

# Relative survival from breast cancer in England during 1975 to 2008 by age and socioeconomic deprivation

Devon Spika<sup>1</sup>, Bernard Rachet<sup>2</sup>, Sarah Walters<sup>2</sup>  
<sup>1</sup>King's College London Promoting Early Presentation Group, <sup>2</sup>Cancer Research UK Cancer Survival Group, London School of Hygiene and Tropical Medicine

## Background

- National Health Service (NHS) Breast Screening Programme started in 1988.
- Currently invites women aged 50 to 70 (47 to 73 in some areas).
- Relative survival for women diagnosed with breast cancer in England has increased over past several years and age-standardised deprivation gap has slowly narrowed.<sup>1,2,3</sup>
- Long-term, age-specific trends have not been thoroughly investigated.

## Aim

To investigate whether and how initiation of the NHS Breast Screening Programme coincided with changes in long-term trends in relative survival and the deprivation gap in relative survival among women invited to screening compared to women in age groups not invited.

## Methods

### Data

- 898,969 records of individual breast cancer registrations for females diagnosed between 1 January 1971 and 31 December 2008 (followed up to 31 December 2009)
- Excluded 39,468 records (deprivation unknown (n=10,038), not first record identifying patient with primary, invasive malignancy of the breast (n=29,430))
- Included 859,501 records for women diagnosed with a primary, invasive malignancy of the breast between 1975 and 2008

### Age groups

- Three groups by age at diagnosis:
  - 15-49
  - 50-70 (invited to breast screening)
  - 71-99

### Socioeconomic deprivation

- Deprivation quintiles assigned based on socioeconomic characteristics of Lower Super-Output Area where woman resident at time of diagnosis

Period of diagnosis	Index used to assign deprivation
1971 to 1985	1981 census-derived Carstairs Deprivation Index
1986 to 1995	1991 census-derived Carstairs Deprivation Index Score
1996 to 2008	Indices of Multiple Deprivation Score (IMD)

### Relative survival analysis

- Relative survival:

Observed survival among cancer cases  
Survival expected among general population by calendar year, age, sex and deprivation

- Complete life tables used to quantify survival expected among general population
- Relative survival calculated at one year, five years, and five years conditional on having lived at least one year after diagnosis

### Deprivation gap in relative survival

- Deprivation gap:

Absolute difference in linearised relative survival between least and most deprived, by year of diagnosis

- Wider (more negative) deprivation gap → greater inequality

## Key findings

- Relative survival from breast cancer:
  - Increasing trend in relative survival across all age groups
  - Marked decrease in one-year relative survival among 71-99 age group in mid-1990s
- The deprivation gap in relative survival:
  - Narrow in 15-49 age group, remains fairly constant with year of diagnosis
  - Wider in 50-70 and 71-99 age groups for all three survival estimates, but decreased overall
  - Widened in 71-99 age group in late 1990s

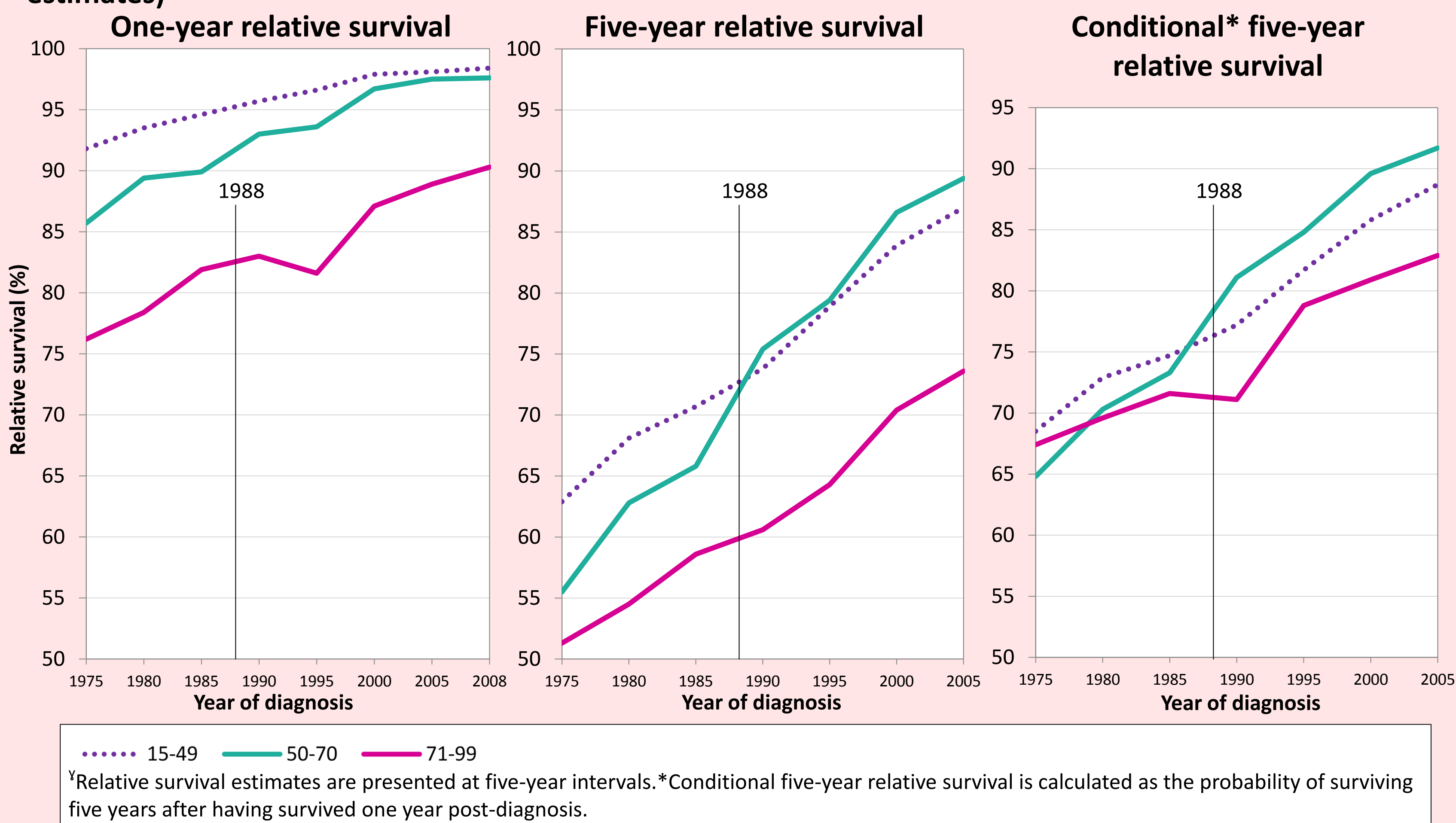
## Results

### Age distribution of diagnoses

- Mean age at diagnosis relatively constant in 15-49 and 50-70 age groups. Increased by 2.1 years in 71-99 age group, from 1975 to 2008.

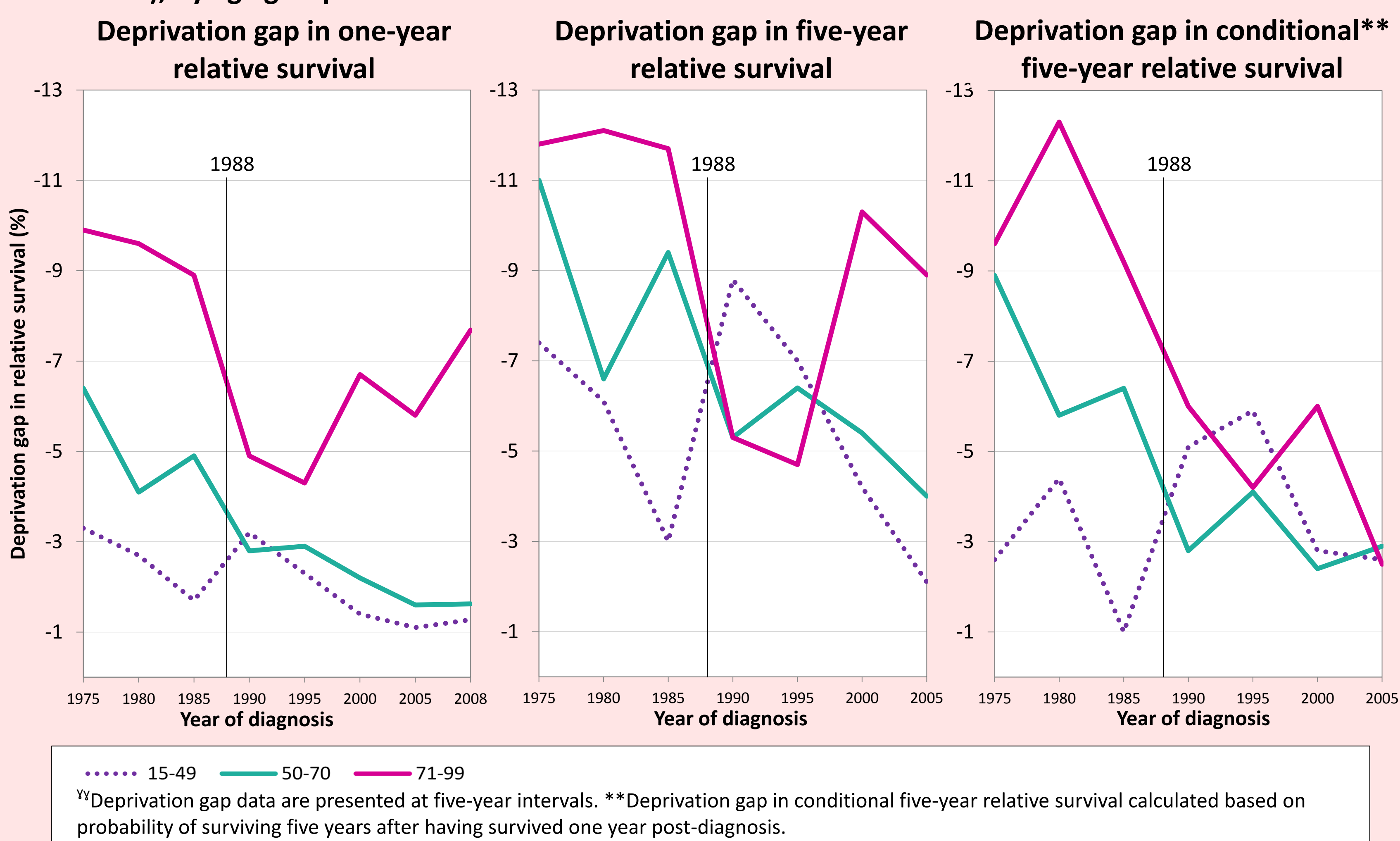
### Relative survival by age group

Figure 1: Trends<sup>y</sup> in relative survival (%) by age group at diagnosis during 1975 to 2005 (2008 for one-year estimates)



### Deprivation gap in relative survival by age group

Figure 2: Trends<sup>yy</sup> in deprivation gap (%) in relative survival during 1975 to 2005 (2008 for one-year estimates), by age group



## Conclusions

- Between 1975 and 2008, relative survival increased markedly and the deprivation gap narrowed across all age groups and survival estimates.
- The deprivation gap was generally widest in the 71-99 age group. Interestingly, it widened in the late 1990s among women aged 71-99.
- Further research is needed to investigate causality between screening, relative survival and the deprivation gap.
- Future research should also investigate reasons for persistently lower relative survival and a generally wider deprivation gap among women diagnosed above age 70.

1. Quinn, M.J., et al., *Survival from cancer of the breast in women in England and Wales up to 2001*. Br J Cancer, 2008. **99** Suppl 1: p. S53-5.  
2. Coleman, M.P., et al., *Trends and socioeconomic inequalities in cancer survival in England and Wales up to 2001*. Br J Cancer, 2004. **90**(7): p. 1367-73.  
3. Lyratzopoulos, G., et al., *Changes over time in socioeconomic inequalities in breast and rectal cancer survival in England and Wales during a 32-year period (1973-2004): the potential role of health care*. Ann Oncol, 2011. **22**(7): p. 1661-6.