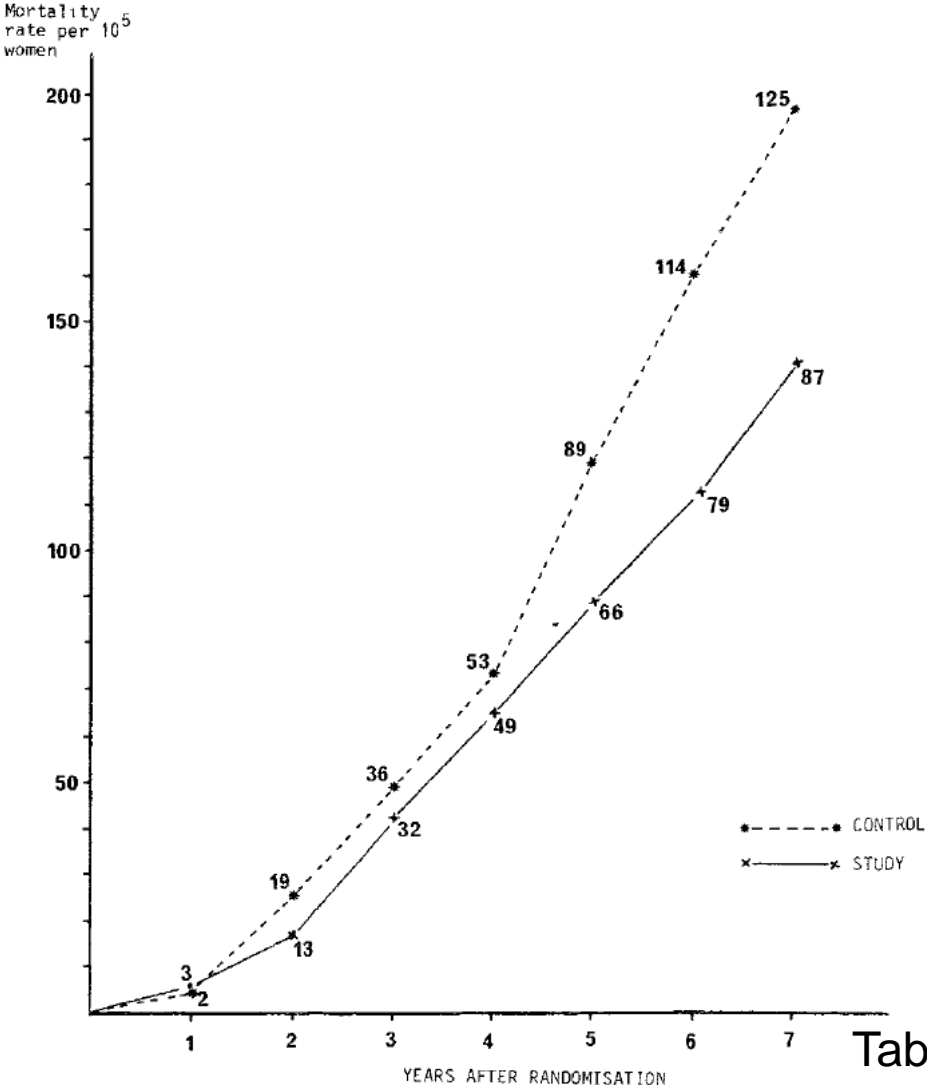# Controversies in Mammography Screening and Screening between 40 and 50 years

H. Junkermann

Cumulative mortality rates
women aged 40 -74 at entry

Tabar et al, Lancet 1985

Early service screening programs in Europe

- Sweden, Västmanland 1986
- Netherlands   1988
- Great Britain   1988
- Finland   1989
- Sweden, Stockholm   1989

Giordano et al, J Med Screen 2012

Criticism

- Validity of studies questioned by Nordic Cochrane foundation
  - Olsen and Gøtzsche, Lancet 2001
- Criticism refuted by WHO:
  - Screening reduces mortality in participants by 30 %. IARC Working Group, in : Vaino and Bianchini eds. Lyon 2002

Meta-analysis of 11 randomized trials:
risk reduction by invitation to screening 20%

Independent UK Panel on Breast Cancer Screening, Lancet 2012
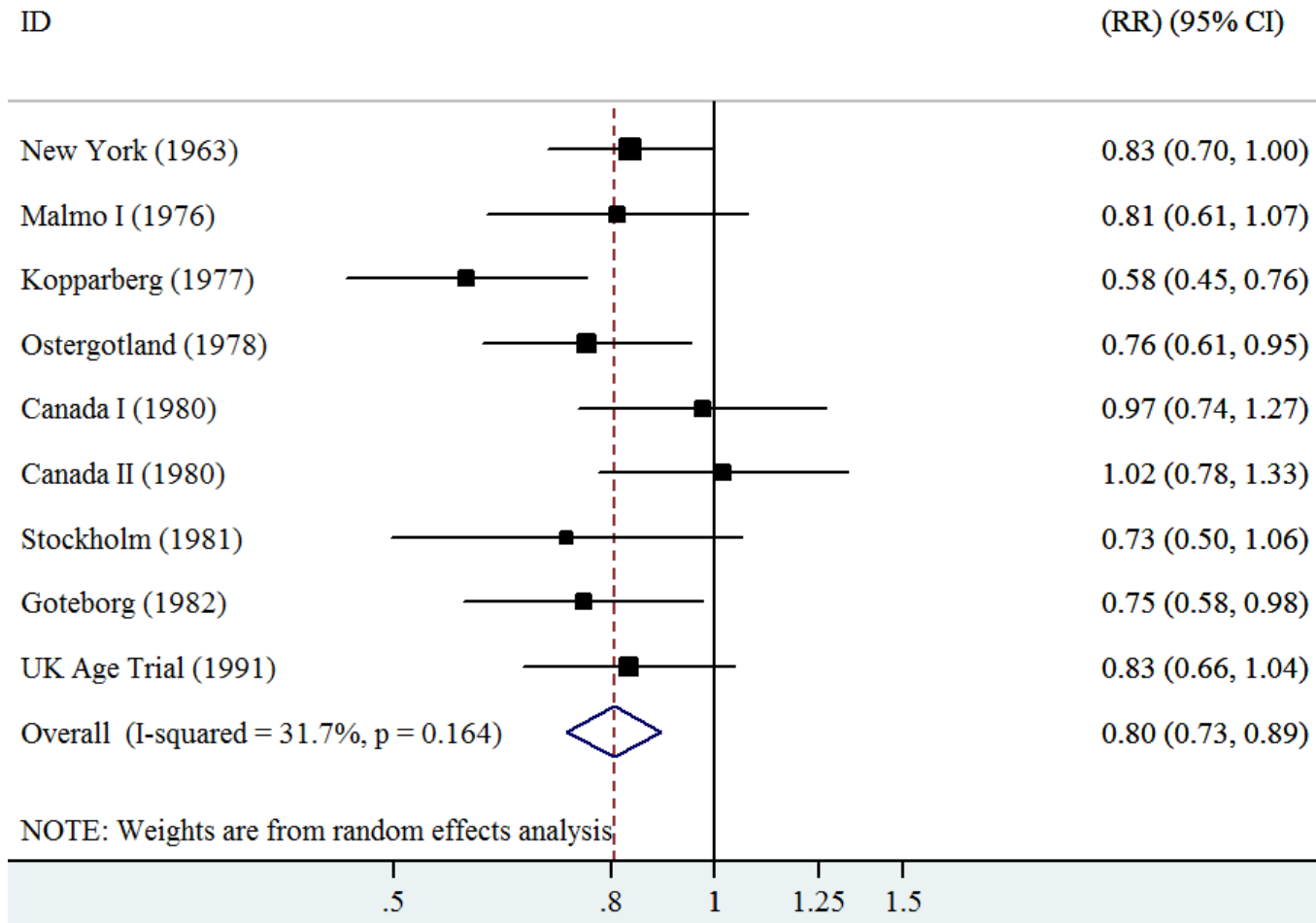
Observational Studies

| Type	N	Breast cancer mortality reduction	Comment
Trend analysis	12	1-9%/year pre vs postscreening: 28% - 36%	Least reliable
Incidence based mortality	7	Invitation 25% Participation 38%	Meta-analysis
Case control	7	Invitation 31% Participation 48%	Meta-analysis

EUROSCREEN Group, J Med Screen 2012

Overdiagnosis

- Carcinoma are detected, which would not have become symptomatic during the remaining lifetime of the screened person

- These carcinoma are treated as all other carcinomas, since they cannot be discriminated from other carcinoma.

- This leads to more therapies in a screened population with associated morbidity and cost
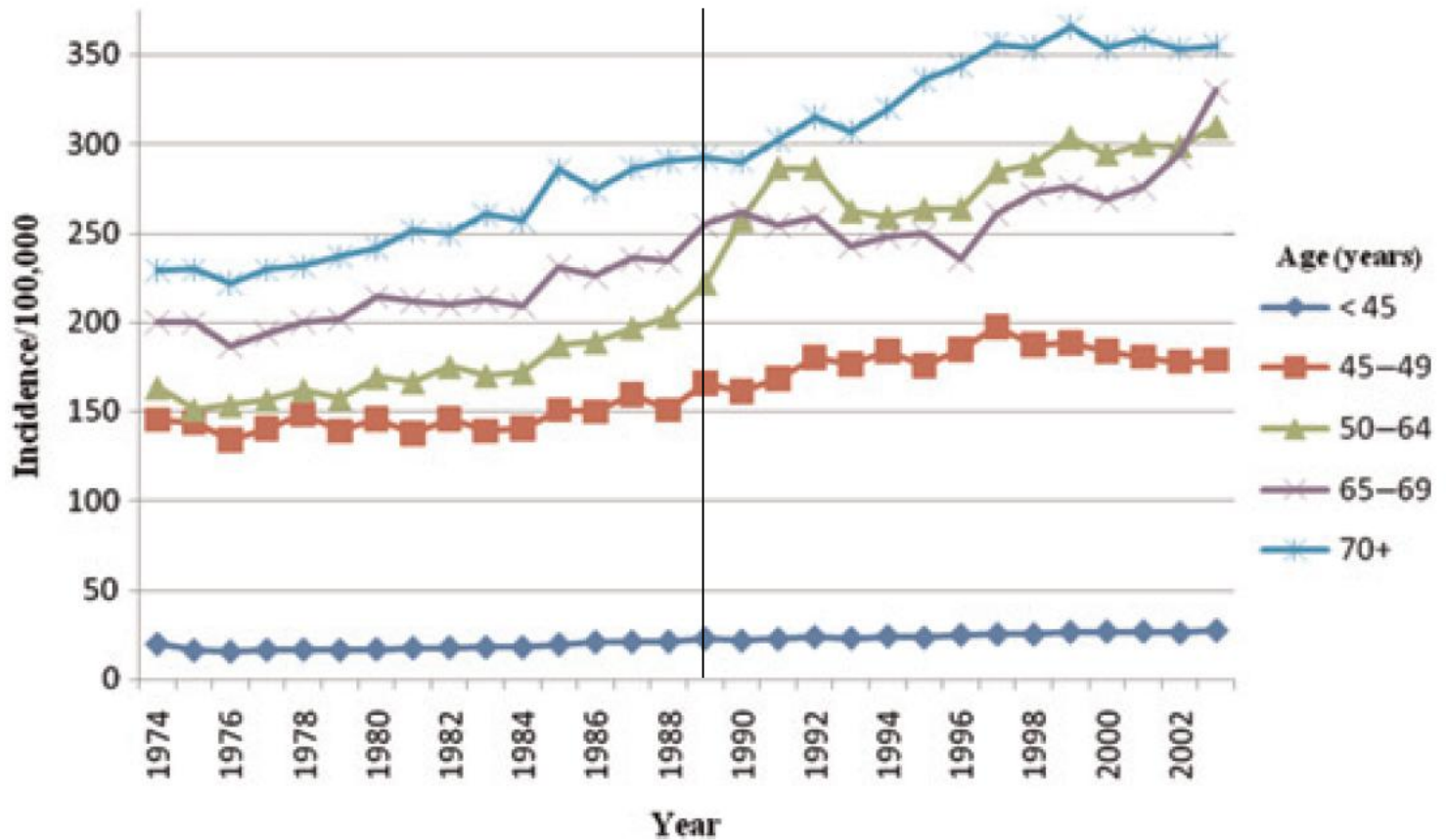
Problems with estimation of overdiagnosis

- Changing background incidence in screened and control group

- Lead time bias

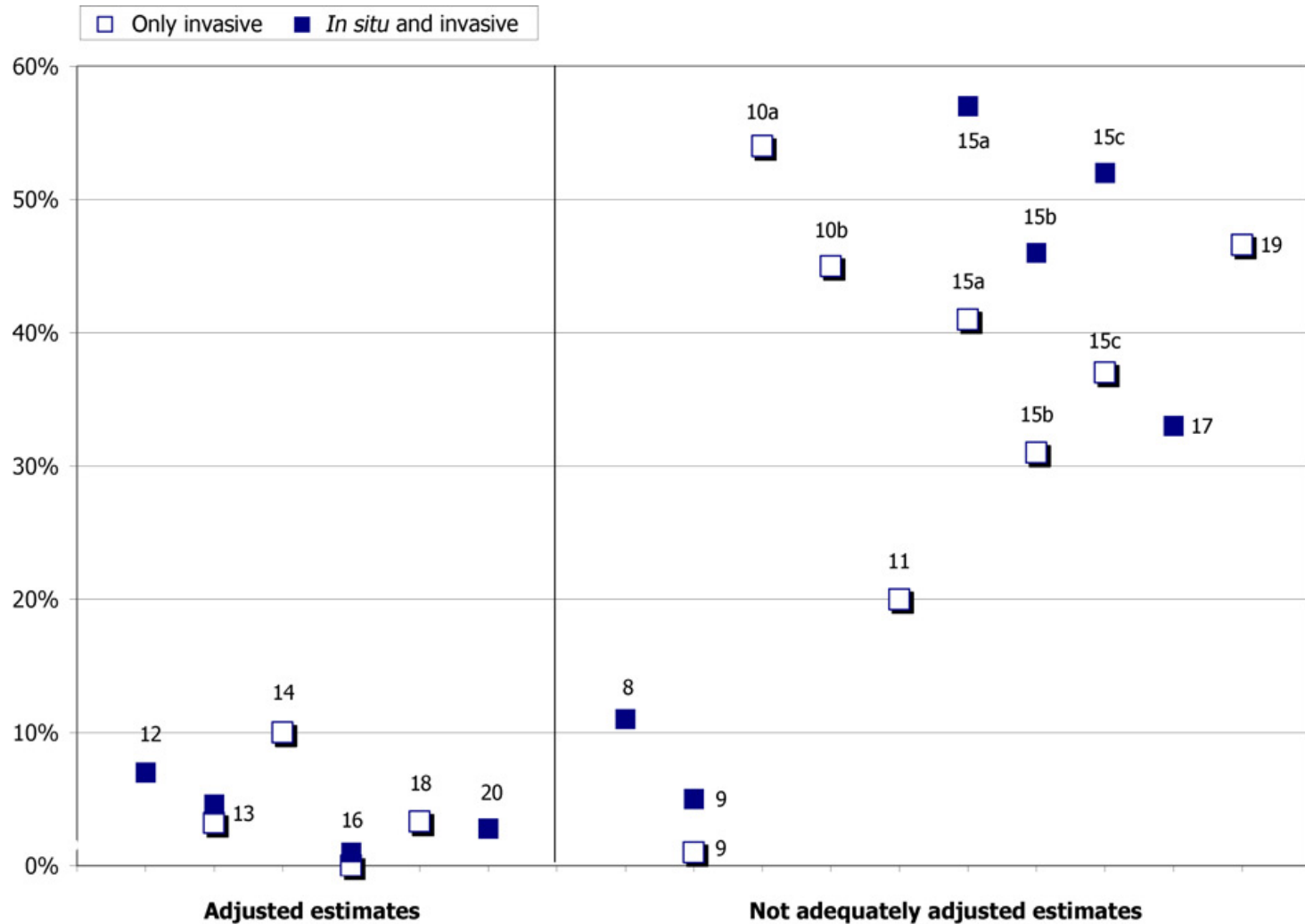# Overdiagnosis in UK equals 53%

Jørgensen and Gøtzsche, BMJ 2009

Overdiagnosis in UK equals 4 – 7 %
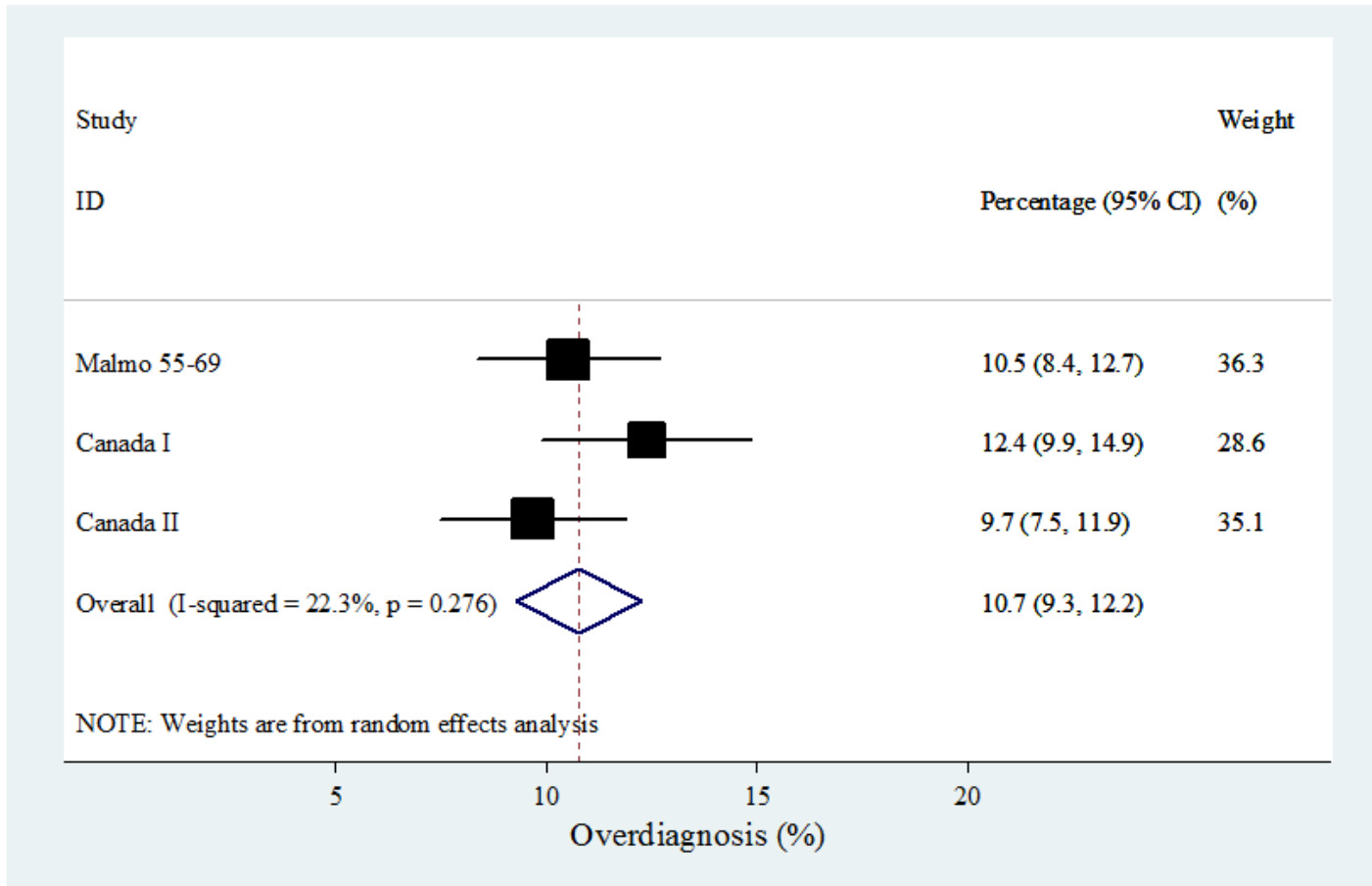

Duffy et al, J Med Screen 2010
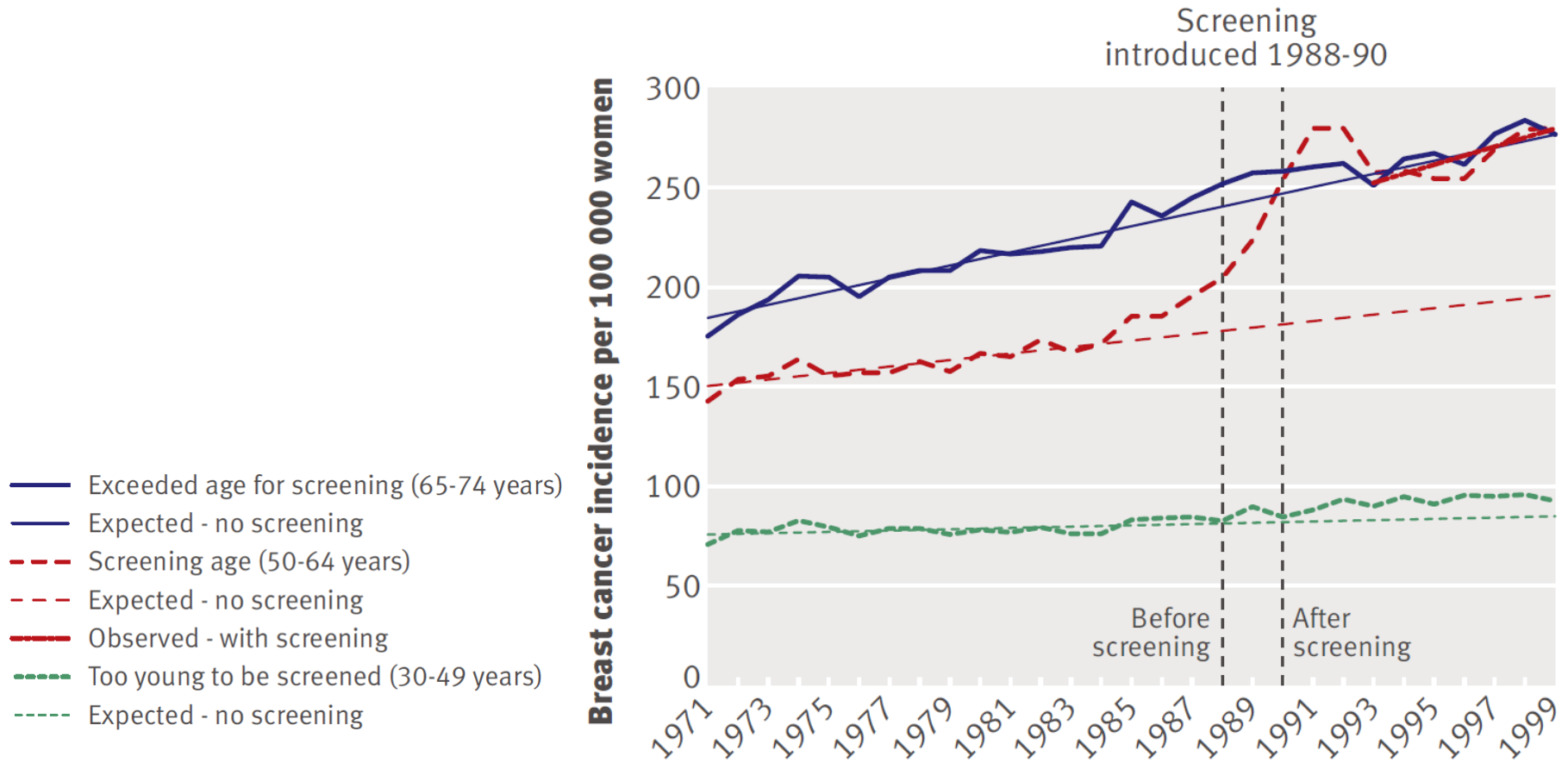
Overdiagnosis in mammographic screening for breast cancer in Europe: observational studies

Puliti et al, 2012

Overdiagnosis in mammographic screening: randomized studies
proportion of cancers over long-term follow-up

Independent UK Panel on Breast Cancer Screening, Lancet 2012

Balance of mortality reduction and overdiagnosis

	Per 1000 participants	Participanmts per event
Breast cancer diagnosis	71	14
Mortality reduktion	8	120
Overdiagnosis	4	250

EUROSCREEN Working Group 2012

Age dependent mortality reduction

Nyström et al, Lancet 2002
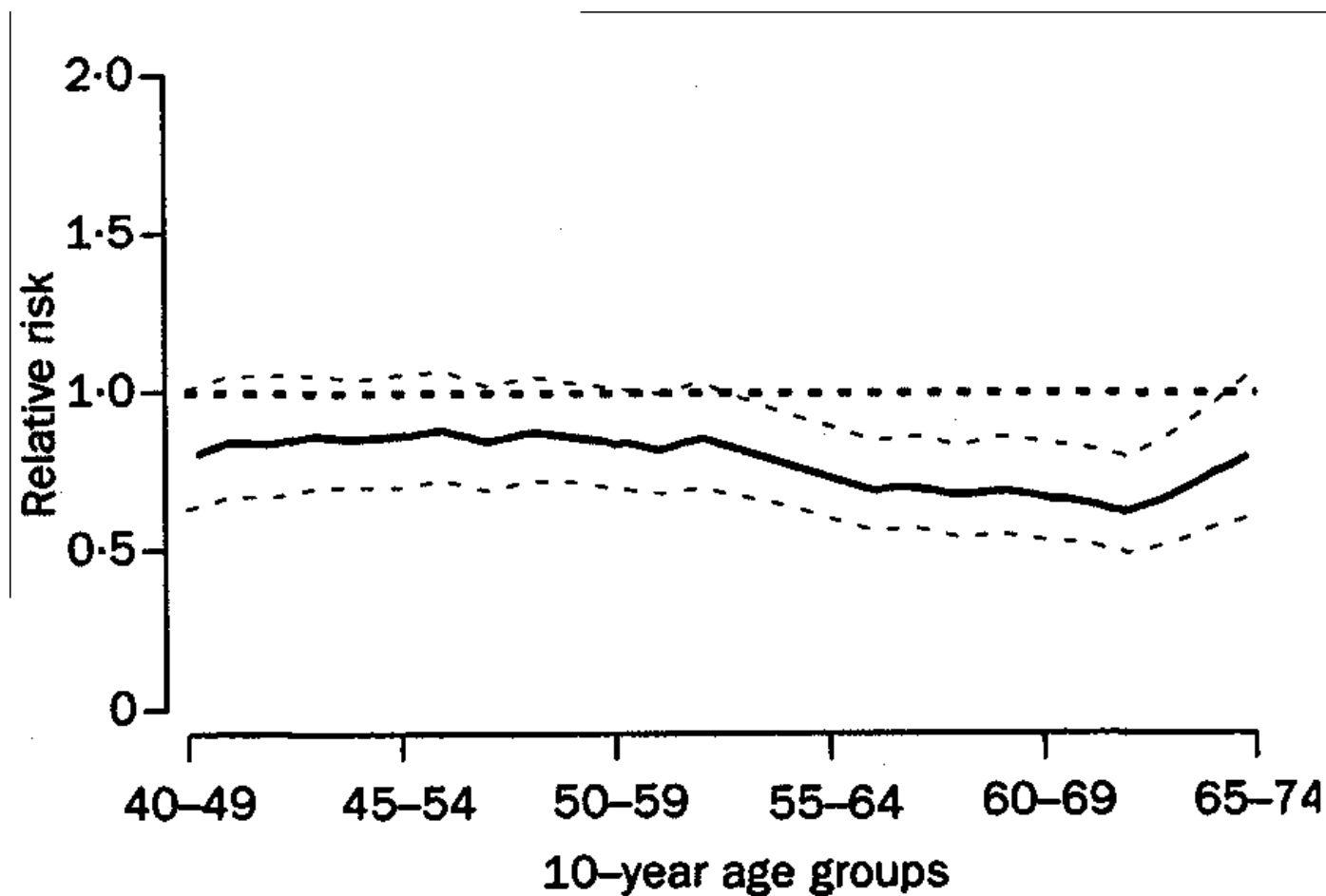
Coverage of new breast cancers by age groups
on the basis of new cases in Germany before the screening program started

50 – 69 years	47 %
50 – 74 years	57 %
45 – 74 years	65 %

From: RKI 2012

Significant randomized studies of screening from 40 to 50 years

Study	Breast cancer mortality	95% CI	Citation
Gothenburg	44%	32-98%	Bjurstam et al, 1997, Cancer 80:2091
Malmö	64%	45-89%	Andersson u. Janzon, 1997, JNCI Monogr: 63

Meta-analysis

- Several meta-analyses of the randomized studies have confirmed reduced breast cancer mortality from mammography screening of women 40 to 50 years

Nijmegen case-control study

Age at index-invitation	Cases	Referents	Odds ratio (95% CI)
	Screened (unscreened)	Screened (unscreened)	
40–49	50 (26)	596 (154)	0.50 (0.30–0.82)
50–59	69 (39)	350 (107)	0.54 (0.35–0.85)
60–69	53 (35)	107 (46)	0.65 (0.38–1.13)

Van Schoor et al, EJC 2010

Reduction of breast cancer mortality from service screening of women from 40 to 50 years in Sweden

Age	Reference	%	95% CI
40 - 44	invited	17	0 - 30
40 - 44	screened	18	0 - 33
45 - 49	invited	32	22 - 41
45 - 49	screened	37	25 - 46

Hellquist et al, 2011

Radiation risk of mammography
breast cancer mortality per 100000 women

age	induced	avoided
50 - 74	1,6 x 2 = 3,2	1121
40 - 74	3,7 x 2 = 7,4	1302
40 - 49	2,1 x 2 = 4,2	181

nach: de Gelder et al, (2011) B J Cancer 104:1214

Studies in Great Britain

- Randomized extension of lower and upper age range from 50 - 70 to 47 - 73 years
- Pilot study with 60000 women successfully closed
- Recruitment will be finished in 2016

Moser et al (2011) J Med Screen 18:96

Summary and Conclusion

- Recent research has confirmed the mortality reducing effect of breast cancer screening with mammography

- Overdiagnosis with following overtreatment is the most important hazard, but is in an acceptable range if analyzed properly

Summary and Outlook

- Recent results have confirmed the influence of mammography screening on breast cancer mortality in women between 40 and 50 years of age

- The relative mortality reduction seems to be similar to age 50 and 70 years

- A lowering of the entry age of organized screening programs should be considered