

Increasing Trends in Breast Cancer Incidence: Does Overdiagnosis Play a Role?

Klaus Giersiepen

email: giersiep@bips.uni-bremen.de

GMDS Leipzig, September 11, 2006

Bremen Cancer Registry

The logo for BiPS (Breast International Primary Survey) features the letters 'BiPS' in a bold, serif font. The 'i' has a red dot above it. A thick green horizontal line is positioned below the letters 'i' and 'P'. A thin red vertical line is positioned to the right of the letter 'S'.

www.bips.uni-bremen.de

Cancer Registration in Germany, 2006

Year: beginning of registration

*German Society of
Population Based
Cancer Registries*

(GEKID)

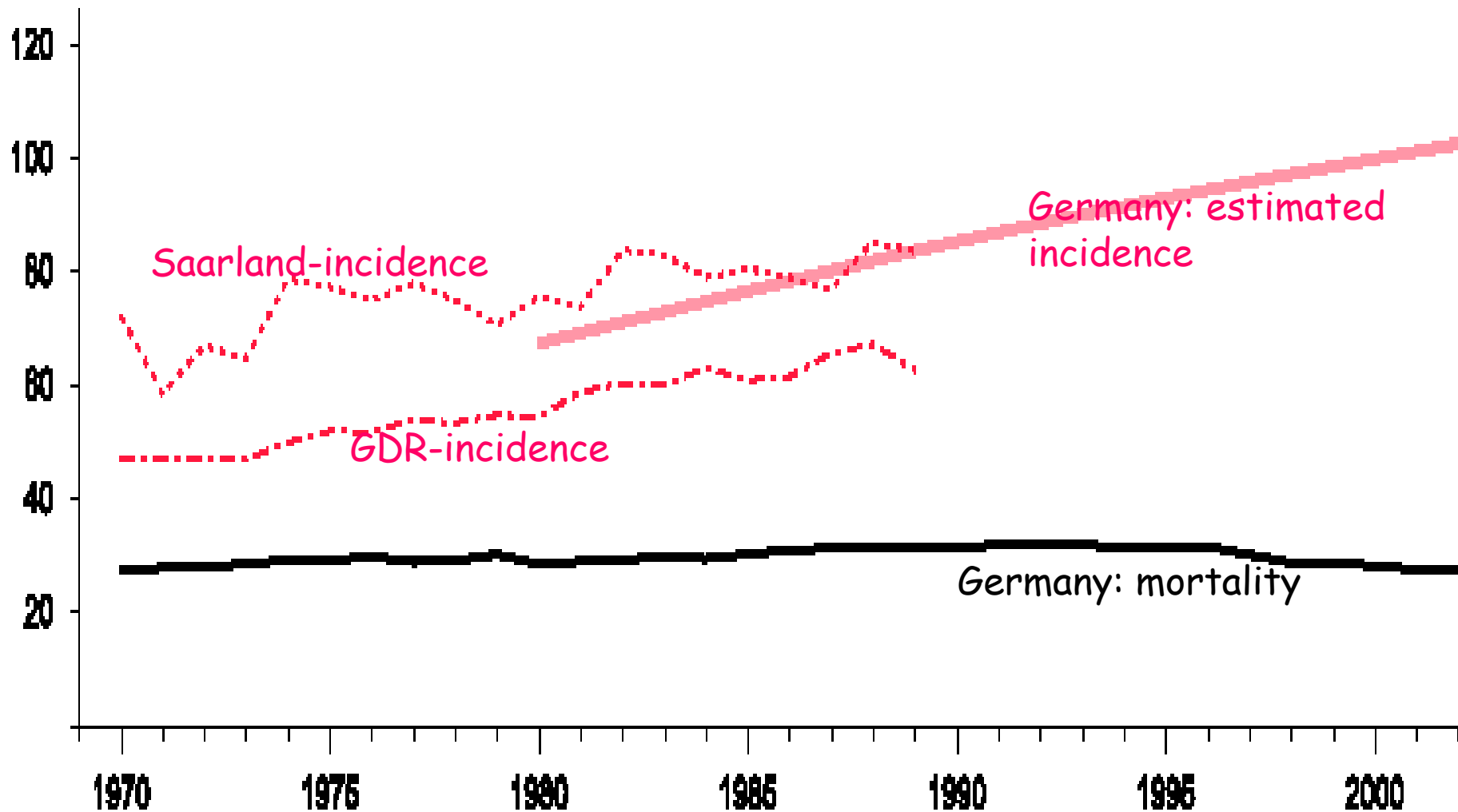
www.gekid.de



Germany: Age Standardised Breast Cancer Incidence and Mortality, 1970-2002 (ICD10: C50)

www.gekid.de

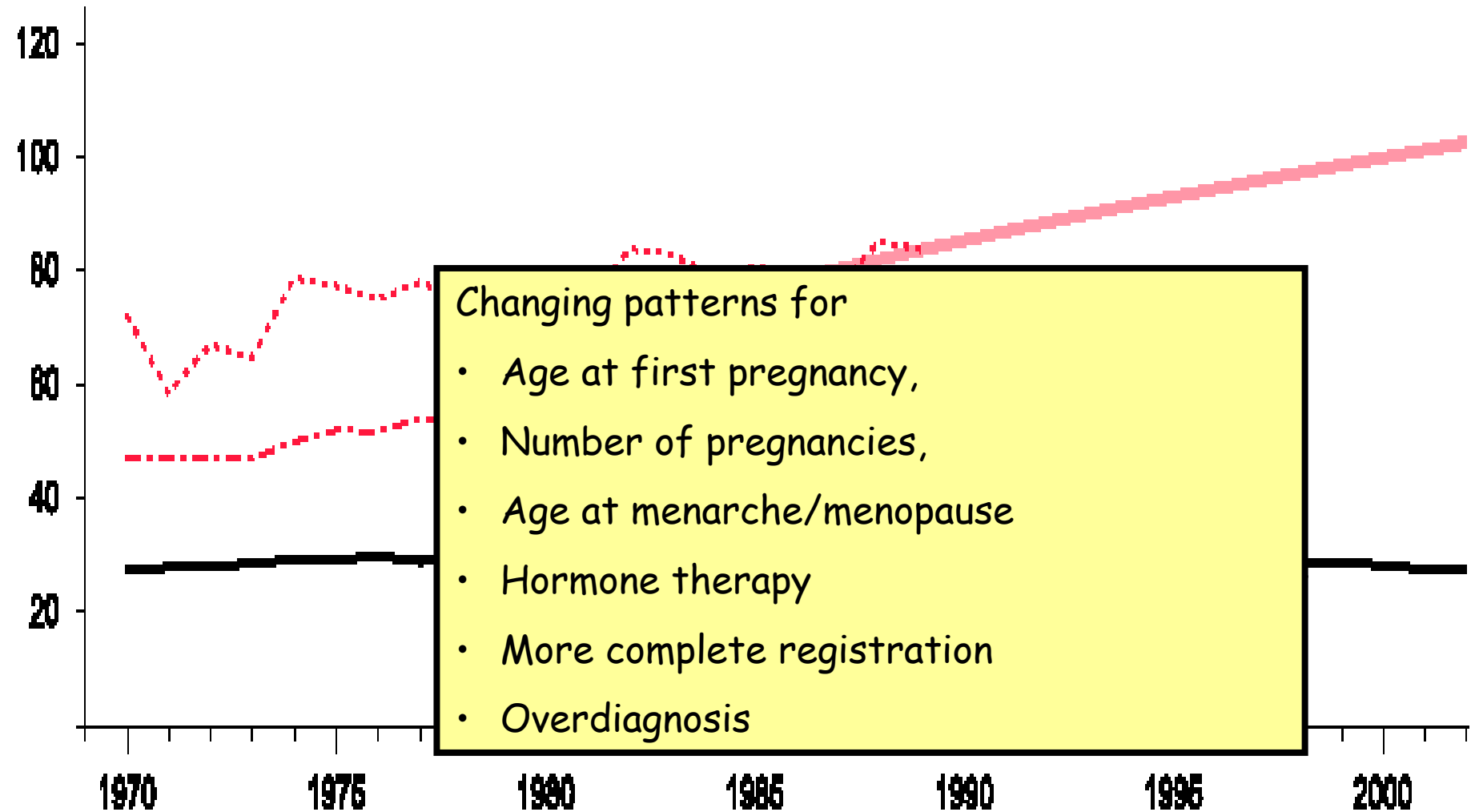
Per 100,000 women, ESR



Reasons for Rising Incidence

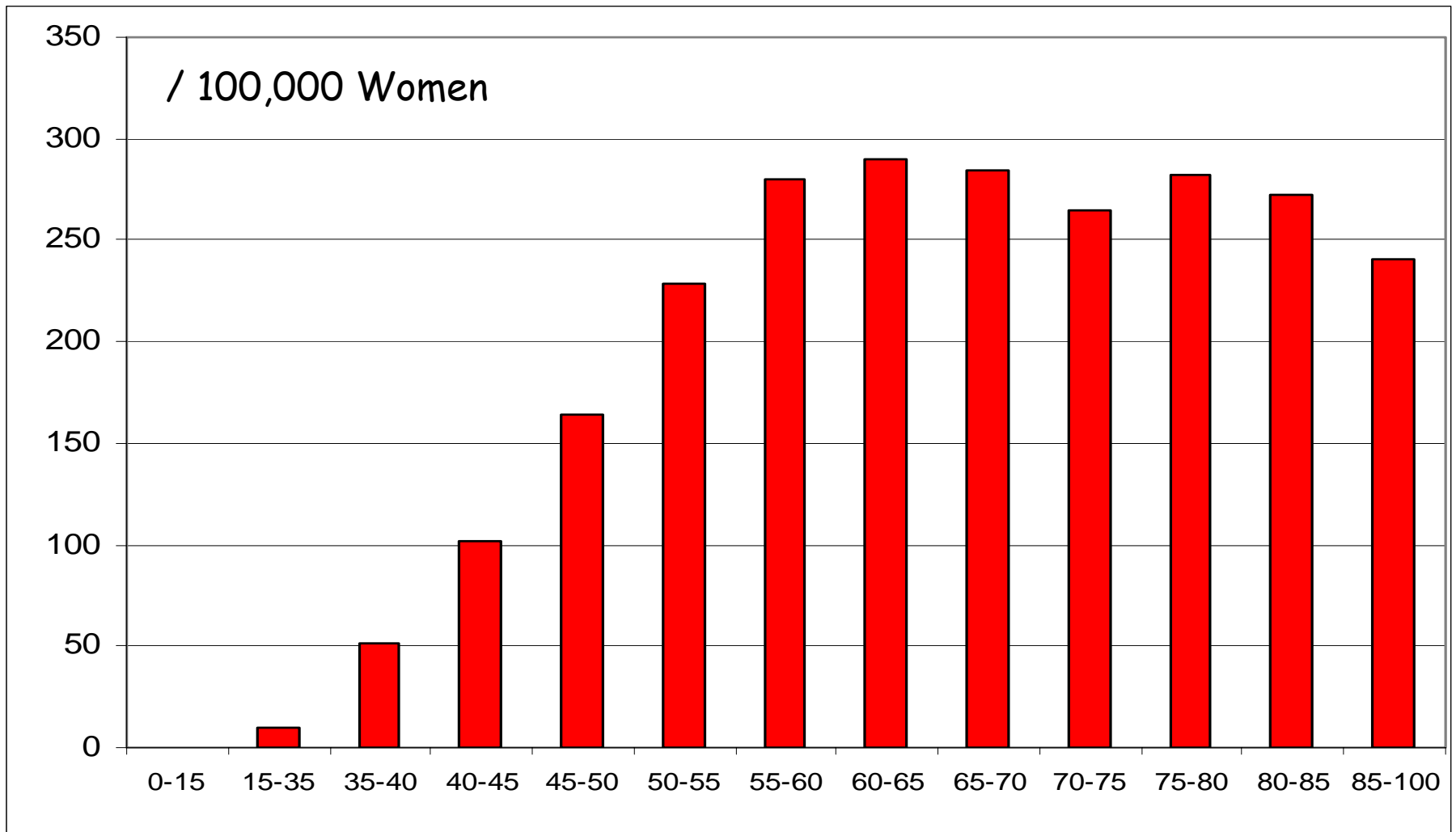
www.gekid.de

Per 100,000 women, ESR

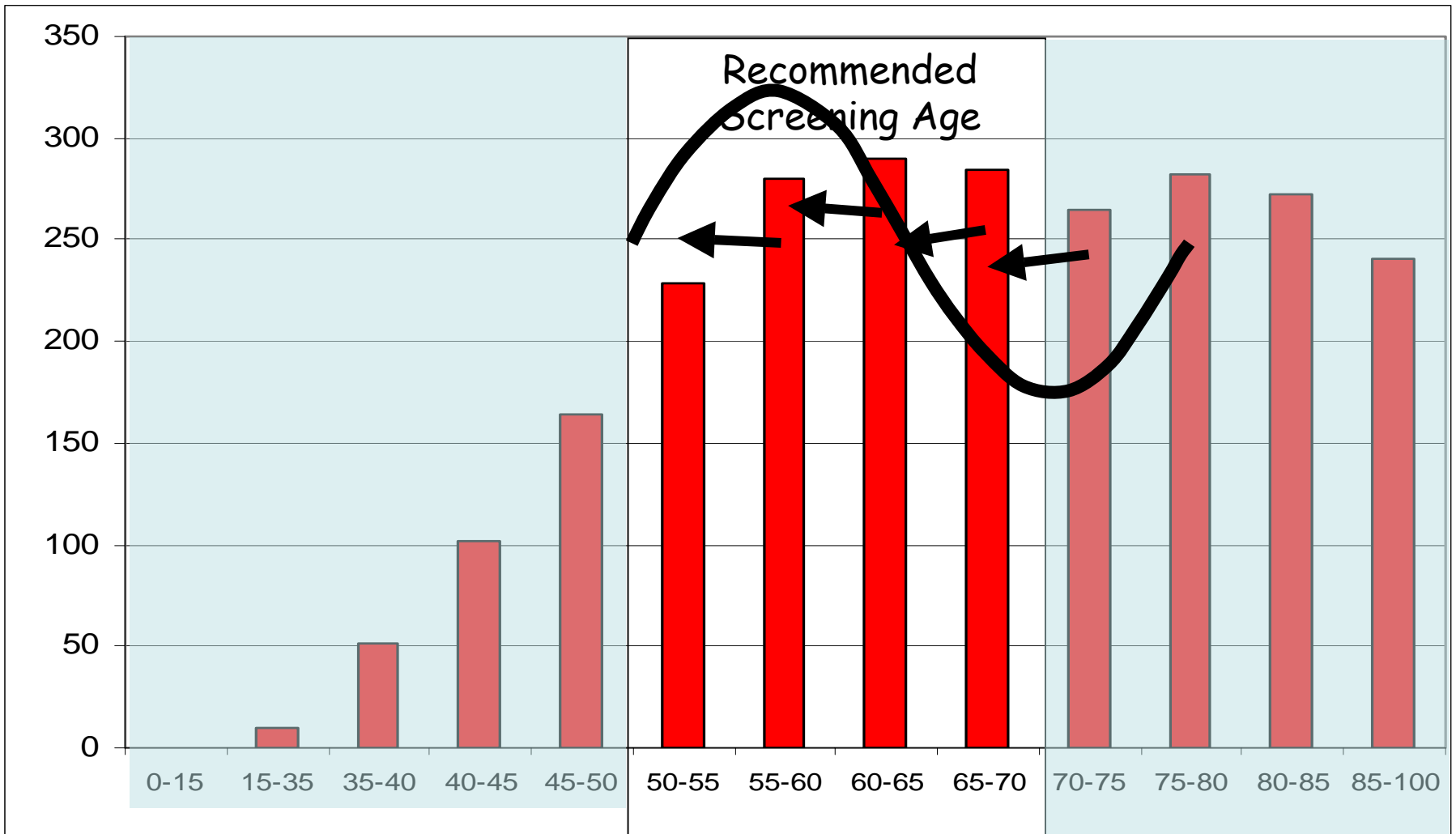


Age-Specific Breast Cancer Incidence Germany, 2002

www.gekid.de



Anticipated Shift to Younger Ages Due to Early Detection by Screening Mammography

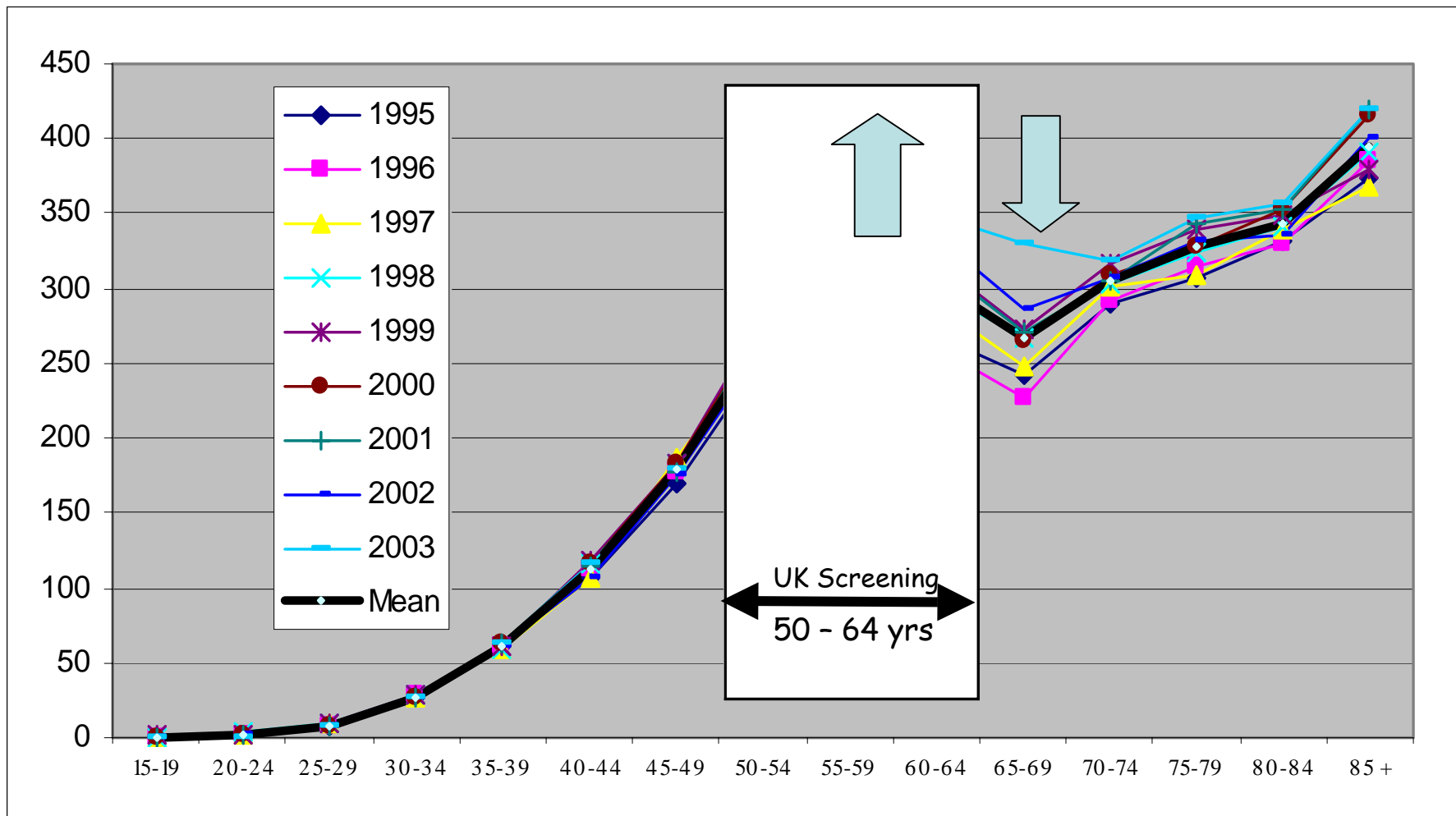


England: 1995-2003

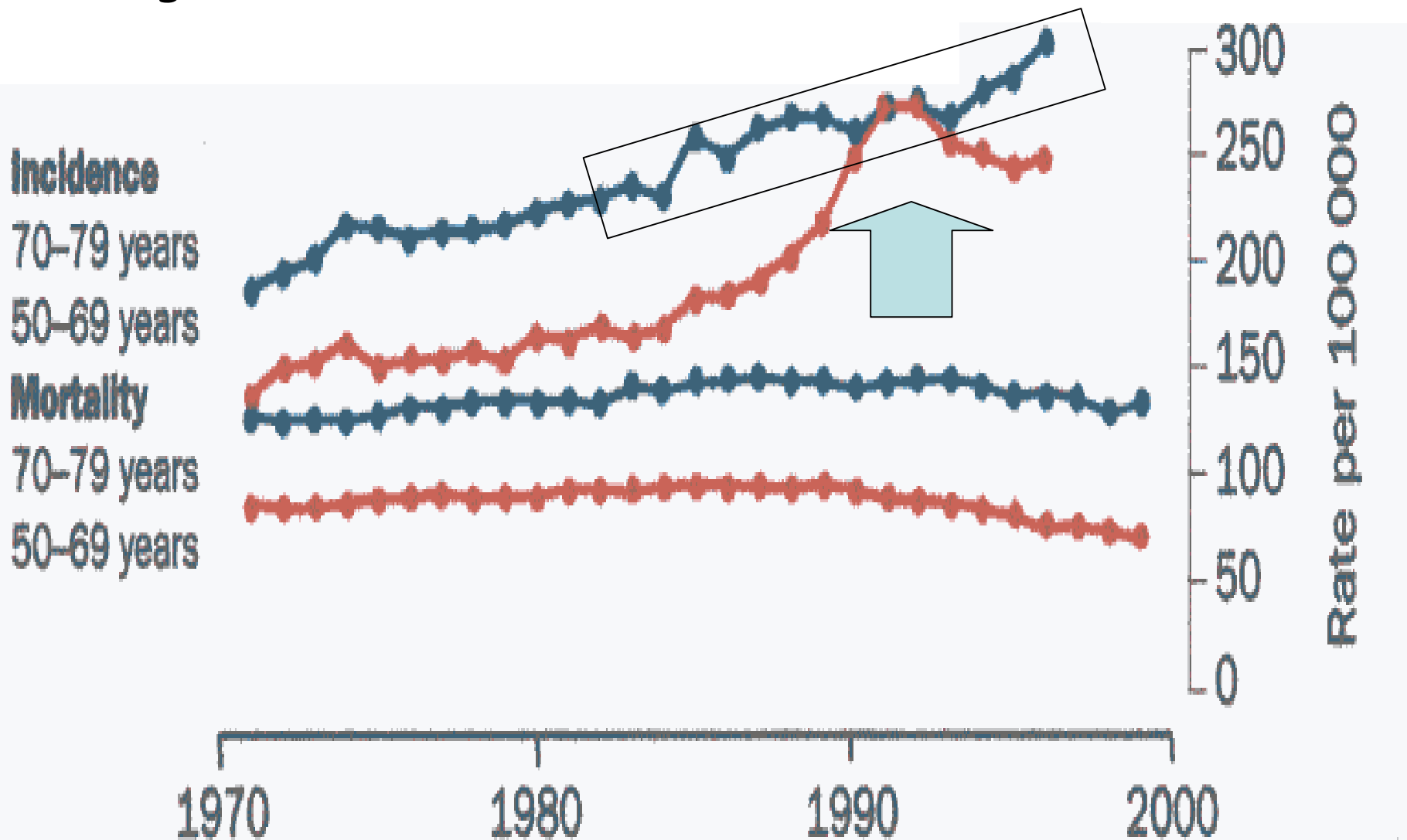
ICD10:C50

Age Specific Incidence

Series MB1 no. 28 London: THE STATIONERY OFFICE
Registrations of cancer diagnosed in 1995-1997, England. Cancer statistics registrations



Incidence and Mortality, Women with Breast Cancer England & Wales 50-69 Years, 70-79 Years; 1971-1998



Coleman M et al. 2000: Lancet 356:590

Overdiagnosis

- in cancer screening is defined as the detection of low malignancy lesions that otherwise would not be detected in a patient's lifetime.
- not to be confused with false positives classified by a screening test!

Incidence of breast cancer in Norway and Sweden during introduction of nationwide screening: prospective cohort study

Per-Henrik Zahl, Bjørn Heine Strand, Jan Mæhlen

Abstract
Objective
incidence
mammog
incidence

Conclusions Without screening one third of all invasive breast cancers in the age group 50-69 years would not have been detected in the patients' lifetime. This level of overdiagnosis is larger than previously reported.

Norwegian Institute
of Public Health,
Box 4404
Blindern, N-0403
Oslo, Norway
Henrik Zahl
Senior statistician

Norway

Zahl PH (2004) Br Med J. 328:921-4.

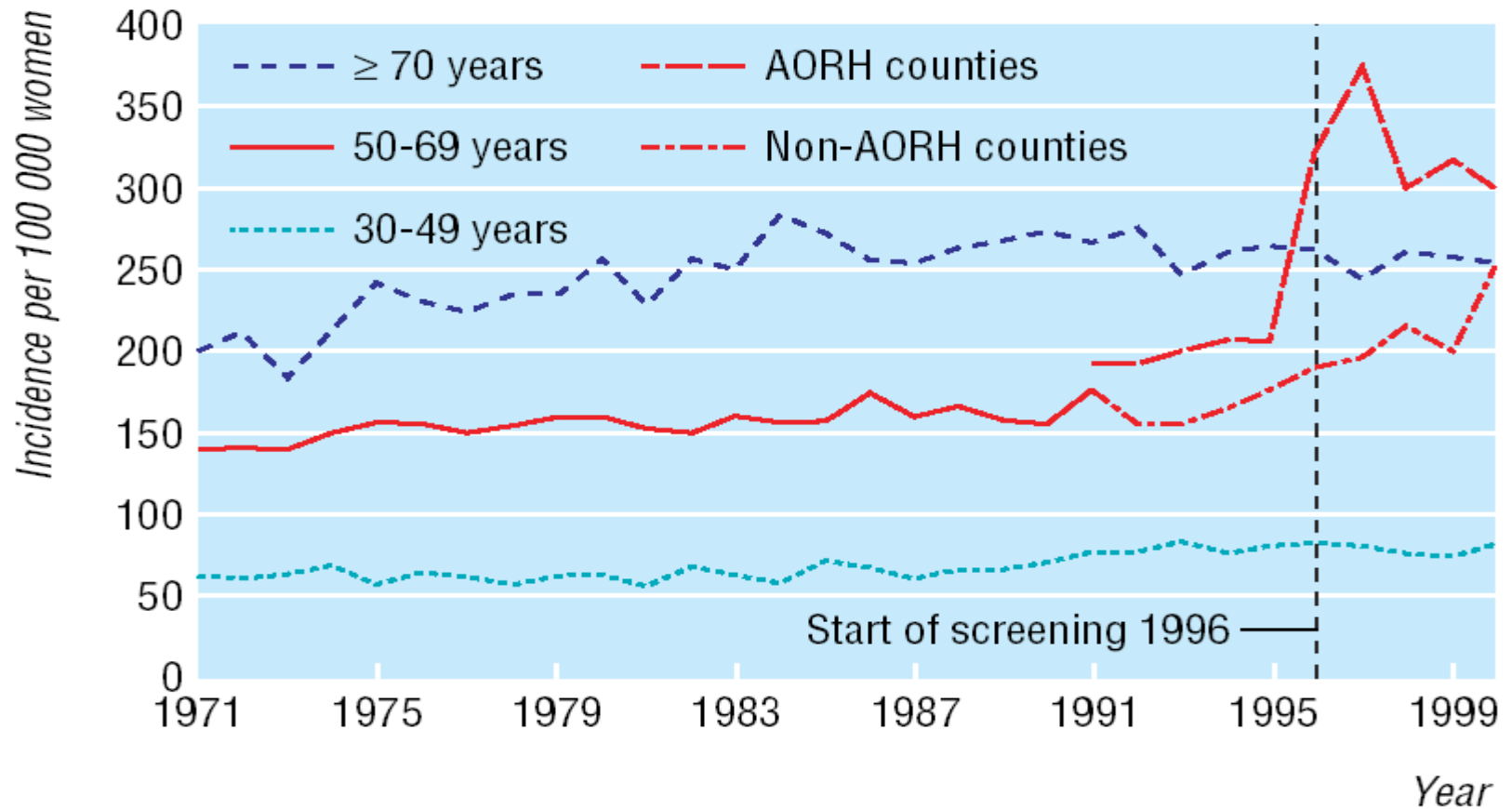


Fig 1 Age specific incidence of invasive breast cancer in Norway and for age groups 30-49, 50-69, and >69 years. From 1991 incidence rate for age group 50-69 years in Norway is split between AORH counties that started organised screening in 1996 and other counties

Norway

Zahl PH (2004) Br Med J. 328:921-4.

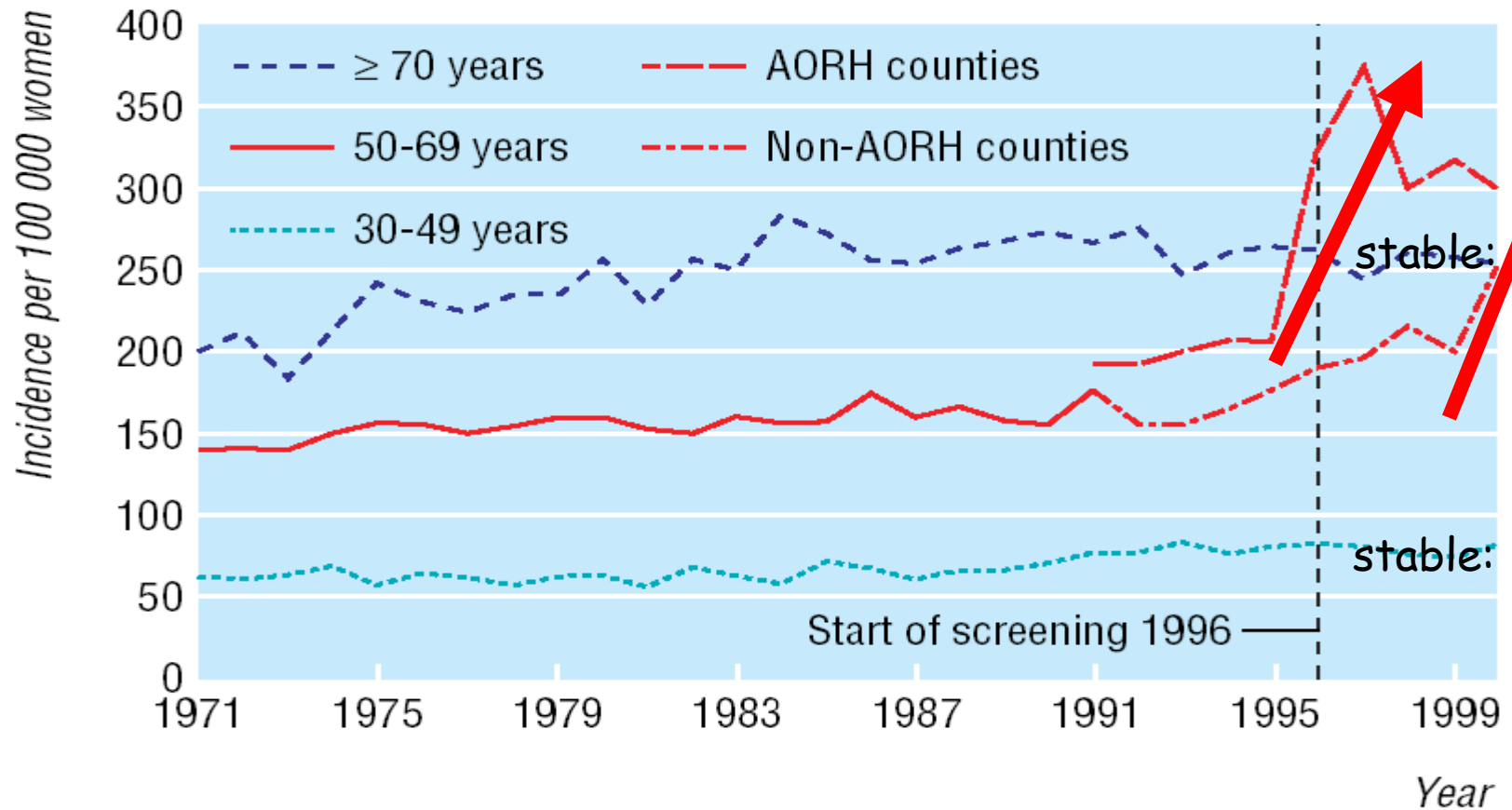


Fig 1 Age specific incidence of invasive breast cancer in Norway and for age groups 30-49, 50-69, and >69 years. From 1991 incidence rate for age group 50-69 years in Norway is split between AORH counties that started organised screening in 1996 and other counties

Sweden

Zahl PH (2004) Br Med J. 328:921-4.

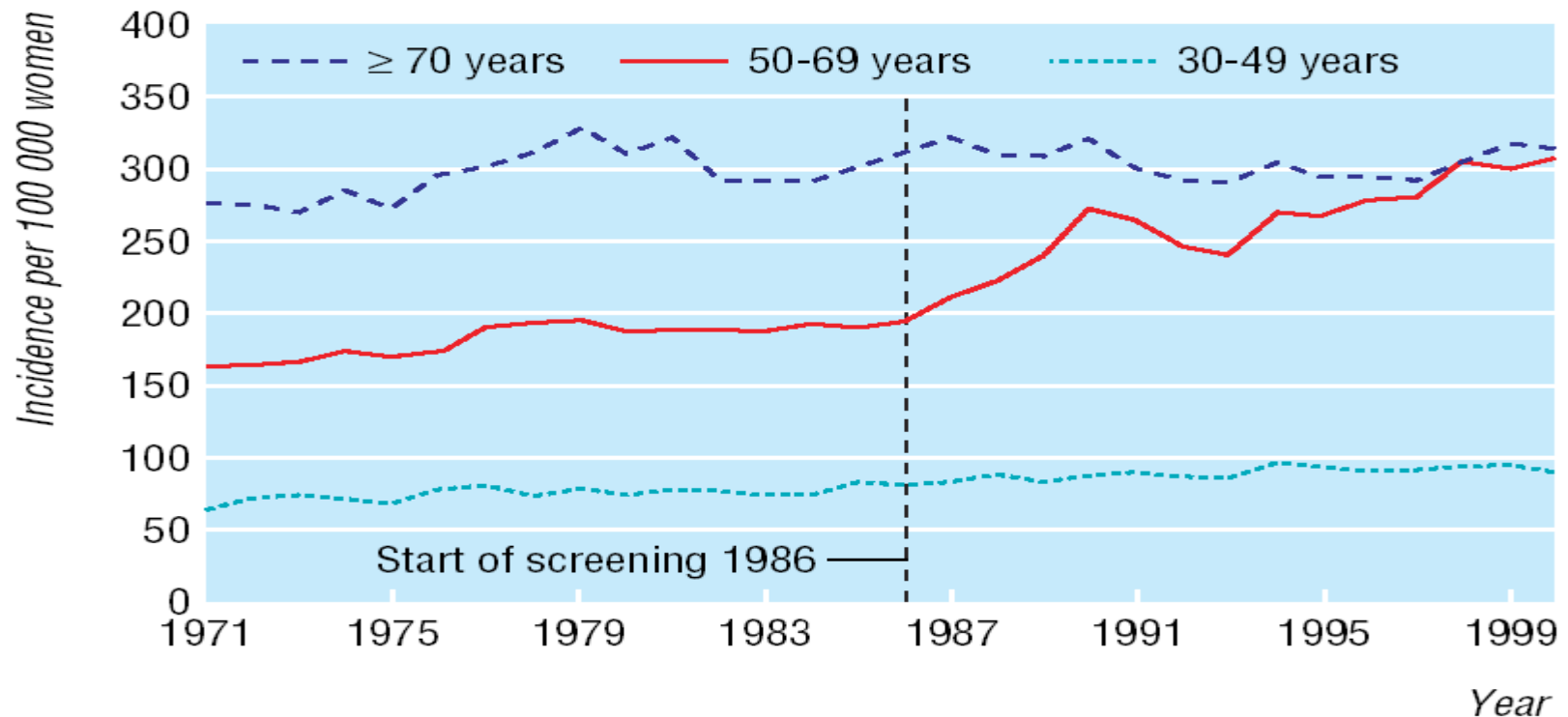


Fig 2 Age specific incidence of invasive breast cancer in Sweden and for age groups 30-49, 50-69, and >69 years. Vertical line indicates start of organised screening in Sweden (1986)

Sweden

Zahl PH (2004) Br Med J. 328:921-4.

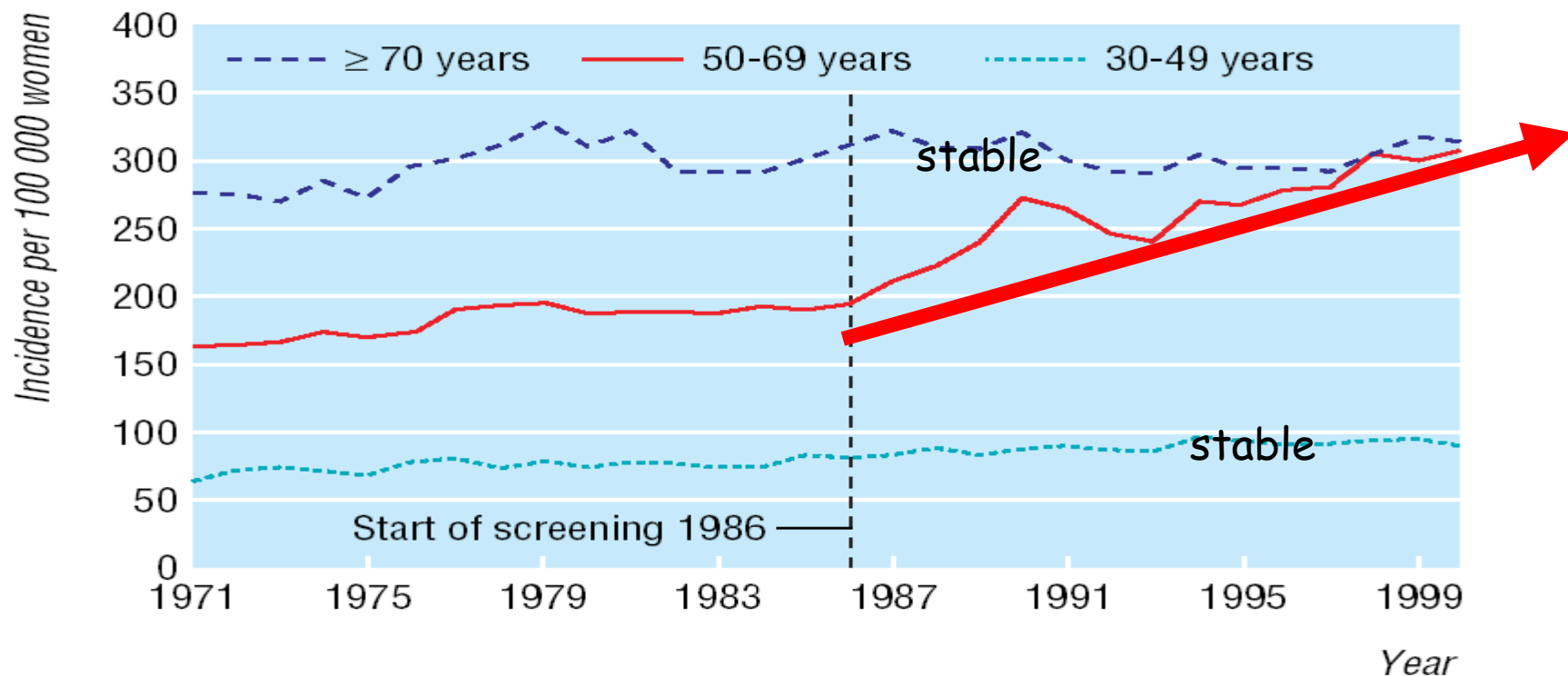
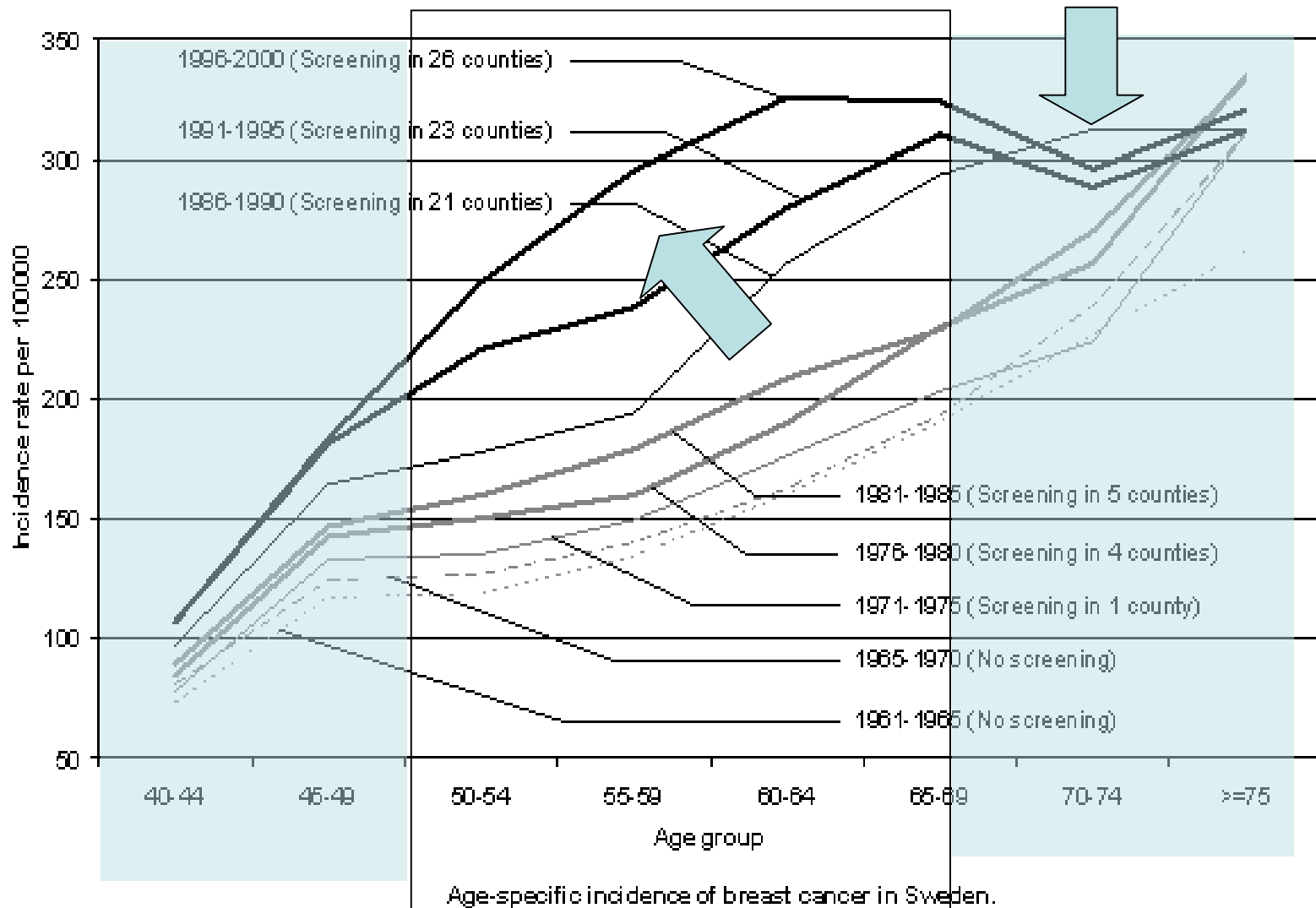


Fig 2 Age specific incidence of invasive breast cancer in Sweden and for age groups 30-49, 50-69, and >69 years. Vertical line indicates start of organised screening in Sweden (1986)

Estimates of Overdiagnosis of Breast Cancer Due to Screening

- Boer et al. 1994, NL: + 2%
- Gøtzsche et al. 2001, (RC-Trials): + 30%
- Zahl et al. 2004, Norway/Sweden: + 45%

Rapid Response to Zahl et al.; 2004 by Kari Hemminki (DKFZ, Heidelberg)



Author	Keyword(s)
<input type="text"/>	<input type="text"/>
Vol	Page
<input type="text"/>	<input type="text"/>
[Advanced]	<input type="button" value="Search"/>

[Home](#) | [Help](#) | [Search](#) | [Archive](#) | [Feedback](#) | [Table of Contents](#)

[Iris Pigeot](#) | [View/Change User Information](#) | [Email alerts](#) | [Sign Out](#)

BMJ 2006;332:689-692 (25 March), doi:10.1136/bmj.38764.572569.7C (published 3 March 2006)

Research

Rate of over-diagnosis of breast cancer 15 years after end of Malmö mammographic screening trial: follow-up study

Sophia Zackrisson, *doctor*¹, Ingvar Andersson, *associate professor*², Lars Janzon, *professor*¹, Jonas Manjer, *associate professor*¹, Jens Peter Garne, *associate professor*³

¹Department of Clinical Sciences in Malmö, Epidemiological Research Group, Lund University, Malmö University Hospital, SE-205 02, Malmö, Sweden, ²Medical Radiology, Malmö University Hospital, ³Department of Surgery, Aarhus University Hospital, DK 8000 Århus C, Denmark

Correspondence to: S Zackrisson sophia.zackrisson@med.lu.se

Abstract

Objective To evaluate the rate of over-diagnosis of breast cancer 15 years after the end of the Malmö mammographic screening trial.

- ▶ [Abst](#)
- ▶ [Abri](#)
- ▶ [PDF](#)
- ▶ [extra](#)
- ▶ [All v](#)
- ▶ [332/](#)
- ▶ [bmj.](#)
- ▶ [Resp](#)
- ▶ [Reac](#)
- ▶ [Alert](#)
- ▶ [Alert](#)
- ▶ [Alert](#)
- ▶ [View](#)

- ▶ [Email](#)
- ▶ [Find](#)
- ▶ [Find](#)
- ▶ [Find](#)
- ▶ [Find](#)

Conclusion on overdiagnosis of breast cancer in the Malmö mammographic screening trial can be drawn mainly for women aged 55-69 years at randomisation whose control groups were never screened.

Fifteen years after the trial ended the rate of overdiagnosis of breast cancer was 10% in this age group.

Rate of over-diagnosis of breast cancer 15 years after end of Malmö mammographic screening trial: follow-up study

Sophia Zackrisson, *doctor*¹, Ingvar Andersson, *associate professor*², Lars Janzon, *professor*¹, Jonas Manjer, *associate professor*¹, Jens Peter Garne, *associate professor*³

¹Department of Clinical Sciences in Malmö, Epidemiological Research Group, Lund University, Malmö University Hospital, SE-205 02, Malmö, Sweden, ²Medical Radiology, Malmö University Hospital, ³Department of Surgery, Aarhus University Hospital, DK 8000 Århus C, Denmark

Correspondence to: S Zackrisson sophia.zackrisson@med.lu.se

Abstract

Objective To evaluate the rate of over-diagnosis of breast cancer 15 years after the end of the Malmö mammographic screening trial.

- ▶ PDF
- ▶ extra
- ▶ All v 332/ bmi.
- ▶ Resp
- ▶ Reac
- ▶ Alert
- ▶ Alert
- ▶ Alert
- ▶ View

- ▶ Email
- ▶ Find
- ▶ Find
- ▶ Find
- ▶ Find

Estimates for Overdiagnosis

of Invasive Breast Cancer Due to Mammography-Screening

- Boer et al. 1994, NL + 2%
- Gøtzsche et al. 2001 (RC-Trials) + 30%
- Zahl et al. 2004 Norway/Sweden + 45%
- NHS-BSP Publication No 61 2006 (UK) + 5-10%
- Zackrisson et al. 2006 Sweden + 10%

Search Highlight Pop-Ups Blocked: 64 Form Fill Clear Browser History News Email Weather



INFLUENZA PANDEMICS: BIRD FLU

Home Help Search Archive Feedback

Author	Keyword(s)
<input type="text"/>	<input type="text"/>
Vol	Page
<input type="text"/>	<input type="text"/>
[Advanced]	Search

Rapid Responses to:

RESEARCH:

Sophia Zackrisson, Ingvar Andersson, Lars Janzon, Jonas Manjer, and Jens Peter Garne

Rate of over-diagnosis of breast cancer 15 years after end of Malmö mammographic screening trial: follow-up study

BMJ 2006; 332: 689-692 [\[Abstract\]](#) [\[Full text\]](#)

▶ Rapid Responses: [Submit a response to this article](#)

Rapid Responses published:

- ▼ **A confusing definition of overdiagnosis**
 Per-Henrik Zahl, Jan Mæhlen, Ullevål University Hospital (7 March 2006)
- ▼ **How much overdiagnosis?**
 H. Gilbert Welch (10 March 2006)
- ▼ **Overdiagnosis in the Malmö mammography screening trial was considerably underestimated**
 Peter C Gøtzsche (16 March 2006)
- ▼ **1 in 4 Cancers detected by mammography are pseudocancers**
 H. Gilbert Welch (20 March 2006)
- ▼ **Quantification of overdiagnosis : simple solutions are not necessarily true**
 Eugenio Paci, Stefano Ciatto (15 April 2006)

A confusing definition of overdiagnosis

7 March 2006

Estimates for Overdiagnosis

of Invasive Breast Cancer Due to Mammography-Screening

- Boer et al. 1994, NL 2%
- Gøtzsche et al. 2001 (RC-Trials) 30%
- Zahl et al. 2004 Norway/Sweden 45%
- NHS-BSP Publication No 61 2006 (UK) 5-10%
- Zackrisson et al. 2006 Sweden 10%
 - Letter (Zahl): 10% = underestimate >10%
 - Letter (Welch): 10% = underestimate 24%

Recent Trends: In Situ Breast Cancers (D05)

(Majority Detected by
Screening-Mammography)

Welch GH, Black WC (1997): Using Autopsy Series To Estimate the Disease "Reservoir" for Ductal Carcinoma in Situ of the Breast: How Much More Breast Cancer Can We Find?

Ann. Int. Med.127: 1023-1028

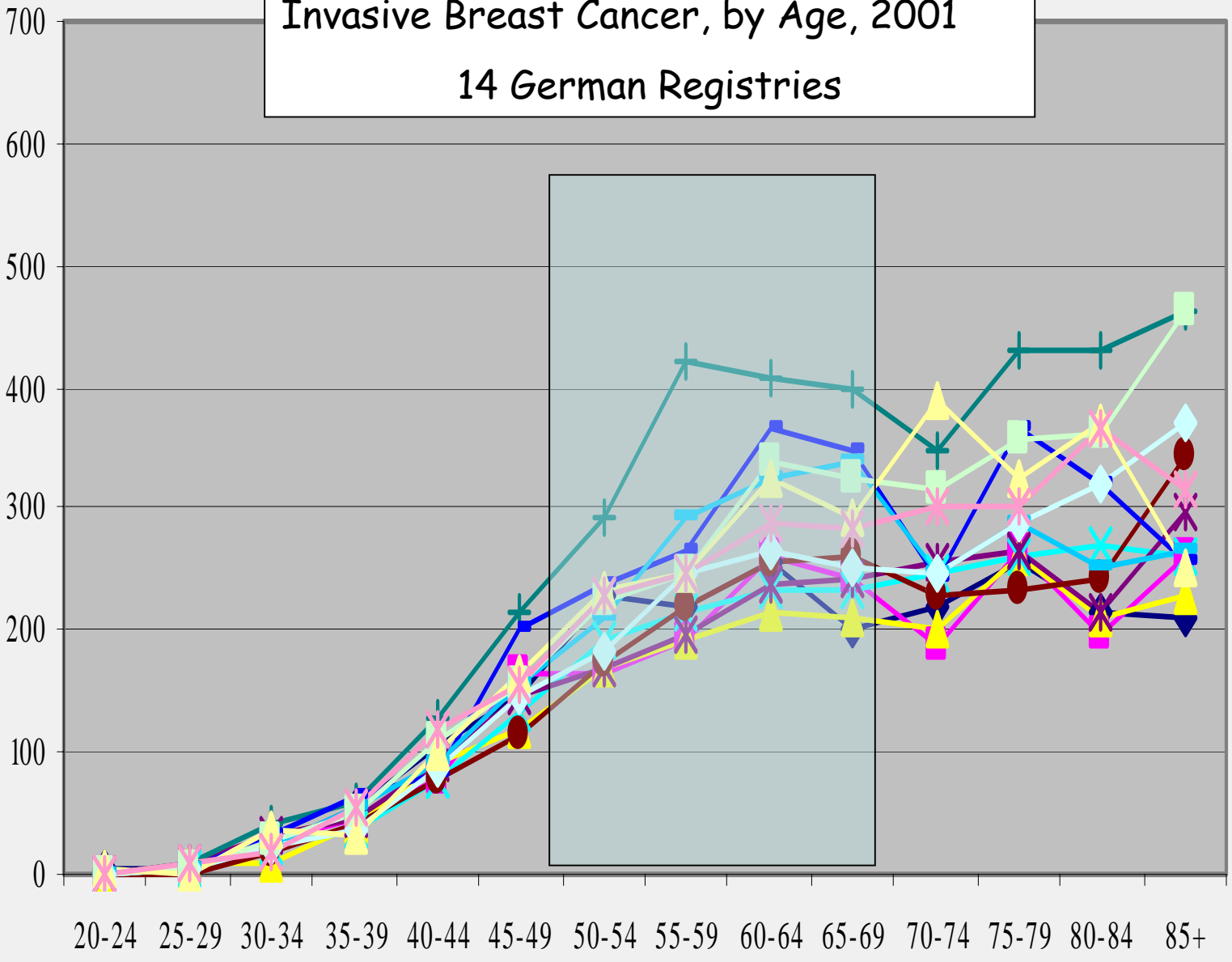
Results of Review:

- Median prevalence of invasive breast cancer: 1.3% (range 0% - 1.8%).
- Median prevalence of DCIS 8.9% (range, 0% to 14.7%).
- Prevalences higher among women likely to have been screened (40-70 years).
- Mean number of slides examined per breast: range 9-275.

Germany

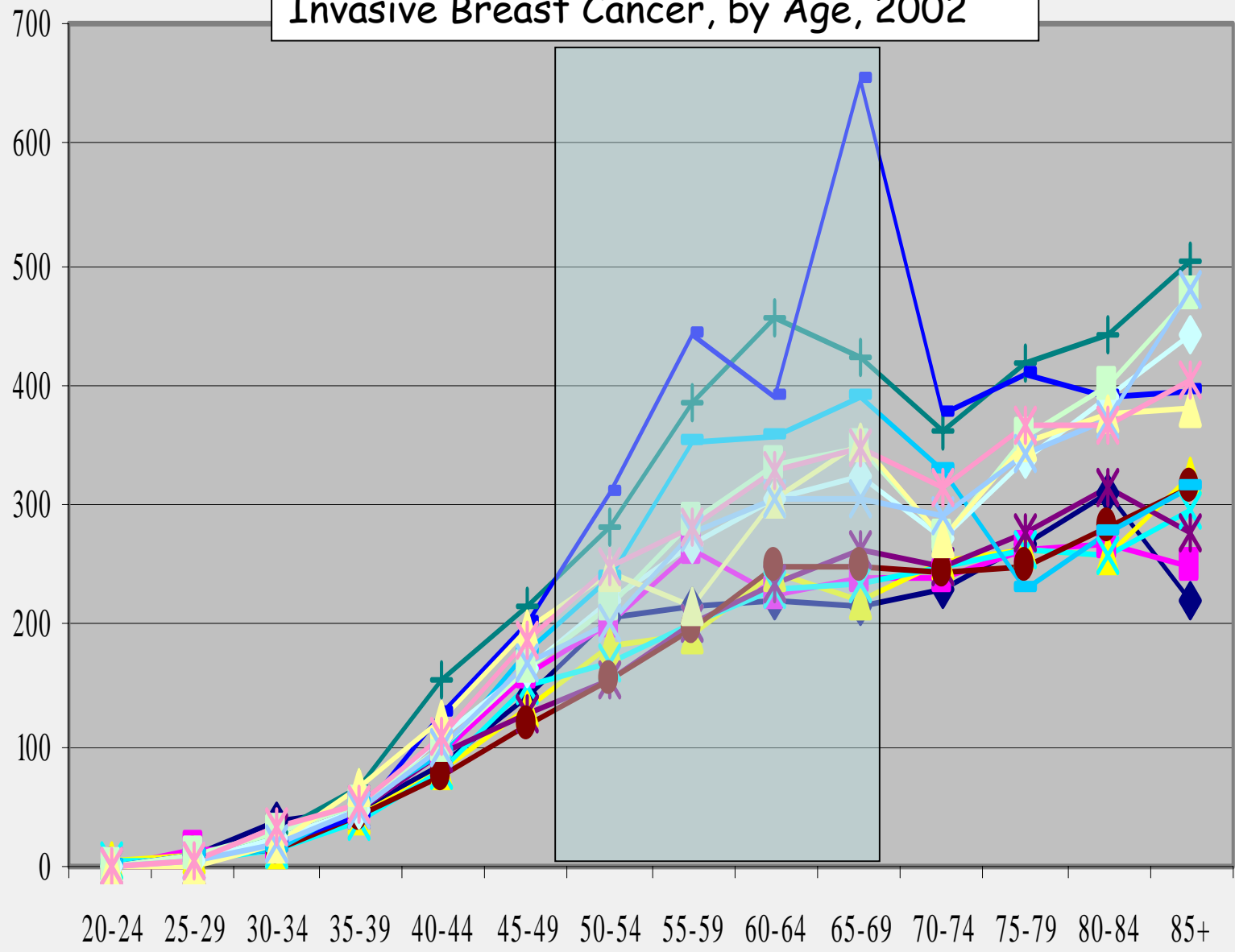
- Trends in Breast Cancer Incidence 1998-2003
- Any Signs of Overdiagnosis?

Invasive Breast Cancer, by Age, 2001
14 German Registries



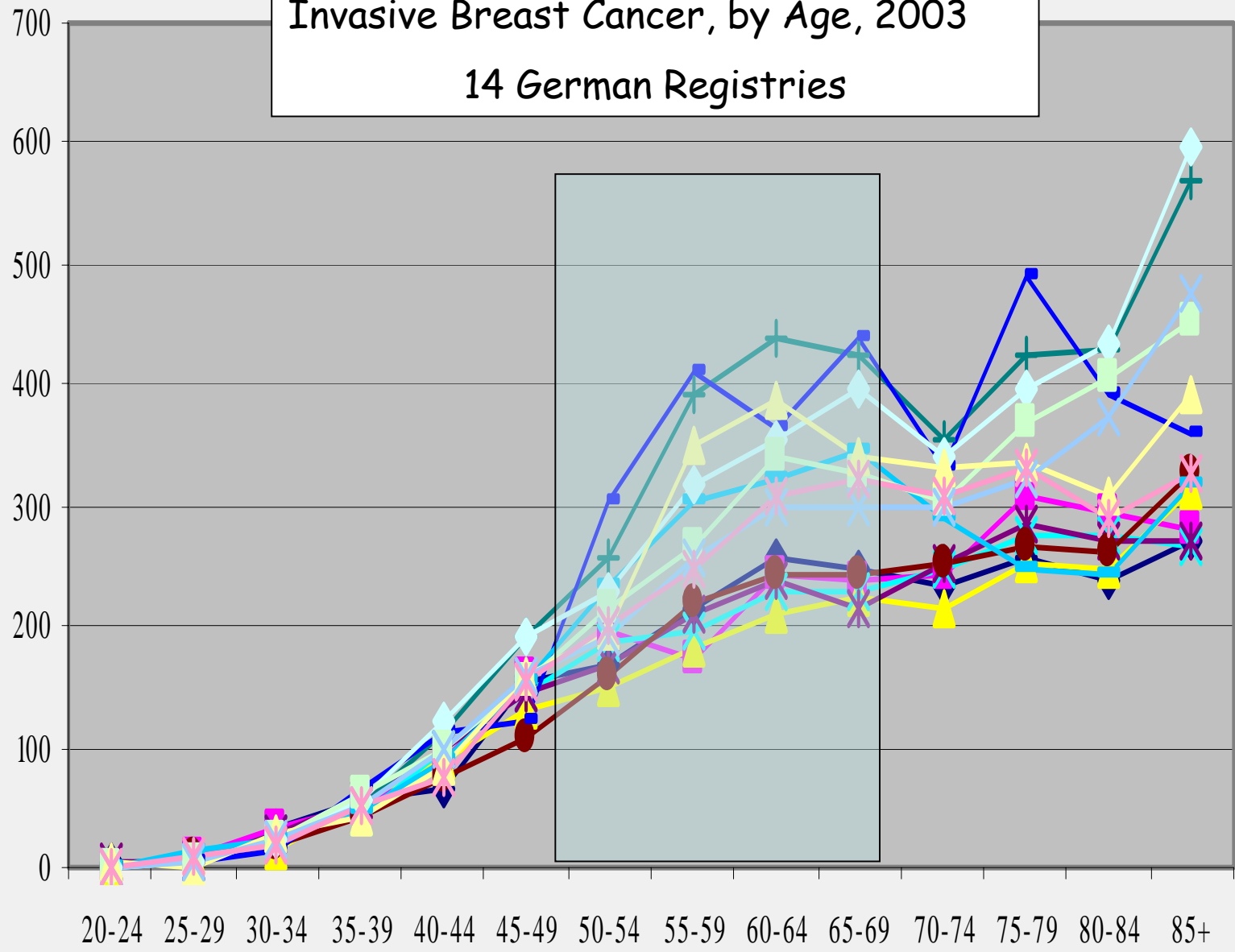
- MV2001
- BB 2001
- ST2001
- SN2001
- TH2001
- BE2001
- SH2001
- HB 2001
- HH2001
- NI2001
- RP 2001
- SL2001
- BY2001
- NW2001

Invasive Breast Cancer, by Age, 2002



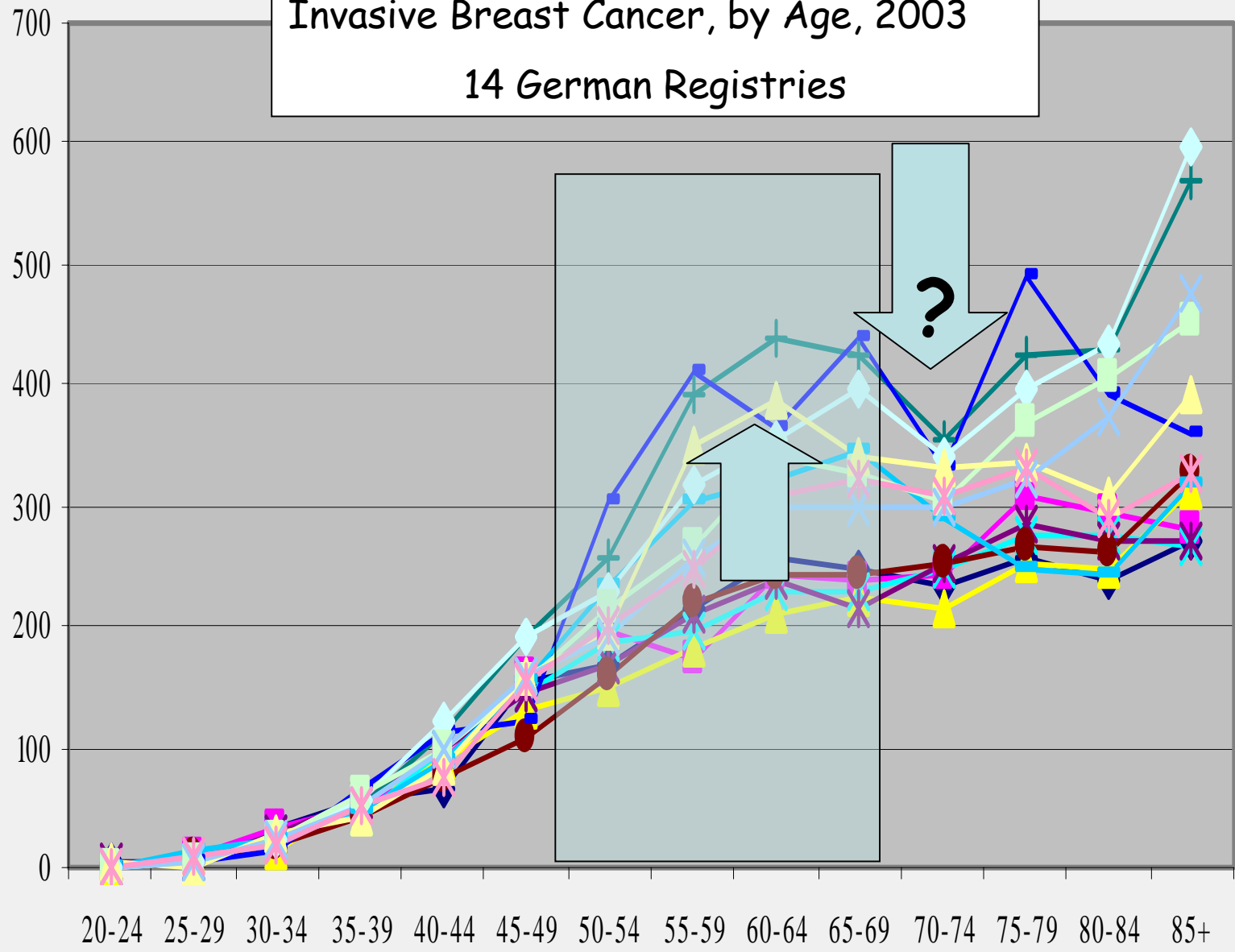
- MV2002
- BB 2002
- ST2002
- SN2002
- TH2002
- BE2002
- SH2002
- HB 2002
- HH2002
- NI2002
- RP 2002
- SL2002
- BY2002
- NW2002

Invasive Breast Cancer, by Age, 2003
14 German Registries



- MV2003
- BB 2003
- ST2003
- SN2003
- TH2003
- BE2003
- SH2003
- HB 2003
- HH2003
- NI2003
- RP 2003
- SL2003
- BY2003
- NW2003

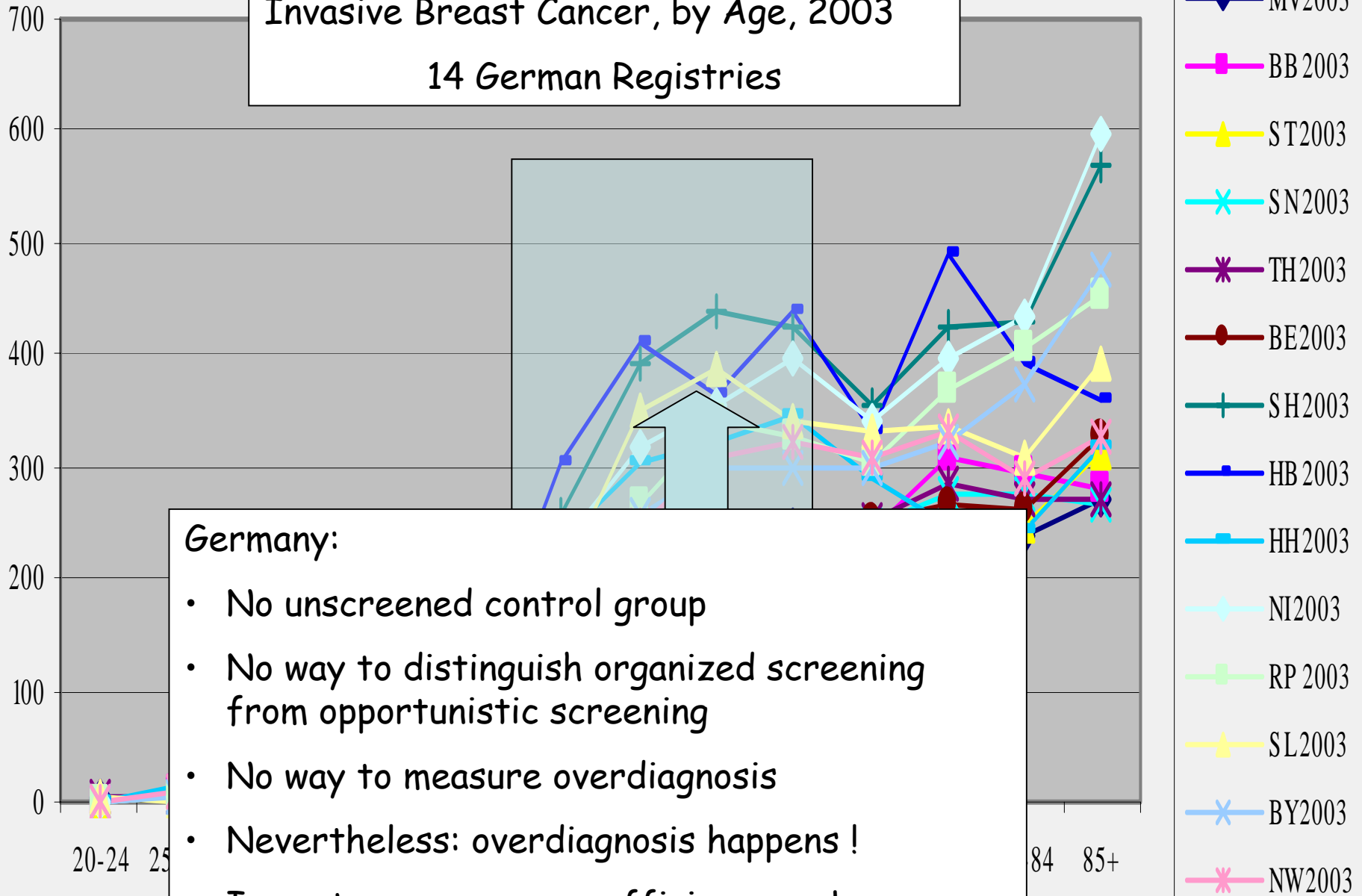
Invasive Breast Cancer, by Age, 2003
 14 German Registries



- MV2003
- BB 2003
- ST2003
- SN2003
- TH2003
- BE2003
- SH2003
- HB 2003
- HH2003
- NI2003
- RP 2003
- SL2003
- BY2003
- NW2003

Invasive Breast Cancer, by Age, 2003

14 German Registries



- Germany:**
- No unscreened control group
 - No way to distinguish organized screening from opportunistic screening
 - No way to measure overdiagnosis
 - Nevertheless: overdiagnosis happens !
 - Impact on programme efficiency: unknown

Summary

- Breast cancer incidence is rising in Germany
- In situ-cancers (D05) also rising
- Germany showing similar increases as other screening countries
- Present German screening evaluation system will not be able to provide data on overdiagnosis (nor on claimed mortality benefit!)
- Women should be informed about risk of overdiagnosis:
 - invasive cancers: best estimates available: 10-45%
 - non-invasive cancers: not clear; greater than for invasive cancers
- Programme-efficiency affected by overdiagnosis