



Evidence from a BreastScreen cohort to inform risk-stratified screening

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Summary

- In contemporary Australian women, those with personal or first-degree history of breast cancer, dense breasts, history of benign breast conditions, hormone replacement therapy use, and symptoms had relatively high cancer detection rate (CDR) and/or interval cancer rate (ICR).
- There were further variations between age groups as shown in the bar graphs below.
- The patterns of CDR and ICR by risk factors and age groups found in this study may inform discussions in screening programs world-wide regarding a potential role for risk-stratified breast cancer screening.

Background

- Mammography screening has been shown to reduce breast cancer deaths in average-risk women in randomised trials.
- In Australia, the BreastScreen program has been providing publicly-funded mammography screening for over 25 years, currently targeting women aged 50-74 years.
- Several risk factors increase individual women's probability of developing breast cancer.
- There is increasing interest in risk-stratified population breast cancer screening as a way to improve benefit and reduce harms of screening.
- Major gaps in knowledge on the outcomes of mammography screening in women with various risk factors and no empiric evidence from the Australian setting.

Aim

To determine mammography screening outcomes by risk factors and age in contemporary Australian women to inform discussions in the BreastScreen program regarding a potential role for risk-stratified screening.

Results

Characteristics	Category	N	%
Age (years)	40-49	142700	13.9%
	50-59	424213	41.3%
	60-69	356073	34.7%
	≥70	103151	10.1%
	post-code-based SES (IRSD)	1st quintile (most disadvantaged)	98683
2nd quintile		231500	22.6%
3rd quintile		199763	19.5%
4th quintile		160137	15.6%
5th quintile (least disadvantaged)		331041	32.3%
WA could not be classified		3969	0.4%
Time since last screen	NT	259	0.0%
	Postcode missing	785	0.1%
	First screen	148499	14.5%
	Repeat screen, <15 months	92484	9.0%
	Repeat screen, 15<=, <27 months	591503	57.6%
Breast density*	Repeat screen, >=28 months	193651	18.9%
	Dense	235476	22.9%
	Not dense	703213	68.5%
Personal history of breast cancer	Unknown	87448	8.5%
	Yes	39086	3.8%
	No	987049	96.2%
Personal history of ovarian cancer	No response	2	0.0%
	Yes	5319	0.5%
	No	1020811	99.5%
First-degree family history of breast cancer	No response	7	0.0%
	Yes	211742	20.6%
	Did not report any	814395	79.4%
Hormone replacement therapy in past 6 months	Yes	121189	11.8%
	No	904850	88.2%
	No response	98	0.0%
Breast surgery or biopsy for benign conditions	Yes	182562	17.8%
	Did not report any	843575	82.2%
	Yes	10455	1.0%
Self-reported breast symptoms	Did not report any	1015682	99.0%
	Yes	145086	14.1%
BSWA's high risk category	No	881051	85.9%
	Yes	145086	14.1%

*Breast density was recorded only for women who had no abnormality on the mammogram (not recalled). Women were considered to have dense breasts if at least one of the two radiologists visually classified it as showing heterogeneously or extremely dense breasts.

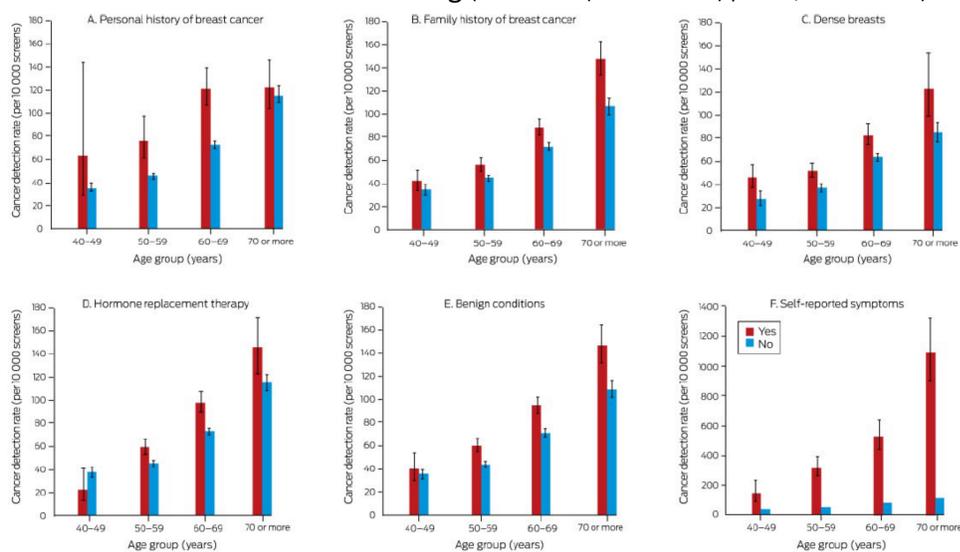
Conclusion

- Different risk factors have varied influence on CDR and ICR.
- There were further variations between age groups.
 - Increase in CDR associated with personal history was greater in women aged <70 years, whilst those associated with all other risk factors were more evident in older women.
 - Increase in ICR associated with family history was greater in younger women, whilst those associated with HRT use and dense breasts were more evident in older women.
- The patterns of CDR and ICR by risk factors and age found in this study may inform discussions of and new research in risk-stratified screening in Australia and world.

Methods

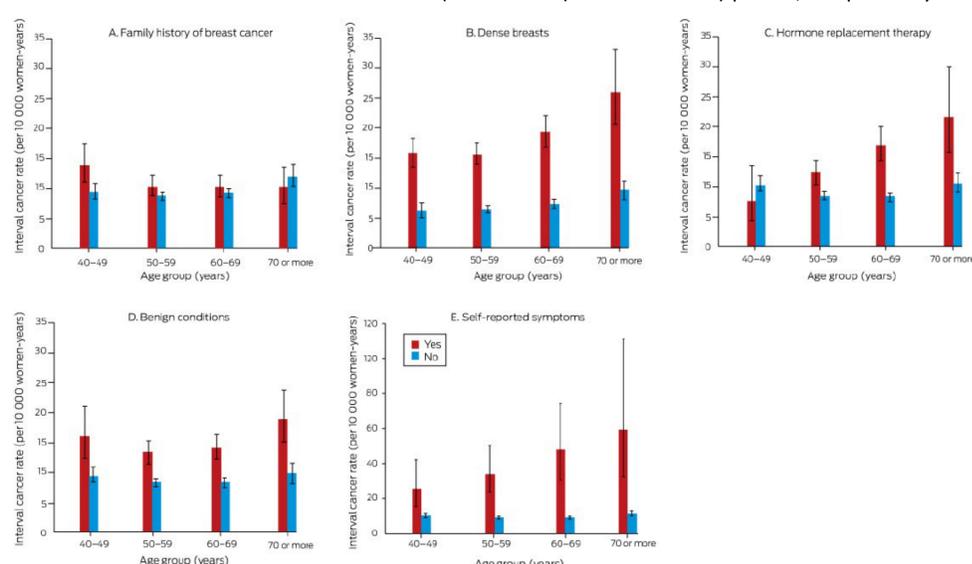
- Retrospective cohort study using routinely collected administrative and clinical data with the BreastScreen WA program.
- All 1,026,137 mammography screening episodes for 323,082 women aged ≥40 between July 2007 and June 2017.
- Cancer detection rates (CDR; per 10,000 screens) and interval cancer rates (ICR; per 10,000 women-years) by risk factors and age groups.
- Screening-detected cancers = cancers detected following abnormal mammograms and further testing.
- Interval cancers = cancers in women whose screen results were negative and in whom breast cancer diagnosis occurred before the next scheduled screen (2 years in most women).

Cancer detection rate at screening (Overall 68 (95%CI 67-70) per 10,000 screens)



- First screens were excluded when calculating age-stratified CDR because CDR is known to be high in first screens
- As breast density was recorded only for women who had no abnormality on the mammogram, CDR by breast density was determined on density in the previous screen within 27 months.

Inter-screen interval cancer rate (Overall 9.7 (95%CI 9.2-10.1) per 10,000 person-years)



ICR could not be determined for personal history of breast cancer because recurrent or second breast cancers are not routinely reported to cancer registries.