The impact of screen-detection upon international differences in survival from breast cancer:
a comparison of the West Midlands, England, and New South Wales, Australia

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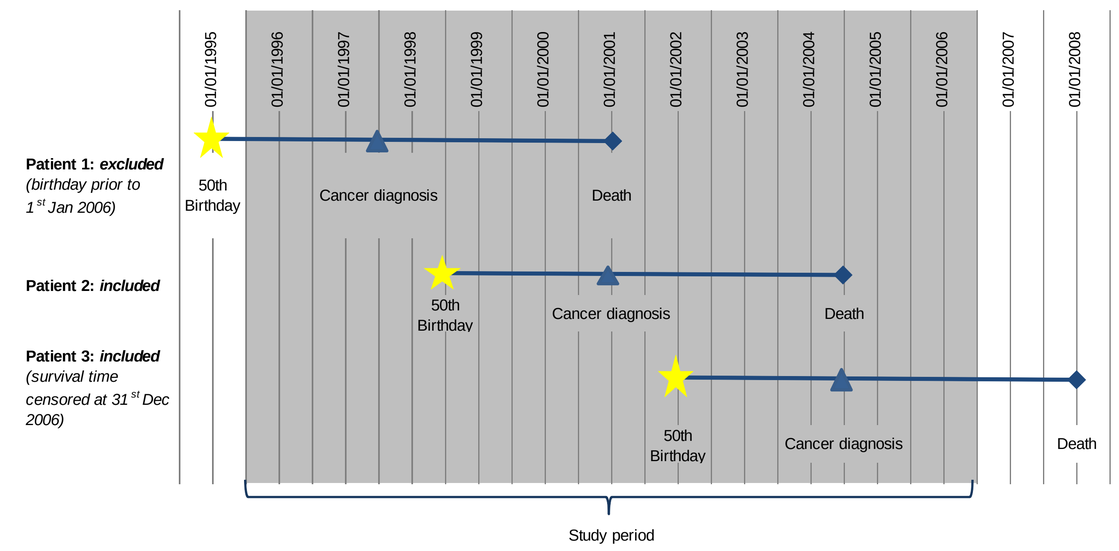
Introduction

- ***Our previous results***: a significant difference in five-year breast cancer survival between Australia and England of 6% in the screening age group for women diagnosed during the period 1996-19991
- ***One possible explanation***: relatively low intensity of breast screening in England compared to Australia

Material

- Women aged 50 years or younger on 1st January 1996
- Diagnosed with a primary invasive breast cancer during the period 1 January 1996 to 31 December 2006
- 5,717 women from West Midlands region of England
- 6,396 women New South Wales, Australia
- All women were followed up to 31 December 2006

Figure 1 – Cohort included in analyses



- Cancer registry data
- Individual registry records linked to individual screening records
- Categories for screening status at diagnosis: *screen-detected, interval cancer, lapsed attender, non-attender*

Methods

- Non-parametric net survival estimates using the Pohar-Perme estimator[2], using *stns (*software available for Stata 12[3])
- Comparison of the Pohar-Perme estimates with widely used Estève approach[4;5]
- Excess hazard and hazard ratios derived from survival
- Expected survival from regional life tables (single years of age for each year of follow-up)
- Adjustment for the potential effect of lead time bias:
  - calculation of adjusted survival time E(s) [6]
  - mean sojourn time of 4 years
  - 10 simulated data sets: $E(s)_1$, $E(s)_2$ … $E(s)_{10}$ assuming survival exponentially distributed with a mean of E(s)
  - survival estimates derived from these 10 separate data sets recombined using rules from the multiple-imputation setting[7]

Results

- A significant difference in net survival between women diagnosed in New South Wales and the West Midlands (Figure 2)
- Survival for screen-detected women similar (Figure 3)

Figure 2: Net survival estimates: West Midlands and New South Wales

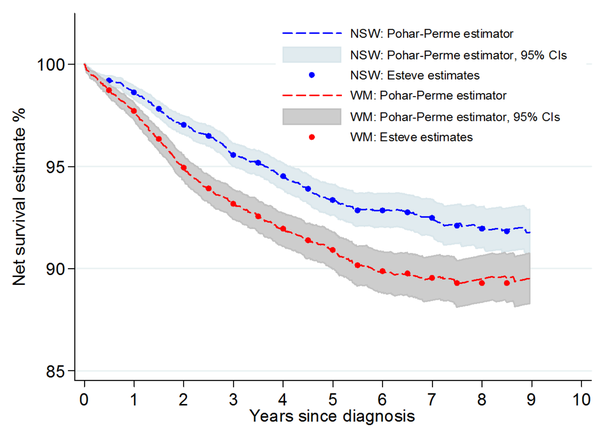
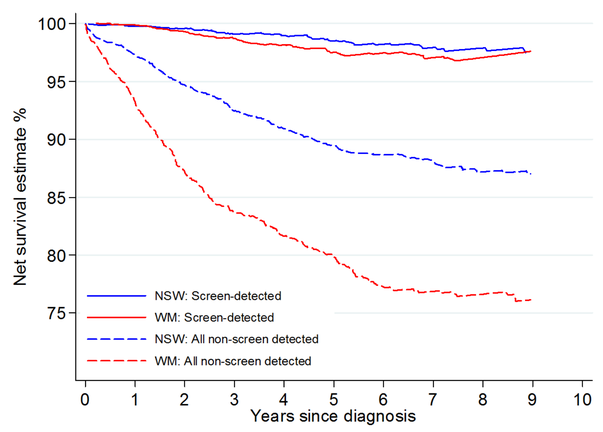


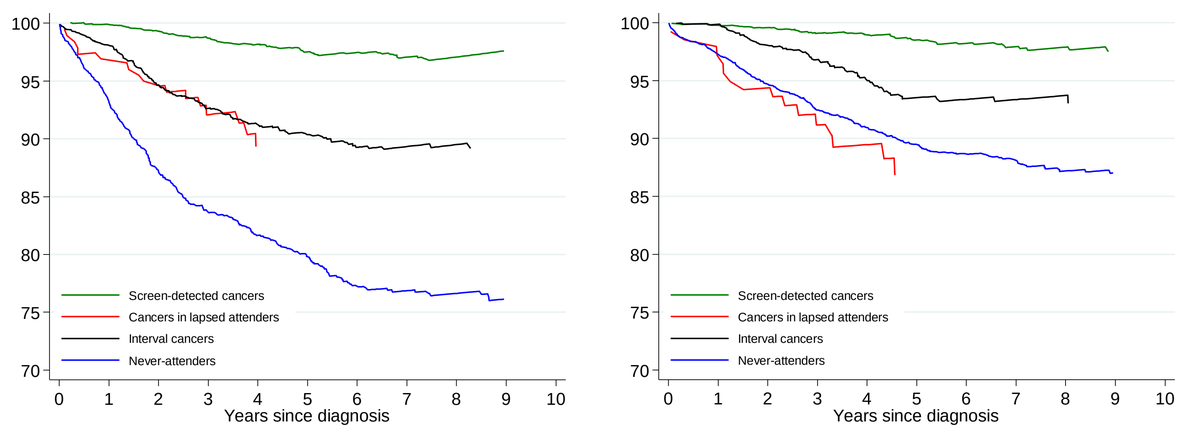
Figure 3: Net survival estimates: Screen-detected vs. non-screened



- Differences smaller for women who had attended screening (Figure 4)

Figure 4: Net survival estimates by screening category

a) West Midlands b) New South Wales



- Lead time adjusted estimates lower (Figure 5)
- Non-significant survival difference between New South Wales and West Midlands in adjusted estimates (Figure 6)

Figure 5: Estimates adjusted for lead time bias: West Midlands

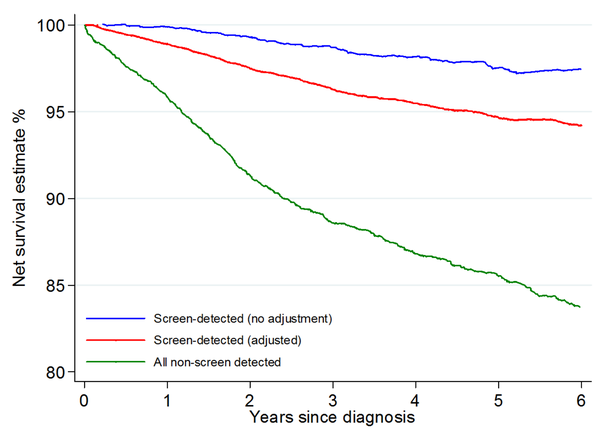
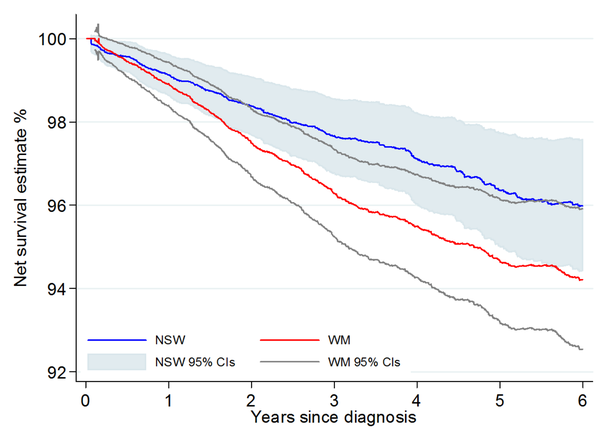


Figure 6: Adjusted net survival estimates: screen-detected cancers

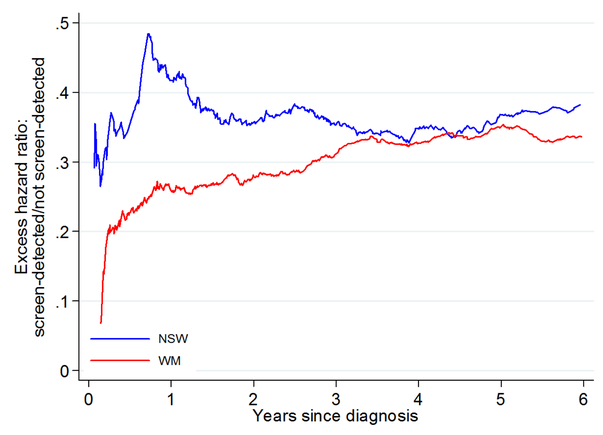


- Excess hazard ratios: regional differences in survival were greatest during the first three years following diagnosis (Figure 7).

Conclusions

- Survival remains higher in New South Wales compared to the West Midlands for women aged 50-64
- Survival differences less marked for women who have attended screening
- Non-significant difference in survival amongst screen–detected women after adjustment for lead time

Figure 7: Excess hazard ratios comparing lead-time adjusted hazard in screened group with the non-screened group



- Differential survival in the non-screen detected groups may be due to women obtaining mammography privately in New South Wales
- Poorer treatment of non-screen detected women after their diagnosis remains one explanation for poorer survival in West Midlands

References

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