

Author(s): Guidelines Development Group (GDG): Mariangela Autelitano, Bettina Borisch, Mireille Broeders, Xavier Castells, Roberto D'Amico, Edoardo Colzani, Jan Daneš, Chris De Wolf, Stephen Duffy, Patricia Fitzpatrick, Markus Follmann, Livia Giordano, Paolo Giorgi Rossi, Axel Gräwingholt, Solveig Hofvind, Lydia Ioannidou-Mouzaka, Susan Knox, Annette Lebeau, Helen McGarrigle, Lennarth Nyström, Elsa Pérez Gómez, Cecily Quinn, Peter Rabe, Holger Schünemann, Alberto Torresin, Ruben Van Engen, Cary Van Landsveld-Verhoeven, Sue Warman, Kenneth Young. Systematic Review team: Carlos Canelo, David Rigau, Margarita Posso, Ivan Solà, Pablo Alonso-Coello. JRC Healthcare Quality team: Zuleika Saz-Parkinson, Donata Lerda

Date: 31/01/2019

Question: annual compared to triennial mammography screening for women aged 45 to 49

Setting: European Union

Bibliography: Vilaprinco E, Forne C, Carles M, Sala M, Pla R, et al. (2014) Cost-Effectiveness and Harm-Benefit Analyses of Risk-Based Screening Strategies for Breast Cancer. PLoS ONE 9(2): e86858

Certainty assessment							Nº of patients		Effect		Certainty	Importance
Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	annual	triennial mammography screening	Relative (95% CI)	Absolute (95% CI)		

Breast cancer mortality

1 ¹	observational studies	not serious ^{a,b}	not serious	serious ^c	serious ^d	none	18/88543 (0.0%)	18/100508 (0.0%)	RR 1.14 (0.59 to 1.27)	3 more per 100,000 (from 7 fewer to 5 more)	⊕○○○ VERY LOW	CRITICAL
----------------	-----------------------	----------------------------	-------------	----------------------	----------------------	------	-----------------	------------------	---------------------------	--	------------------	----------

Breast cancer death averted (modelling studies)

1 ^{2e}	observational studies	not serious	not serious	very serious ^{f,g}	not serious	none			Ratio A/T: 0.7 (-- to --)	14 fewer per 100,000 (from -- to --)	⊕○○○ VERY LOW	CRITICAL
-----------------	-----------------------	-------------	-------------	-----------------------------	-------------	------	--	--	------------------------------	---	------------------	----------

QALYs (modelling studies)

1 ^{2e}	observational studies	not serious	not serious	very serious ^{f,g}	not serious	none			Ratio A/T: 1.22 (-- to --)	134 more per 100,000 (from -- to --)	⊕○○○ VERY LOW	CRITICAL
-----------------	-----------------------	-------------	-------------	-----------------------------	-------------	------	--	--	-------------------------------	---	------------------	----------

Overdiagnosis (modelling studies)

1 ^{2e}	observational studies	not serious	not serious	very serious ^{f,g}	not serious	none			Ratio A/T: 1.61 (-- to --)	54 more per 100,000 (from -- to --)	⊕○○○ VERY LOW	CRITICAL
-----------------	-----------------------	-------------	-------------	-----------------------------	-------------	------	--	--	-------------------------------	--	------------------	----------

False positive results -10 year cumulative probability

1 ³	observational studies ^h	serious ⁱ	not serious	very serious ^{j,k}	not serious	none	Annual screening 65% (95%CI 63% to 65%) Triennial screening 29% (95%CI 29% to 30%) Difference: 36,000 more per 100,000.			⊕○○○ VERY LOW	CRITICAL
----------------	------------------------------------	----------------------	-------------	-----------------------------	-------------	------	---	--	--	------------------	----------

Certainty assessment							N ^o of patients		Effect		Certainty	Importance
N ^o of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	annual	triennial mammography screening	Relative (95% CI)	Absolute (95% CI)		

False positive biopsy recommendation -10 year cumulative probability

1 ³	observational studies ^k	serious ^l	not serious	very serious ^{c,j}	not serious	none	Annual screening 11% (11% to 12%) Triennial screening 4% (4% to 4%) Difference: 7,000 more per 100,000.	 VERY LOW	CRITICAL
----------------	------------------------------------	----------------------	-------------	-----------------------------	-------------	------	---	---	----------

Stage of breast cancer (IIB-IV) - not reported

-	-	-	-	-	-	-	-	-	-	-	-	CRITICAL
---	---	---	---	---	---	---	---	---	---	---	---	----------

Interval cancer

1 ⁴	observational studies	not serious ^a	not serious	serious ^d	not serious	none	Annual screening 25% (15% to 36%) Triennial screening 35% (22% to 50%) Difference: 10,000 fewer per 100,000 breast cancers	 VERY LOW	CRITICAL
----------------	-----------------------	--------------------------	-------------	----------------------	-------------	------	--	---	----------

Incidence of advanced breast cancer following first round of screening - not reported

-	-	-	-	-	-	-	-	-	-	-	-	CRITICAL
---	---	---	---	---	---	---	---	---	---	---	---	----------

CI: Confidence interval; RR: Risk ratio

Explanations

- a. The study was carried out in the screening program of Turku-Finland, where since 1987, the women population aged 40–49 years annually (even year-of-birth cohorts) or triennially (odd birth-year cohorts). The analyses were performed according to the intention-to-screen.
- b. Only deaths due to invasive breast cancers up to age 52 years were included. We call this outcome as the incidence-based mortality, also referred to as refined mortality.
- c. Estimations based in studies that included women from 40 to 49 years old.
- d. The confidence interval of the point estimates goes from important benefit to important harms.
- e. 100,000 women screened for calculations.
- f. The comparison for any interval in the models was a no screening scenario. No direct comparisons were reported.
- g. In the publications the age period 45-49 was not included. Results were calculated by subtracting the effects of overlapping age periods.
- h. One modelling study estimated the number of false positive results in annual screening of 9,150 and for triennial of 4,831 per 100,000 screened women from 45 to 59 years old (difference 4,319 more events).
- i. Intervals were classified in base of the month ranges elapsed between two screening mammograms prior to diagnosis. Potential high risk of misclassification.

j. Results were extracted from groups of women with selected characteristics (e.g. normal weight, fatty or scattered fibroglandular breast density, or white race).

k. One modelling study estimated the number of benign biopsy results in annual screening of 408 and for triennial of 108 per 100,000 screened women from 45 to 59 years old (difference 300 more events).

References

1. Parvinen I, Chiu S, Pylkkänen L, Klemi P, Immonen-Räihä P, Kauhava L, Malila N, Hakama M.. Effects of annual vs triennial mammography interval on breast cancer incidence and mortality in ages 40-49 in Finland. *Br J Cancer*; 2011.
2. Vilapriyo, E. Cost-effectiveness and harm-benefit analyses of risk-based screening strategies for breast cancer. *PLoS One*; 2014.
3. O'Meara ES, Zhu W, Hubbard RA, Braithwaite D, Kerlikowske K, Dittus KL, Geller B, Wernli KJ, Miglioretti DL.. Mammographic screening interval in relation to tumour characteristics and false-positive risk by race/ethnicity and age. *Cancer*; 2013.
4. Klemi, P. Mammography screening interval and the frequency of interval cancers in a population-based screening. *Br J Cancer*; 1997.