



SCOTTISH CANCER PREVENTION NETWORK

SHOULD THE BREAST CANCER SCREENING  
PROGRAMME EMBRACE CANCER  
PREVENTION?

*Hilary M Dobson*

*16 November 2011*





**SHOULD THE BREAST CANCER  
SCREENING PROGRAMME EMBRACE  
CANCER PREVENTION?**

- **The context of screening for breast cancer**
- **The opportunity afforded by the screening programme**
- **An initial approach in the West of Scotland**





# BREAST CANCER ~ THE FACTS

Factors known to increase risk of breast cancer:

- Being female
- Increasing age
- Family history of breast cancer
- Histological risk factors
- Late childbearing (first child after 30)
- Nulliparity
- Early menarche
- Late menopause
- Lifestyle choices
- Exposure to ionising radiation
- HRT

Our bodies are made of over 100 million million cells. Cancer occurs when something goes wrong inside just one of these cells and, unrecognized and undestroyed by the body's immune system, the cell goes on multiplying until a lump, called a tumour, forms.

FOR WOMEN IN THE UK LIVING UP TO THE AGE OF 85, THE RISK OF DEVELOPING BREAST CANCER IS ONE IN TEN

An estimated 34,000 new breast cancer cases were diagnosed in the UK in 1995. The overall five-year survival rate is 74 per cent for women diagnosed in the years 1991-1993.

In Britain, we have the fifth lowest incidence of breast cancer in Europe but the highest mortality rate, although survival rates are improving

Around 80 per cent of breast cancer cases occur in post-menopausal women

Over 70 per cent of women with breast cancer have no known family history

Around five per cent of breast cancers are thought to be hereditary

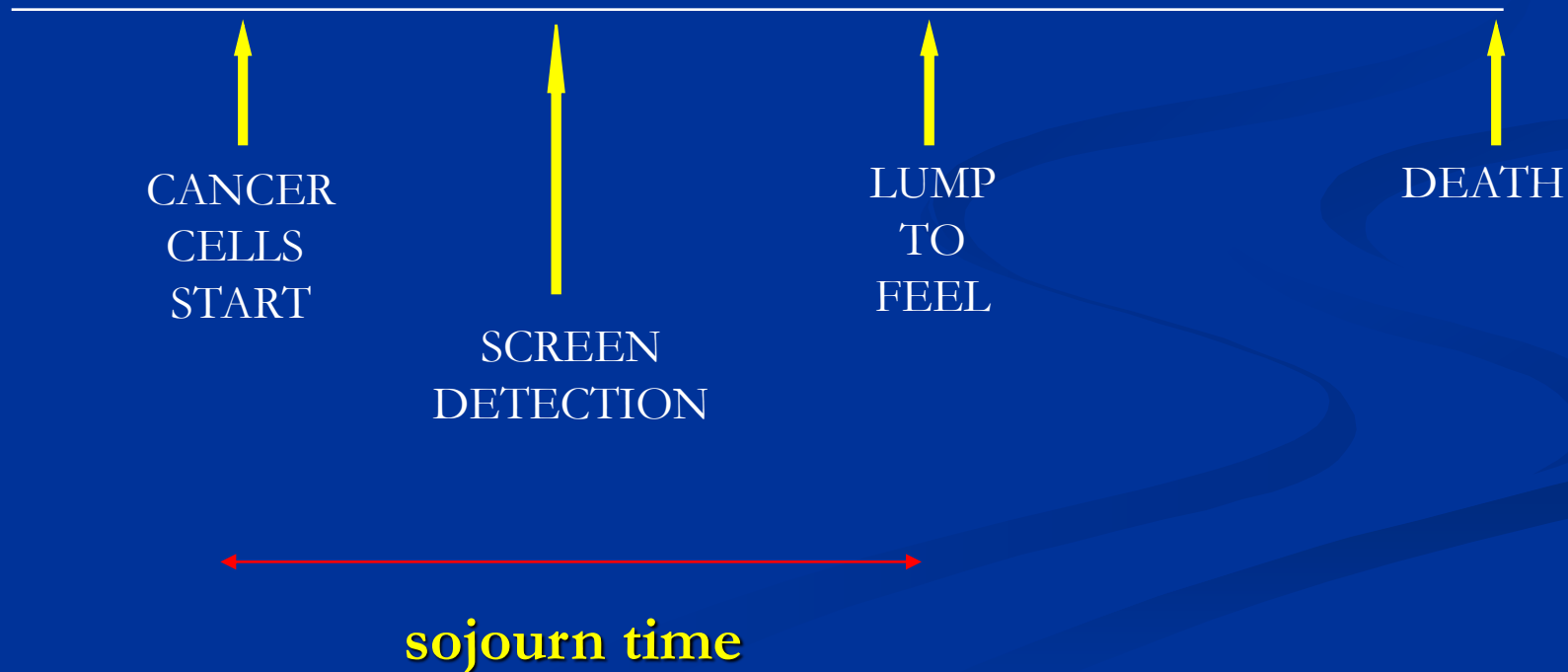
THERE WERE ALMOST 13,200 DEATHS FROM BREAST CANCER IN THE UK IN 1998 - THAT'S MORE THAN 1,000 A MONTH

**the facts**  
BREAST CANCER AWARENESS MONTH OCTOBER 2000





# THEORY OF SCREENING

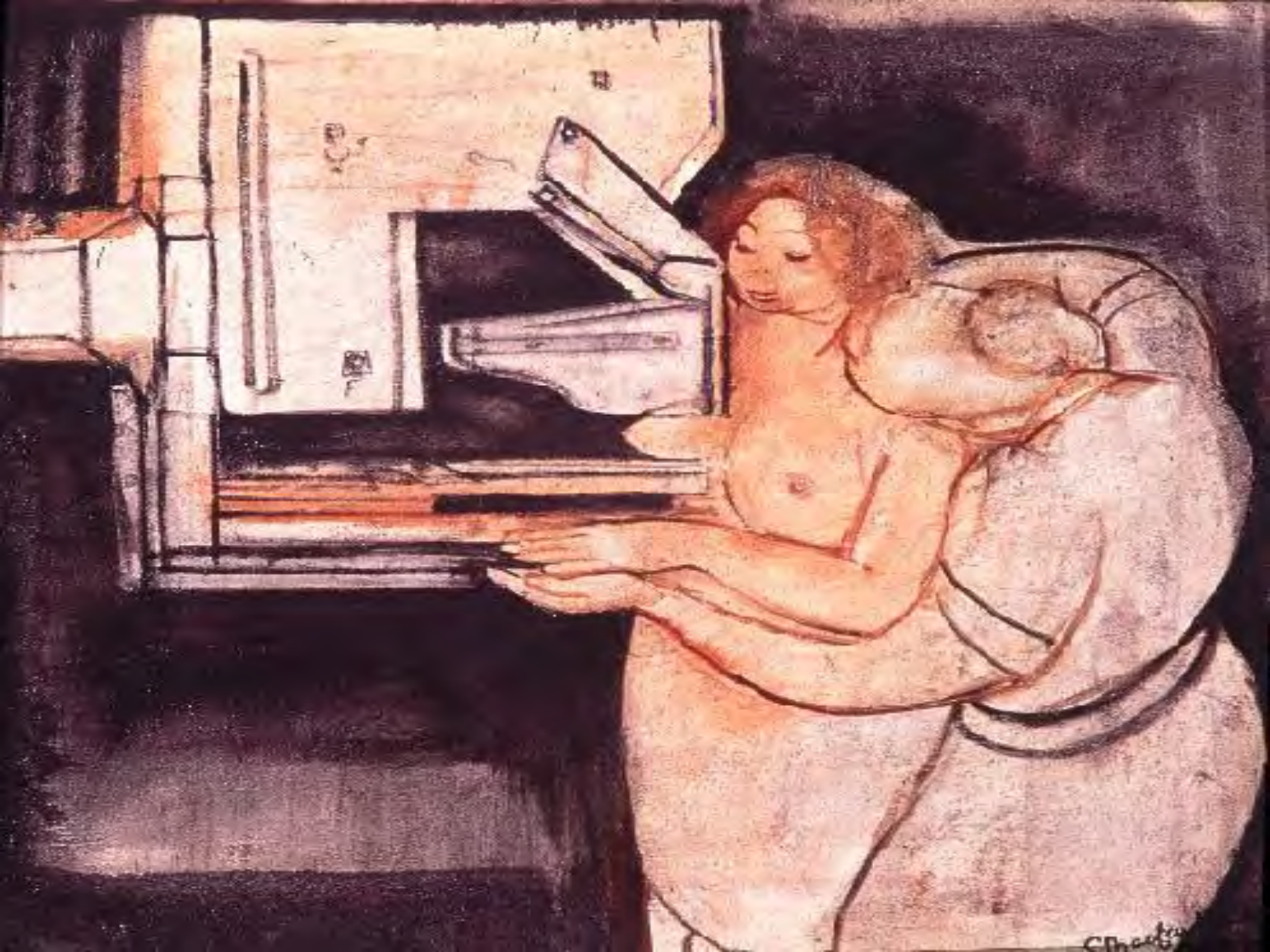


# CONTROVERSIES IN BREAST DISEASE: SCREENING

- Why?.....common disease/effective?
- Who?.....target population/at risk group
- How?.....screening method
- When?....screening interval
- Risks?.....cost versus benefit/QALY

*Wilson and Jungner Criteria – WHO 1968*







# POPULATION SCREENING FOR BREAST CANCER – 1980s

- 11 studies
- women aged  $>50$  years
- interval mammography



# BREAST SCREENING TRIALS

- Mammographic views
- Screening interval
- Younger women
- Older women

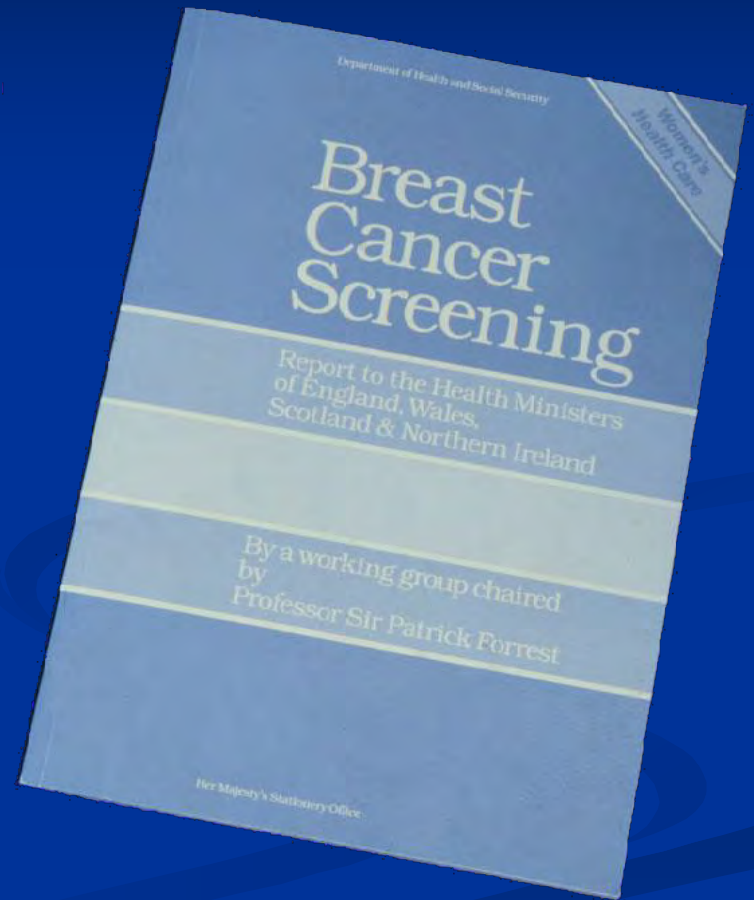




# THE FORREST REPORT

1986

- Screening, by invitation, of women aged 50-64 years
- Screening, by self referral, of women aged >64 years
- Single view mammography
- Every 3 years



NHS Breast  
Screening Programme  
Annual Review 2010

Overcoming  
barriers

# ***NHSBSP ANNUAL REVIEW 2010***

- **2 702 876 invited**
- **2 078 195 screened**
- **16 535 cancers**

- *80% breast cancer occurs in >50 year olds*
- *56% breast cancers detected through the screening programme*



# BMJ 336: p527: 8 March 2008

## Number of deaths from cancers falls after 20 years of screening

Susan Mayor LONDON

More than 100 000 breast cancers and 400 000 major cervical abnormalities have been detected in the 20 years of the NHS's breast cancer and cervical cancer screening programmes in England, figures published this week show.

The NHS programmes include screening for breast cancer every three years for all women aged 50 to 70. All women between the ages of 25 and 64 can have cervical cancer screening tests every three to five years—women registered with a GP are invited for screening at these intervals.

More than 70 million screening tests for breast and cervical cancer have been carried out in England since the programmes began in 1988. In this period more than 18 million sets of mammograms have been taken. From these, more than 100 000 cancers have been detected—equivalent to more than 100 cancers each week since the start of the programme. Breast screening saves an estimated 1400 lives every year, the latest figures show.



More than 18 million sets of mammograms were taken in the 20 years between 1988 and today

*Since 1988.....*

- 18 million mammograms
- 100 000 cancers
- 100 cancers/week

*Julietta Patnick, Coordinator, NHS Screening Programmes*

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*Since 1988.....*

- 18 million mammograms
- 100 000 cancers
- 100 cancers/week
- 1400 lives saved annually

*Julietta Patnick, Coordinator, NHS Screening Programmes*



# Effect of Invasive Cancer Status on Relative Survival – Cancers Diagnosed in 1990/91

	<u>5 Year</u>	<u>10 Year</u>	<u>15 Year</u>
Invasive	93.6 (92.9, 94.4)	88.8 (87.6, 89.9)	86.3 (84.9, 87.8)
Micro-invasive	99.9 (97.0, 102.9)	97.9 (92.8, 103.1)	100.5 (93.6, 107.4)
Non-invasive	100.9 (99.8, 102)	100.8 (98.9, 102.8)	102.1 (99.3, 104.9)

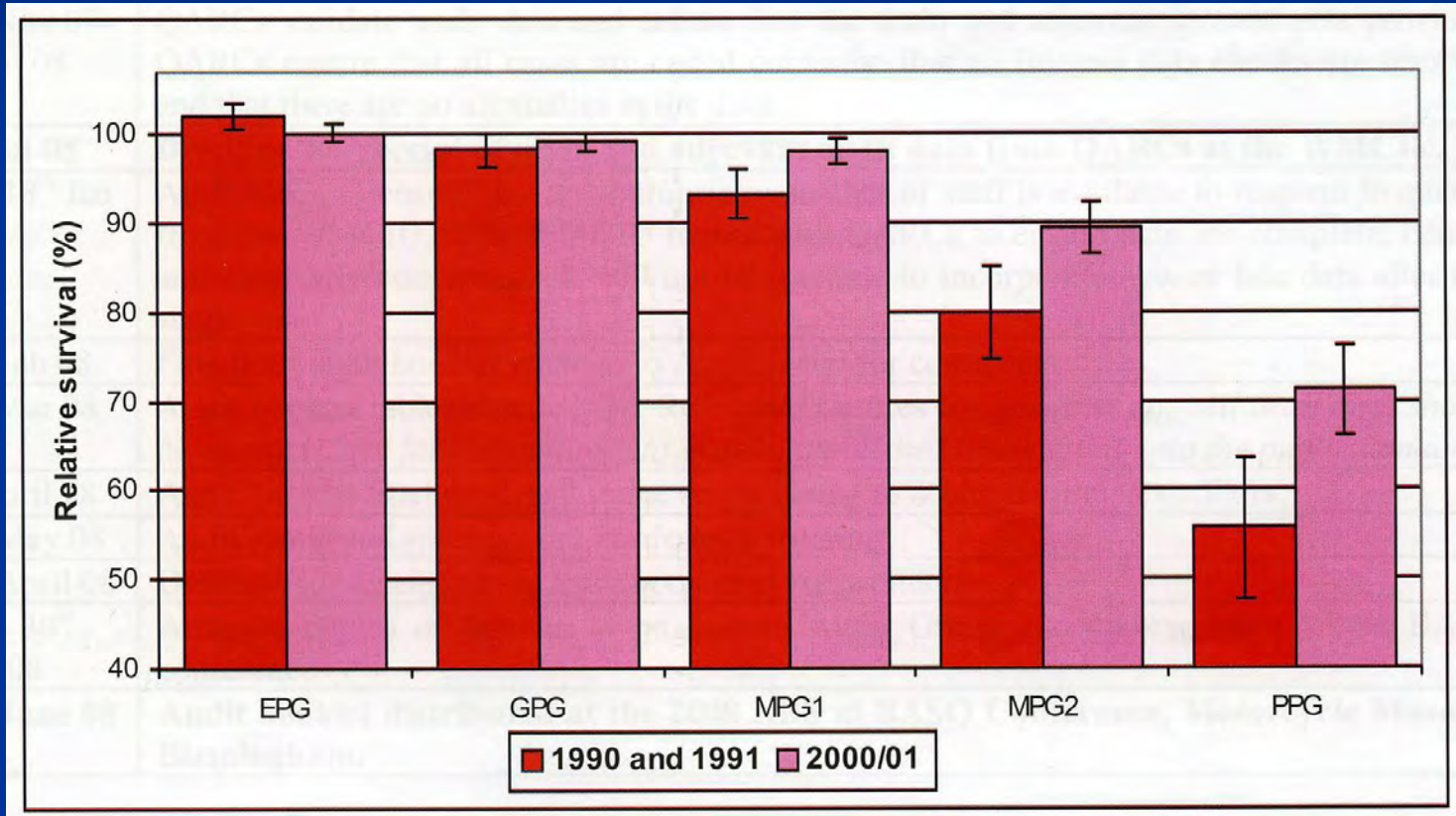
# SCREENING INDUCED REDUCTION IN MORTALITY

- Compliance
- Detection of 'small' 'early' disease
- Reduction in rate of advanced disease
- Reduction in mortality





# Relative Survival of Invasive Cancers with NPI Group



# POPULATION SCREENING FOR BREAST CANCER – 2010s

- 2 view mammography
- 2 – 3 yearly  $>50$  years
- $<2$  yearly  $<50$  years
- digital imaging



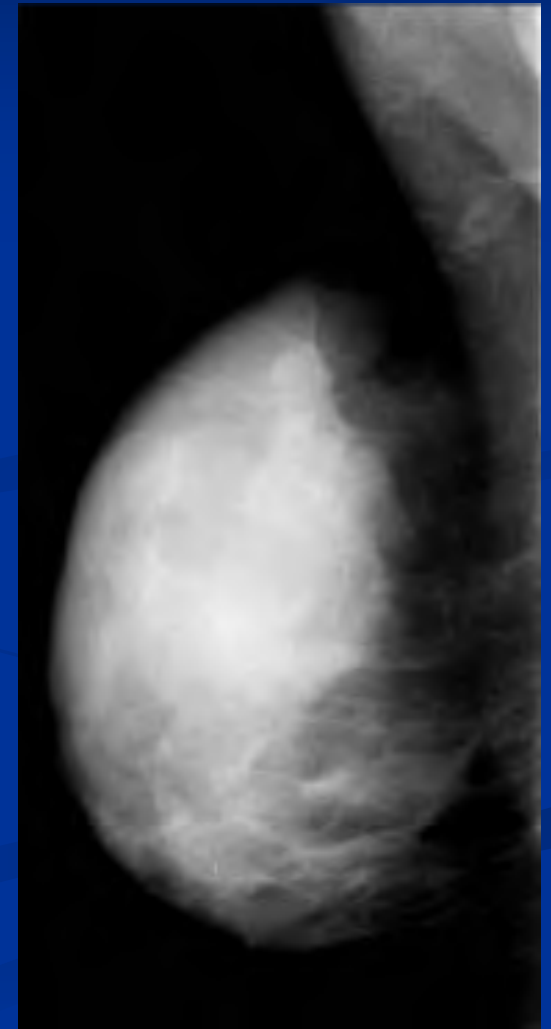
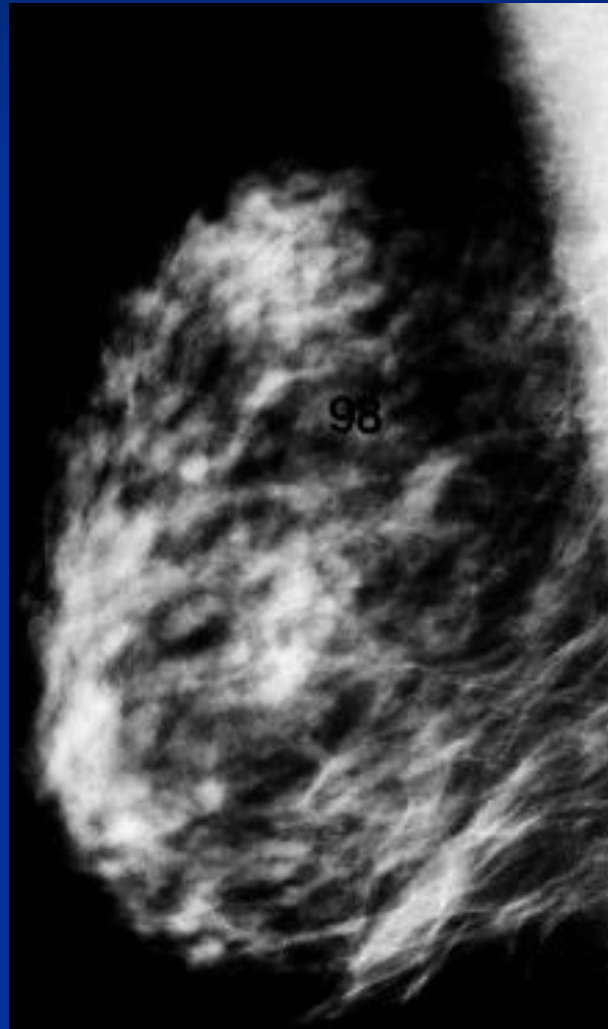
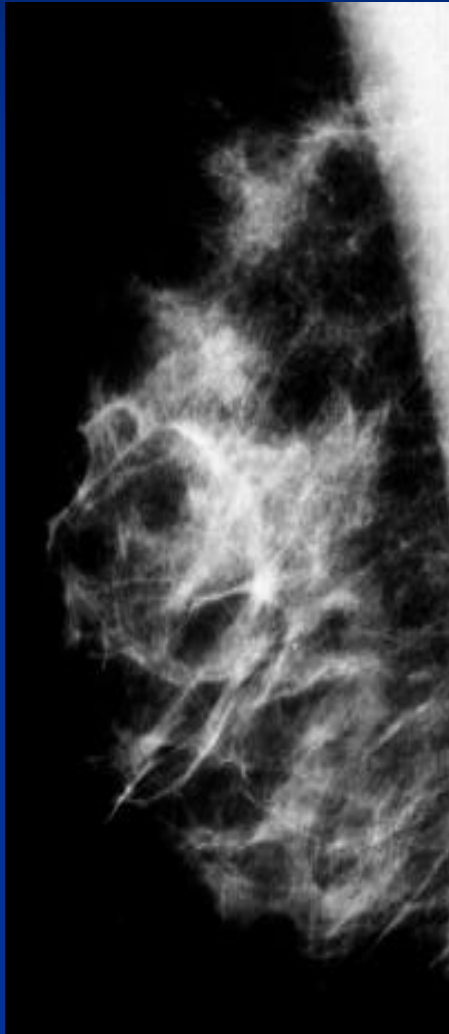


# POPULATION SCREENING FOR BREAST CANCER – 2010s

- 2 view mammography
- 2 – 3 yearly >50 years
- <2 yearly <50 years
- **digital imaging**



# The issue of "imaging dense breasts":





**Pisano ED et al. Diagnostic performance of digital vs film screen  
mammography for breast cancer screening  
N Engl J Med 353; 1773-1783, 2005**



**DMIST**

# DIGITAL MAMMOGRAPHY

- Better tissue visibility, especially in young



# DIGITAL MAMMOGRAPHY

- Better tissue visibility, especially in young
- Lower dose
- Easier storage
- Improved workflow
- Computerised reporting
- Expensive!!





# Last 10-20 years

- 4,200 cases per year
  - Increase of 16.1% from 1998/2008
- Significant improvements in survival
  - 1983-987      61%
  - 2003-2007      81%
- Reflect improved screening and treatment

*Courtesy of ISD/Dr Jennifer Armstrong, SMO*

# Next decade

- Over 4,800 cases per year
  - 20% increase
- Substantial increase in prevalence
  - Greater than 20% increase

*Courtesy of ISD/Dr Jennifer Armstrong, SMO*

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# BREAST CANCER GENES

## Implications for GPs of the discovery of breast cancer genes

**A**n international race to unravel the genetics of familial breast cancer has resulted in the identification of two genes that cause a high risk of breast and ovarian cancer.

One gene, BRCA1, has recently been isolated and another, BRCA2, will be isolated within a couple of years.

Together, BRCA1 and BRCA2 probably account for about two-thirds of multiple cases of breast cancer in families with a history of the disease. These result in some 1,000-1,500 new cases a year.

The genes in the other fami-

lies are yet to be found. Altogether, less than 5 per cent of breast cancers are caused by these high-risk genes.

The immediate clinical implications of these discoveries are limited.

In a very few families with several cases of breast and/or ovarian cancer, it will be possible within the next year or so to tell family members at risk whether they have inherited a predisposition.

Within perhaps two or three years, genetic testing may be possible for some women with a smaller family history - one or two affected relatives. Population screening is not currently in prospect.

### Significant risk factors

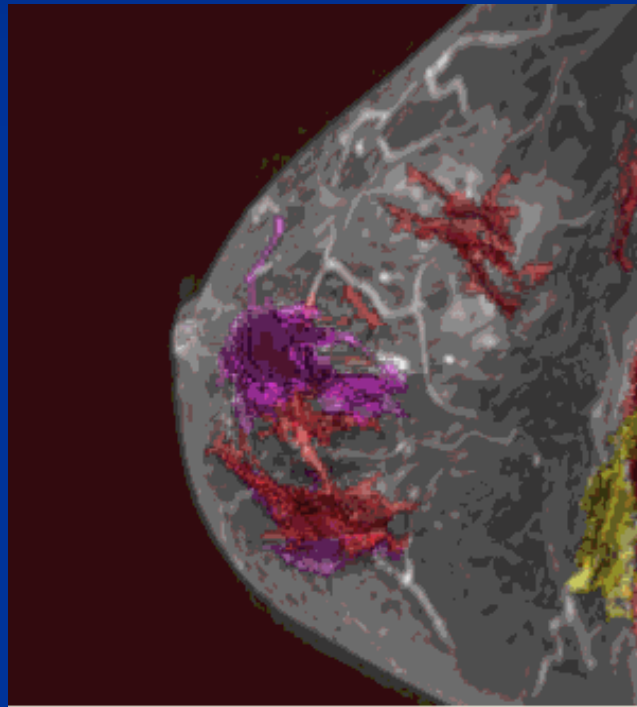
Roughly one woman in 500 is



Wait for

Women at highest risk should be referred to specialist familial cancer clinics

# SCREENING WITH MRI?



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## FOOD, NUTRITION, PHYSICAL ACTIVITY, AND CANCER OF THE BREAST (PREMENOPAUSE)

In the judgement of the Panel, the factors listed below modify the risk of cancer of the breast (premenopause). Judgements are graded according to the strength of the evidence.

	DECREASES RISK	INCREASES RISK
<b>Convincing</b>	Lactation	Alcoholic drinks
<b>Probable</b>	Body fatness	Adult attained height <sup>1</sup> Greater birth weight
<b>Limited — suggestive</b>	Physical activity <sup>2</sup>	
<b>Limited — no conclusion</b>	Cereals (grains) and their products; dietary fibre; potatoes; vegetables; fruits; pulses (legumes); soya and soya products; meat; poultry; fish; eggs; milk and dairy products; fats and oils; total fat; vegetable fat; fatty acid composition, <i>trans</i> -fatty acids; cholesterol; sugar (sucrose); other sugars; sugary foods and drinks; coffee; tea; carbohydrate; starch; glycaemic index; protein; vitamin A; riboflavin; vitamin B6; folate; vitamin B12; vitamin C; vitamin D; vitamin E; calcium; iron; selenium; carotenoids; isoflavones; dichlorodiphenyldichloroethylene; dichlorodiphenyltrichloroethane; dieldrin; hexachlorobenzene; hexachlorocyclohexane; <i>trans</i> -nonachlor; polychlorinated biphenyls; dietary patterns; culturally defined diets; adult weight gain; energy intake; being breastfed	
<b>Substantial effect on risk unlikely</b>	None identified	

- 1 Adult attained height is unlikely directly to modify the risk of cancer. It is a marker for genetic, environmental, hormonal, and also nutritional factors affecting growth during the period from preconception to completion of linear growth (see chapter 6.2.1.3).
- 2 Physical activity of all types: occupational, household, transport, and recreational.

For an explanation of all the terms used in the matrix, please see chapter 3.5.1, the text of this section, and the glossary.

## FOOD, NUTRITION, PHYSICAL ACTIVITY, AND CANCER OF THE BREAST (POSTMENOPAUSE)

In the judgement of the Panel, the factors listed below modify the risk of cancer of the breast (postmenopause). Judgements are graded according to the strength of the evidence.

	DECREASES RISK	INCREASES RISK
<b>Convincing</b>	Lactation	Alcoholic drinks Body fatness Adult attained height <sup>1</sup>
<b>Probable</b>	Physical activity <sup>2</sup>	Abdominal fatness Adult weight gain
<b>Limited — suggestive</b>		Total fat
<b>Limited — no conclusion</b>	Cereals (grains) and their products; dietary fibre; potatoes; vegetables and fruits; pulses (legumes); soya and soya products; meat; poultry; fish; eggs; milk and dairy products; fats and oils; vegetable fat; fatty acid composition; cholesterol; sugar (sucrose); sugary foods and drinks; coffee; tea; carbohydrate; starch; glycaemic index; protein; vitamin A; riboflavin; vitamin B6; folate; vitamin B12; vitamin C; vitamin D; vitamin E; calcium; iron; selenium; carotenoids; isoflavones; dichlorodiphenyldichloroethylene; dichlorodiphenyltrichloroethane; dieldrin; hexachlorobenzene; hexachlorocyclohexane; <i>trans</i> -nonachlor; polychlorinated biphenyls; dietary patterns; culturally defined diets; birth weight; birth length; energy intake; being breastfed	
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# LIFESTYLE CHOICES AND BREAST CANCER

- The Science
- The Breakthrough Generation Project
- Modest changes.....
- ‘Early’ response....



## 5 ways to protect yourself from breast cancer

Dr Michelle Harvie is a research dietician for the Genesis Appeal, the UK's only breast cancer charity entirely dedicated to prevention

**Have breast screening**  
Over 50 (and 40-45 who have a family history of breast cancer) are eligible for screening every three years as part of the NHS Breast Screening Programme. Women aged 50-69 who are not invited to screening usually respond better to treatment. If you think you have a family history, your GP may refer you to a Family History Clinic.

**Eat wholegrains**  
Wholegrains can help control levels of cancer-promoting hormones in the body, so will boost your intake of cancer-fighting nutrients like selenium and vitamin E. **What to do:** Choose wholemeal or granary bread, high-fibre and bran-based cereals, and brown pasta and rice.

**EAT A 'RAINBOW'**  
Eating different coloured fruit and veg is a way to ensure you take in a full range of anti-cancer nutrients. They contain plant chemicals that can act as antioxidants and have anti-inflammatory and cancer-preventive properties. **What to do:** Go for a mix of orange, yellow, red and green fruit and vegetables – and aim for at least five portions a day.

**Avoid saturated or trans-fats**  
Not all fats are bad for us, though oily fish, avocados and rapeseed, walnut and olive oils are part of a healthy anti-cancer diet. **What to do:** Cut down on fatty meats, high-fat cheeses, cream, butter, cakes, biscuits, pastry, crisps and certain margarines.

**Cut back on the booze**  
If you have a small drink (25ml) every day of the week, your risk is around 20% higher than someone who doesn't drink. If you drink half a bottle of wine a night, that would raise your risk of developing breast cancer by 25%. Even moderate drinking raises chances of breast cancer. **What to do:** Avoid drinking every night. Make alcohol a treat rather than a habit.

**BE HRT SAVVY**  
Menopausal women can't stand to wean themselves. Taking combined hormone replacement therapy to ease their hot flashes can increase their risk of breast cancer. The pills can combined HRT can double your risk. **What to do:** Try to limit the time you take HRT, and look into other ways of controlling menopausal symptoms. The good news is that the risk of breast cancer goes down within five years of stopping HRT.

**BE BREAST AWARE**  
The majority of breast cancer – is detected by women themselves. Be aware of which normal for you – lumps, changes in the skin or nipple, or discharge or lumps. **What to do:** Self-examine at least once a month when you're bathing – go to the website [breastcancer.org.uk](http://breastcancer.org.uk) for tips.

**Get active**  
Exercise improves the hormone balance in the body, which causes growth of some cancer-causing hormones. **What to do:** Aim to include the 20 to 45-minute exercise sessions each week.

**Watch your weight**  
Putting on a stone in weight in adult life increases your breast cancer risk by 40%. **What to do:** Try to keep weight gain. Studies show that people who manage to lose at least half the excess weight of a stone and keep it off reduce their risk of healthy weight is a BMI of between 19 and 25.

**Go low fat**  
Dairy products seem to be calcium and other vitamins, which can help reduce all low fat. **What to do:** Choose low-fat dairy products like yogurt, semi-skimmed or skimmed milk and cottage cheese.

Dr Michelle Harvie is the author of The Genesis Breast Cancer Prevention Diet (Penguin, £10.99). See [genesiusteam.org.uk](http://genesiusteam.org.uk)

## 10 ways to keep yourself safe



- 1 Eat healthily.** 'A diet rich in fruit and veg, high in fibre and low in red meat, processed foods and sugar will contribute to a protective effect against lots of diseases, including breast cancer,' says Arlene Wilkie, of Breast Cancer Campaign.
- 2 Check your breasts regularly.** Look and feel for any changes, not just lumps.
- 3 Take regular exercise – the more active you are, the lower your risk.** Aim for at least 30 minutes of moderate exercise, such as brisk walking, five days a week.
- 4 See your GP if you notice anything unusual.**
- 5 Attend your routine screenings after 50 – the older you are the greater the risk.** Screening saves 1,400 lives a year.
- 6 Be gene aware.** If breast cancer is in your family, find out from your GP if you qualify for earlier screening.
- 7 Cut down on alcohol.** It's estimated 5,000 cases of breast cancer in the UK each year are linked to excessive alcohol consumption.
- 8 Keep to a healthy weight.** Being obese increases your risk of post-menopausal breast cancer by 30 per cent.
- 9 If you've hit the menopause, discuss HRT with your GP to ease symptoms such as hot flushes.** It can increase your risk slightly, but the less time you take it, the lower your increased risk will be.
- 10 For more info, contact Breakthrough Breast Cancer on 0800 100 200, or go to [www.breakthrough.org.uk](http://www.breakthrough.org.uk).**



Regular exercise combats the risk





# BETTER CANCER CARE, AN ACTION PLAN

*The Scottish Government*  
*27 October 2008*

- **The Challenge for Scotland**
- **Prevention**
- **Early Detection of Cancer**
- **Genetic and Molecular Testing for Cancer**
- **Referral and Diagnosis**
- **Treatment**
- **Living with Cancer**
- **Improving Quality of Cancer Care for Patients**
- **Delivery**



# INFLUENCING LIFESTYLE CHOICES IN BREAST SCREENING SETTING

- Why?
  - aligns with concept of 'feeling well'
  - attempt to 'normalise' activities
- When?
  - 'teachable' moments *ie* results
  - time of invitation\*\*\*\*
- How?
  - written information





1

2

3

4

## Eat Well

Use the eat well plate to help you get the balance right on how much of what you should eat.

For a healthy diet, eat:

- Plenty of fruit and vegetables;
- Plenty of bread, rice and potatoes – choose wholegrain varieties if you can;
- Some meat, fish, eggs, beans and other non dairy sources of protein;
- Small amount of foods and drinks high in fat and sugar.

**Tip:** Snack on fresh fruit and vegetables instead of high fat or sugary snacks.

For more information and advice, please speak to a member of staff or visit [www.eatwell.gov.uk](http://www.eatwell.gov.uk)

# The eatwell plate



Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.





## Your Appointment

Remember, breast screening is the best way to detect breast cancer.

You will receive an appointment when we are in your area.

Please attend when invited.



For more information, please visit our website [www.nhsggc.org.uk/phsu](http://www.nhsggc.org.uk/phsu) or speak to a member of staff.

**West of Scotland  
Breast Screening Service**  
Stock Exchange Court  
77 Nelson Mandela Place  
Glasgow G2 1QT

Tel: **0141 572 5800**  
Text phone: **0141 572 5858**

# 5

## Be Breast Aware

Being breast aware means getting to know your breasts. It is important that you look and feel for changes.

Go to your doctor right away if you notice any changes to your breasts.

**Tip: Check your breasts regularly. You can do this in the bath, shower or when getting dressed.**

For more information and advice, please speak to a member of staff or visit [www.breastcancercare.org.uk](http://www.breastcancercare.org.uk)



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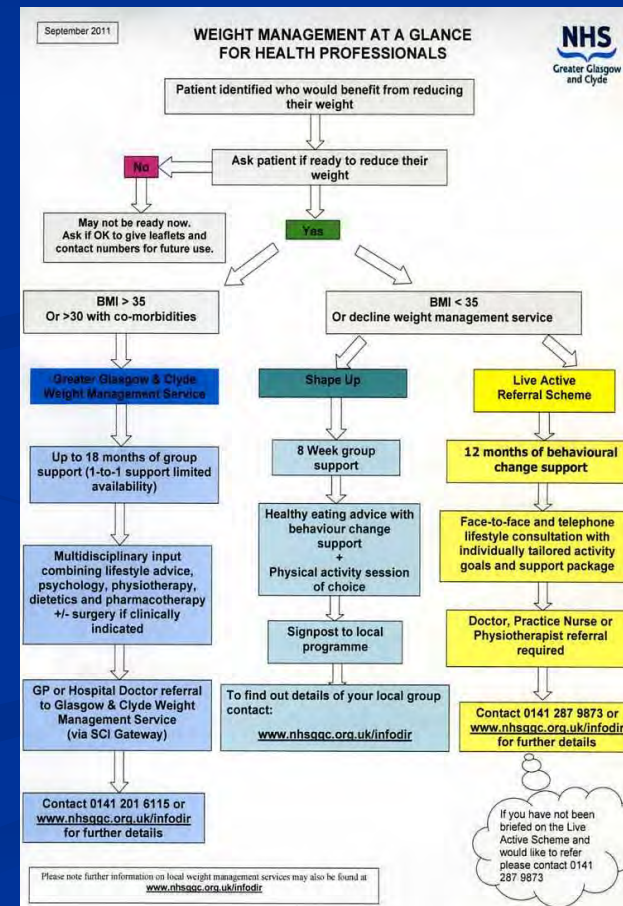
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## ■ When?

- 'teachable' moments *ie* results
- time of invitation

## ■ How?

- written information
- staff training
- signposting





# INFLUENCING LIFESTYLE CHOICES BEYOND THE BREAST SCREENING SETTING

- The Symptomatic Clinic?
  - reaching the 'worried well'
  - similar to the 'assessment' population
  - primary prevention
  - CEL 14
  - staff training



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  - secondary prevention
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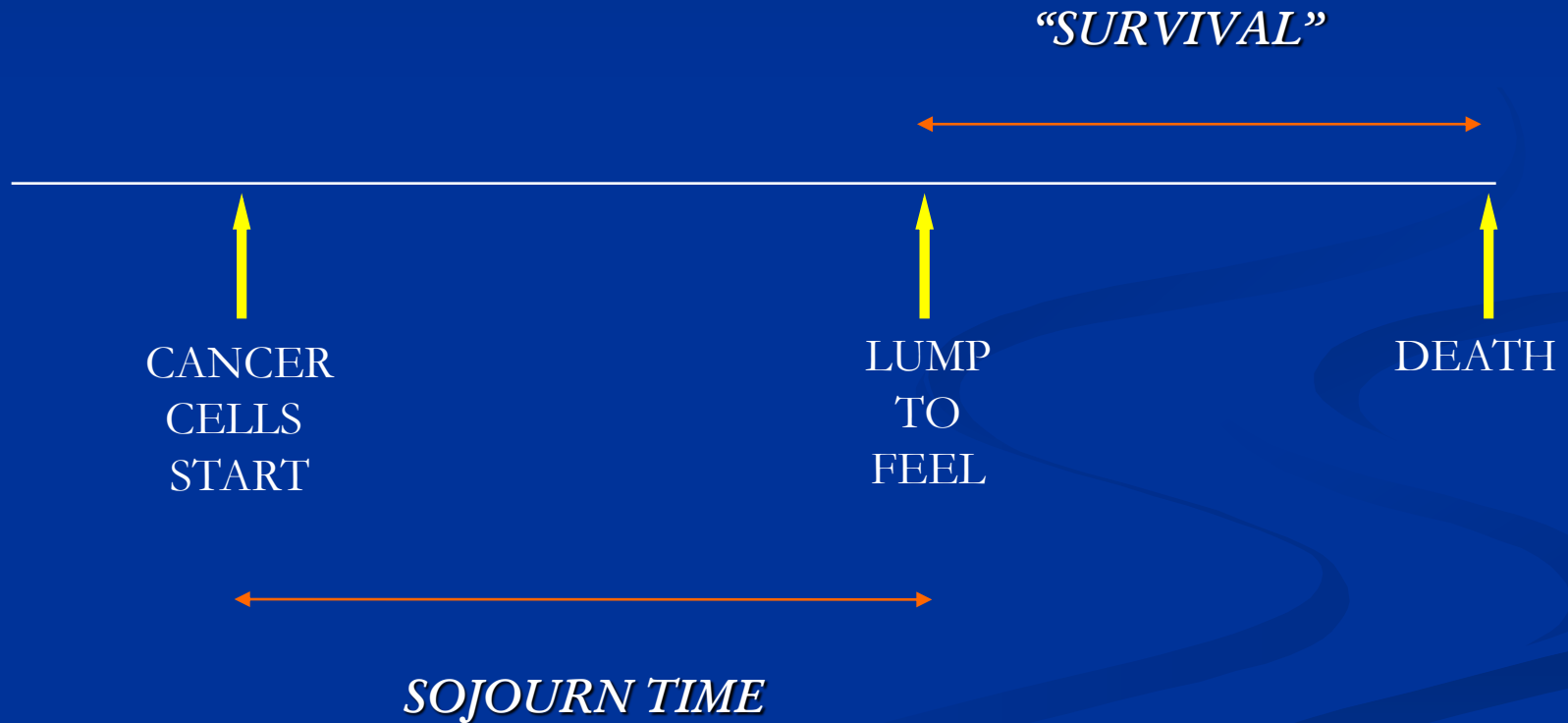
- **West of Scotland Breast Screening**
- **Ann Mumby**
- **NHS GG&C**
- **Emilia Crighton**
- **Claire Donaghy**



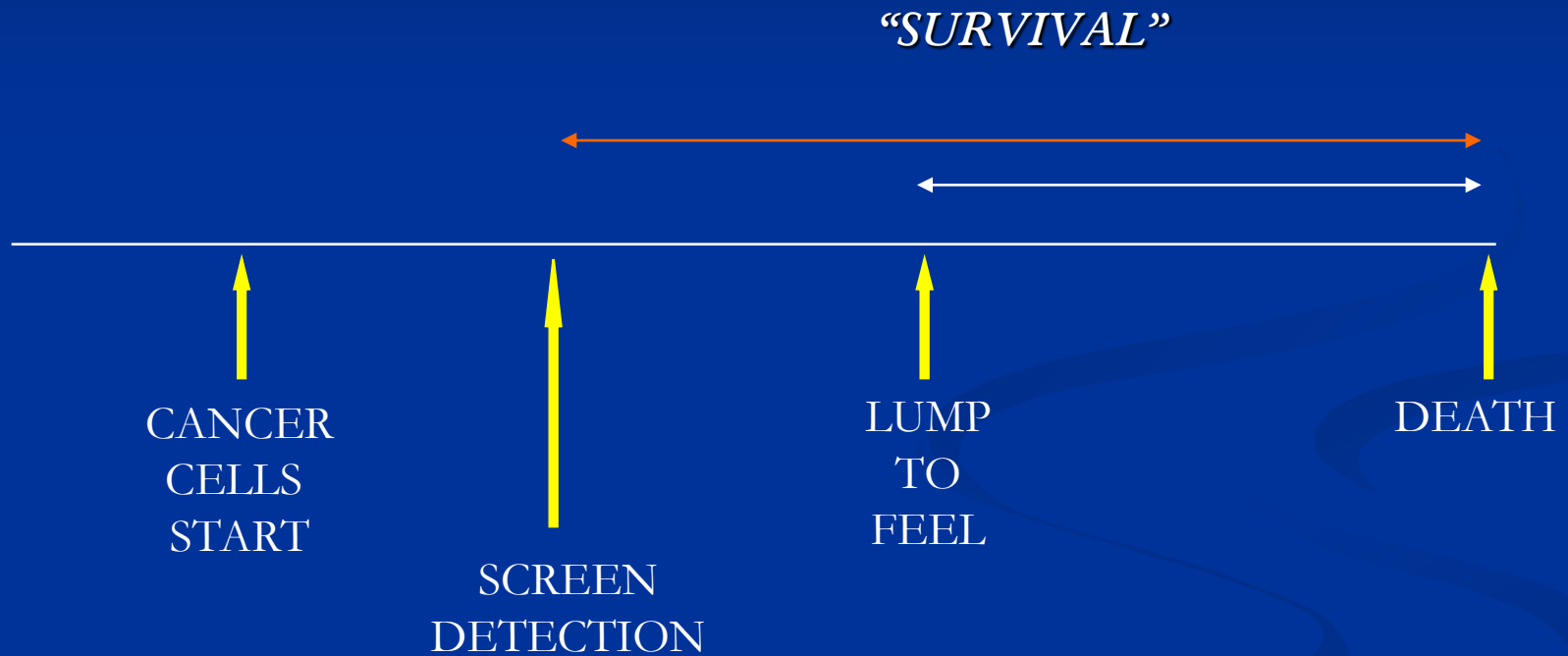




# LEAD TIME BIAS (I)



# LEAD TIME BIAS (II)



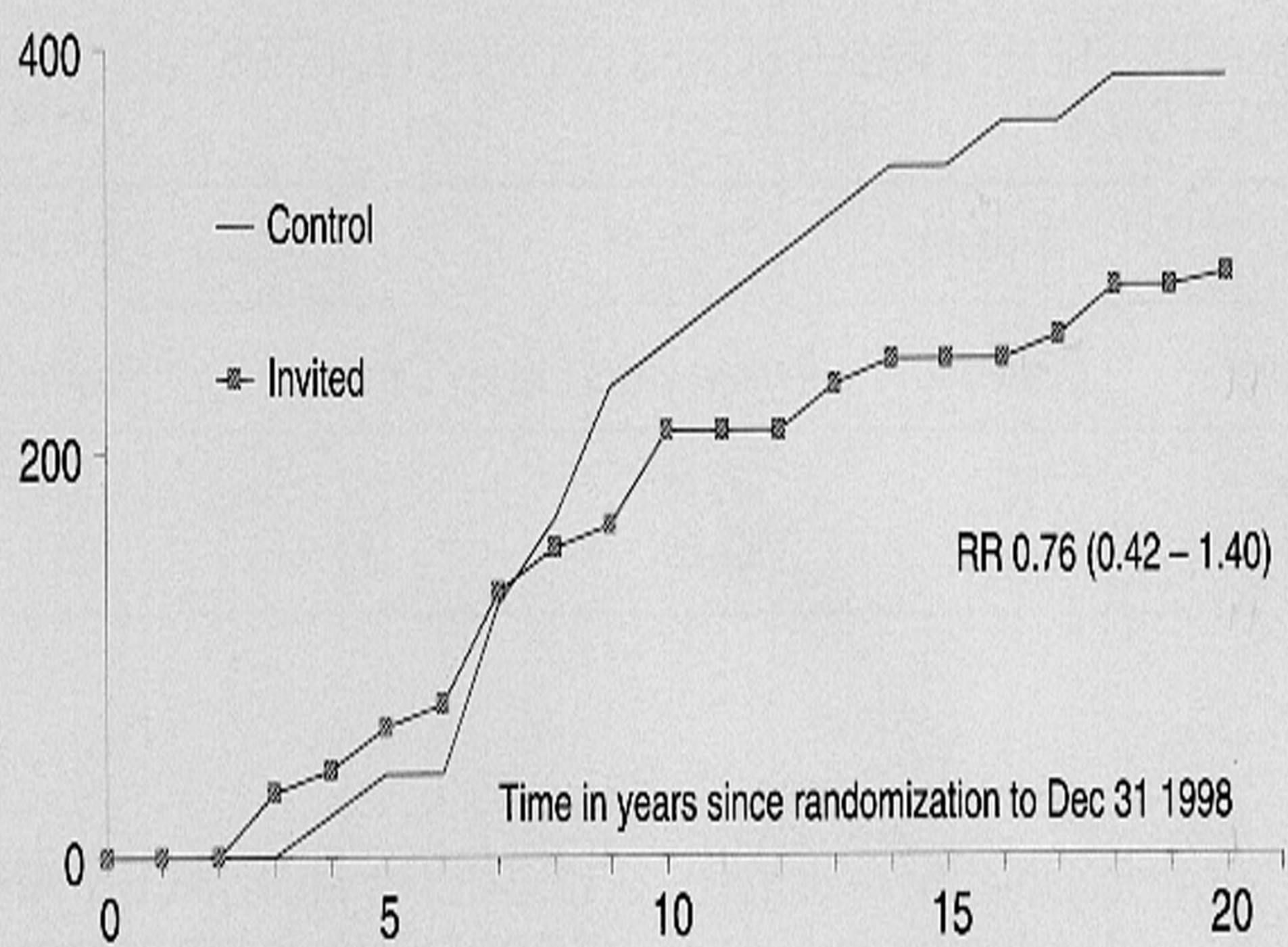


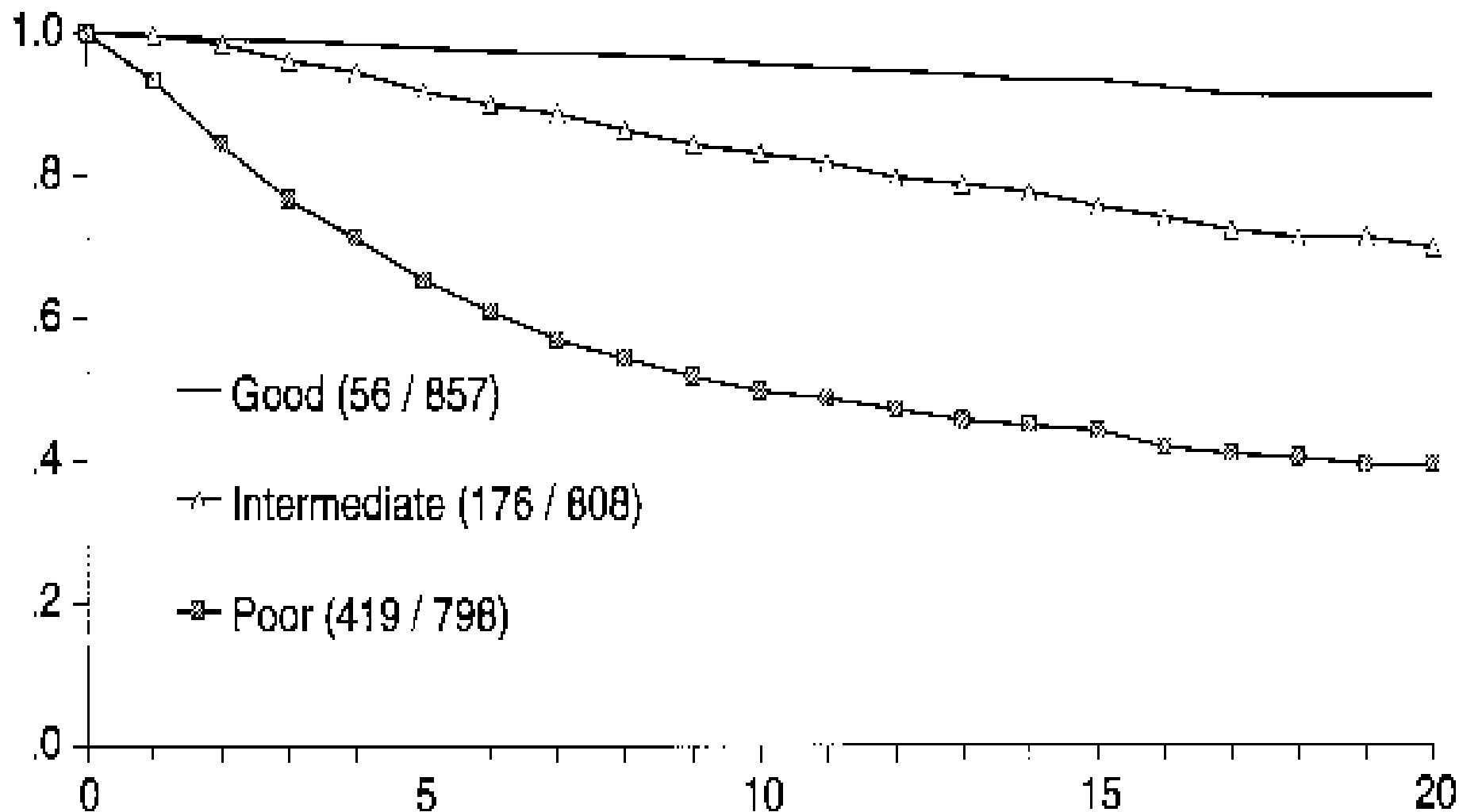
***THE SWEDISH 2 COUNTY  
(WE) STUDY***



# SCREENING FOR BREAST CANCER: THE EVIDENCE 2 COUNTY STUDY 1977

Method:	Single view mammography
Interval:	33 months
Age:	40 - 74 years
Numbers:	162,000 study group 168,000 control group
Compliance:	90% (prevalent screen)
Results:	<b>30% reduction in mortality from breast cancer - study group aged 50-74 years</b>

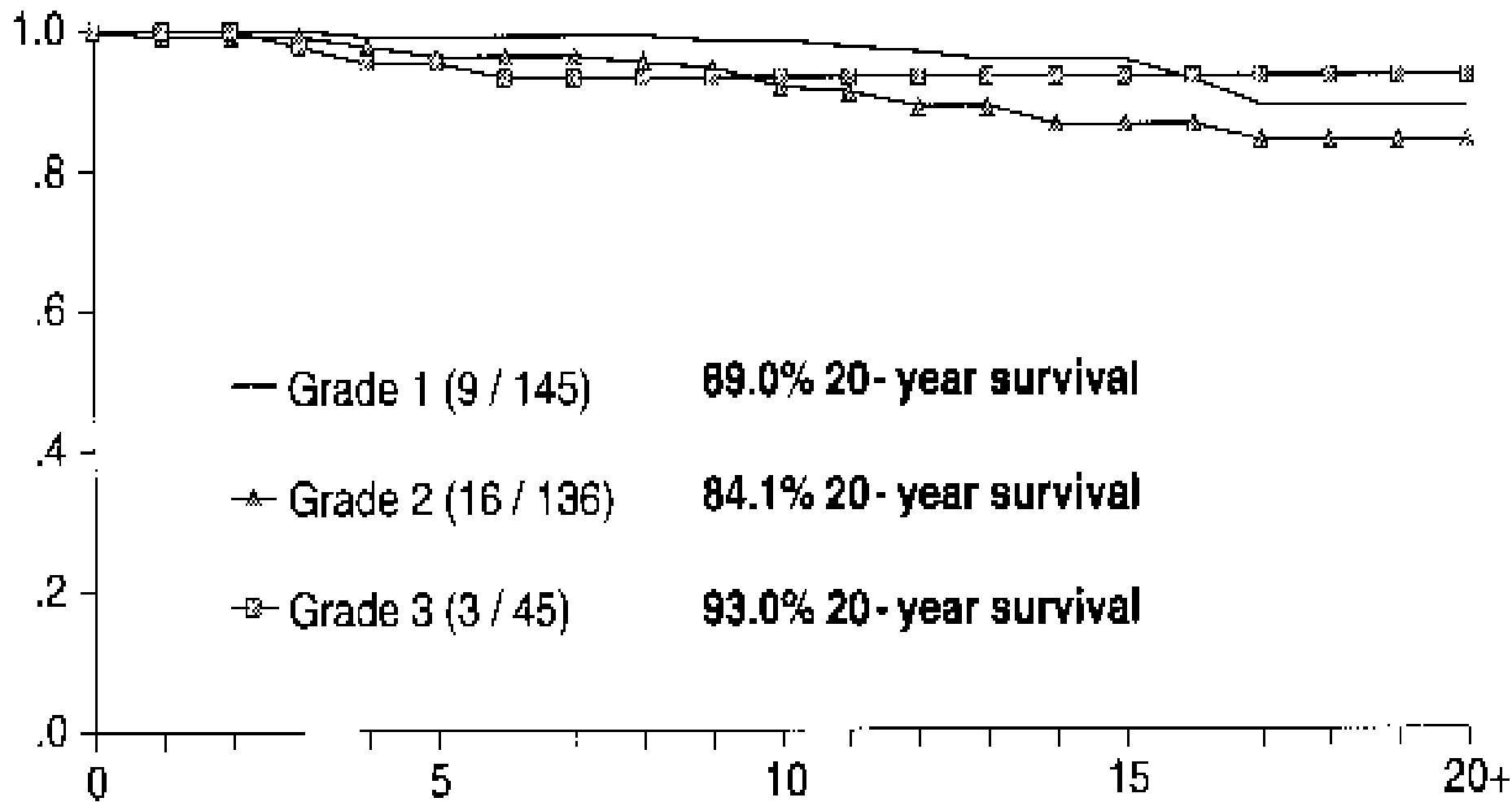




Years since operation to Dec. 31 1998. **W-E Trial, Sweden**

**Figure 12.** Long-term survival by prognostic category for all histologic types.





Years since operation to Dec. 31 1998. **W-E Trial, Sweden**

**Figure 16.** Long-term survival by malignancy grade in tumors of size 1 to 9 mm.

# BREAST SCREENING PROGRAMMES MONITORING and EVALUATION

## Lessons from Swedish 2 County Programme

- Detection of 'small' invasive cancer
  - ~ <15mm
  - ~ 50%\* of all invasive cancers detected (\*3 year cycle)
  
- Detection of 'early' disease
  - ~ 70% node negativity in invasive disease

# BREAST SCREENING PROGRAMMES

## MONITORING and EVALUATION

- Detection of 'small' 'high grade' invasive disease ~  
36% of Grade 3 invasive cancers should be <15mm
- Early detection should result in a first screen prevalence of at least three times the expected incidence rate in the absence of screening (mostly made up of invasive cancers) to achieve the decrease in rates of advanced invasive cancers.

# TABAR ET AL, *CANCER*, MAY 2001

- *50% reduction in mortality in invitees*
- *63% reduction in mortality in attendees*