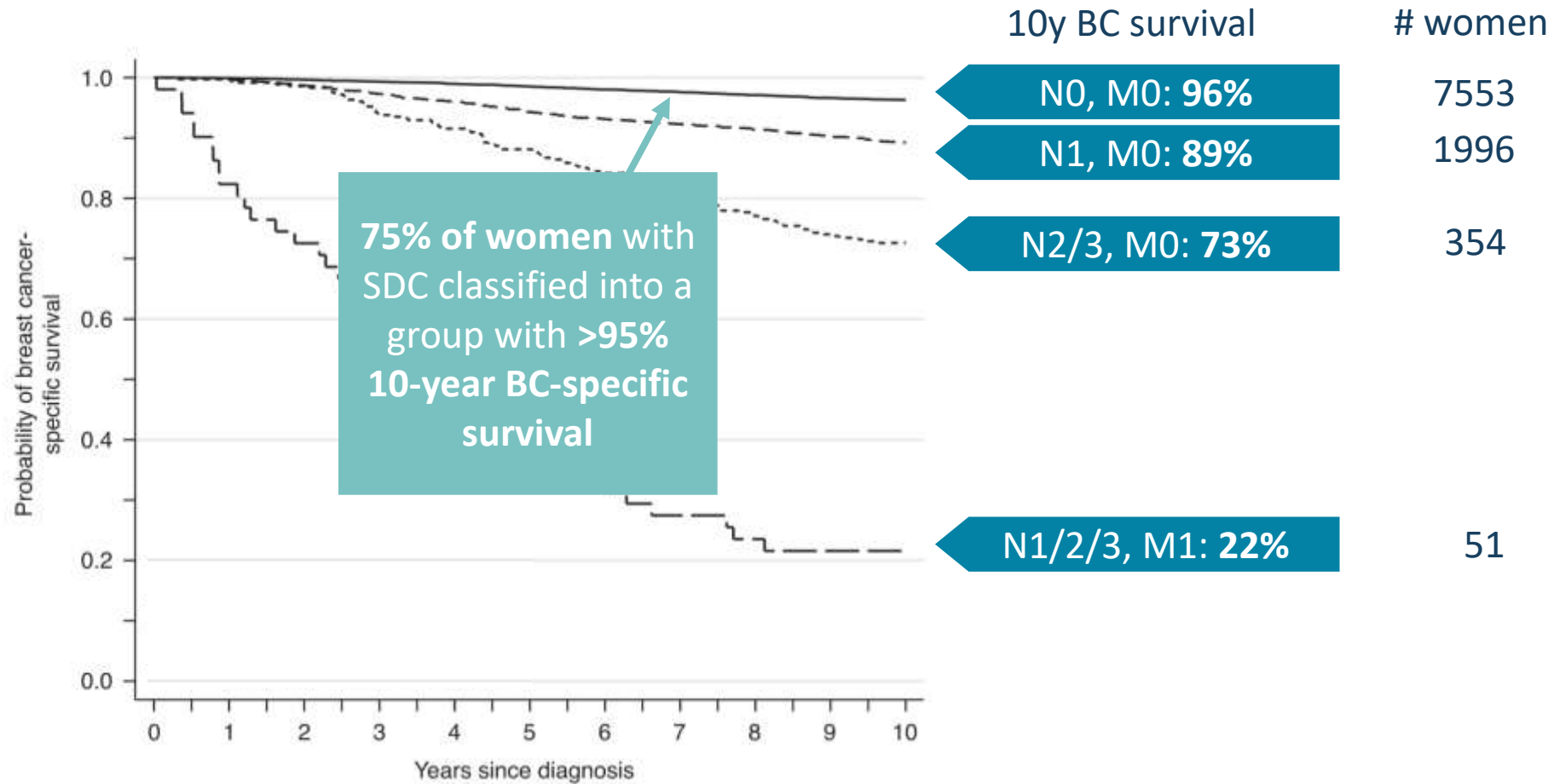
Recursive (binary) partitioning

Subgroups of women with differing survival profiles

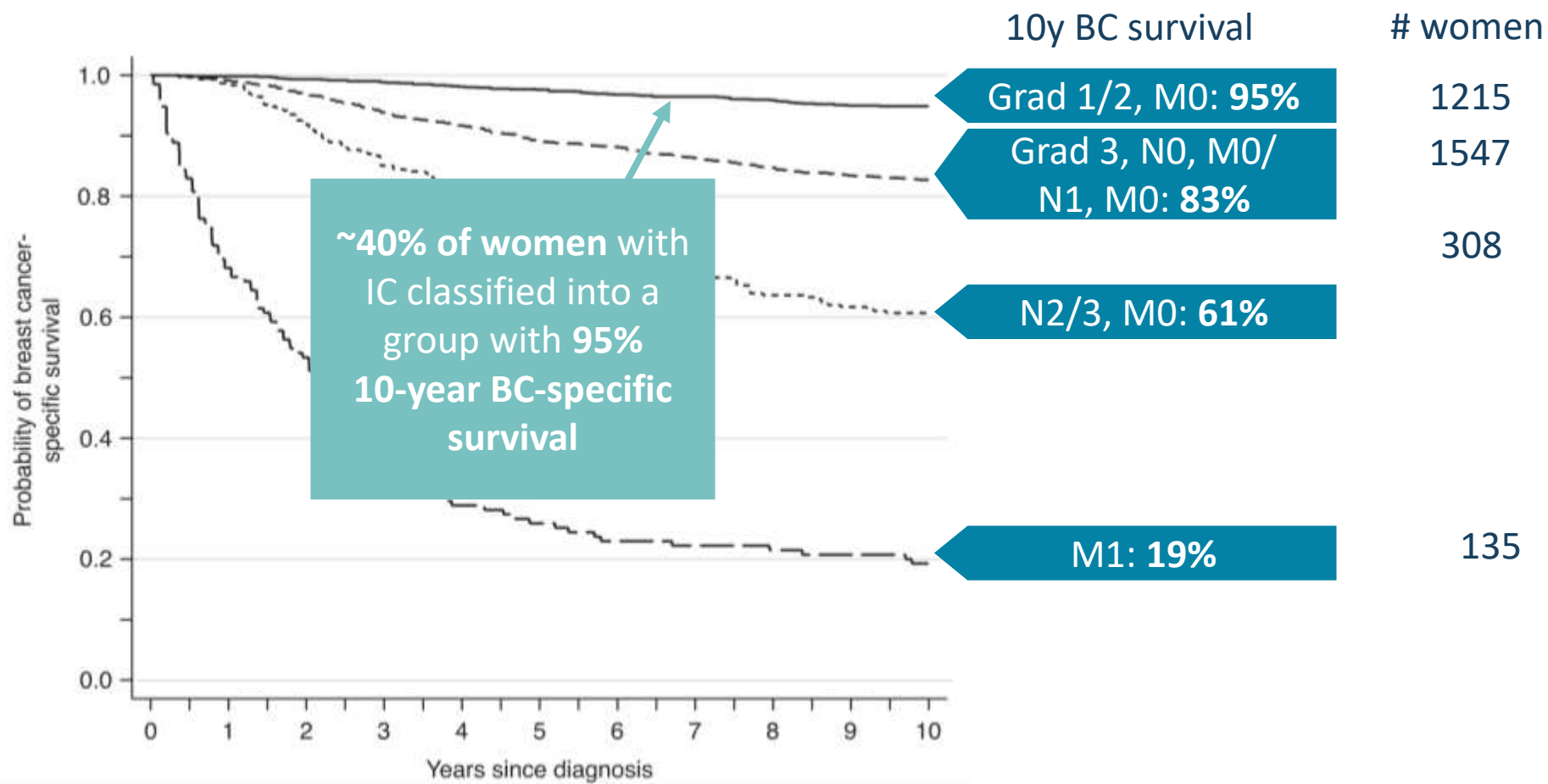
Screen-detected cancers



Screen-detected cancers, n = 9954



Interval cancers, n = 3025



Discussion

- Screening history, ER/PR not selected to define survival groups
- Ki67 and HER2 not available for this study. Nor was whether a woman attended screening based on a reminder (*purring*)
- Cohort selection: closed cohort excludes contemporary cases and includes roll-out of screening program



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Organized screening with mammography aims to detect breast cancer in an early stage and thereby reduce deaths from this disease. In Norway, all women aged 50–69 are invited to screening every other year through BreastScreen Norway and 75% of invited women participate each year. The probability of surviving a diagnosis of breast cancer in Norway is 87% after ten years and is even higher for

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Take home messages

- Overall: roughly half of all women invited to screening and diagnosed with breast cancer during 1996–2011 had an excellent prognosis ($\geq 95\%$ breast cancer specific survival after 10 years)
- Over 75% of women diagnosed with SDC had an excellent prognosis (node negative disease)
- As did nearly 40% of women with IC (Grade 1–2, node negative disease)

Thank you!

Questions?

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Article @ Br J Cancer



<https://rdcu.be/dsG9l>

Blog post



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