



## Investigating the utility of period survival analysis in measuring variation in long term prognosis of cancer patients by West Midlands acute NHS Trusts

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## Acknowledgements

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Analysis and discussion

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## Aims

Identify any significant differences in survival at different Trusts in WM



## Introduction

Survival – it's important

**Question:** Is mortality an appropriate outcome indicator? Are there others to be considered?

**What was said:** 'independent survival' - a more positive outcome measure than mortality

**Govt response:** measures of survival rather than mortality allow a more accurate reflection of the NHS' contribution to helping people to recover

# Introduction



Three characters:



Dr George



Dr Mario



The Analyst - Bill

# The problem



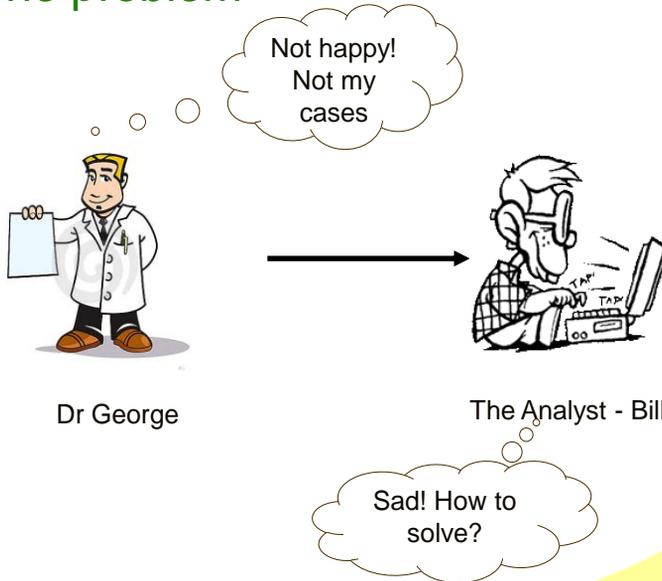
Dr George



The Analyst - Bill

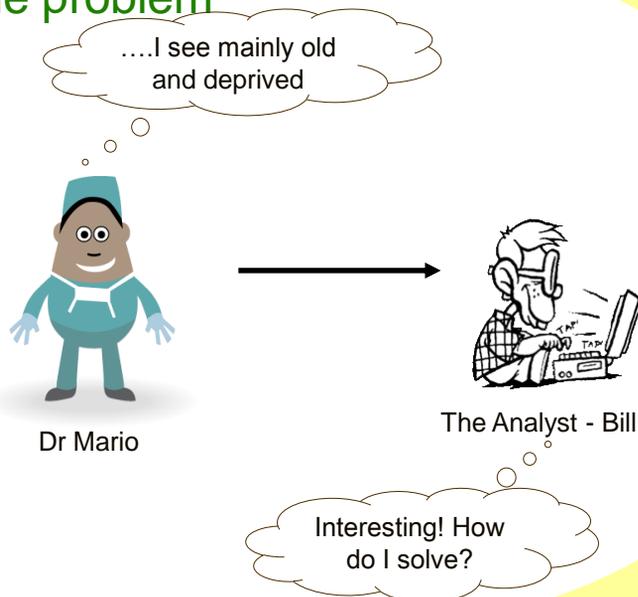


## The problem



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## The problem



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## The solution?...



How to solve?

Perhaps....

Eureka!!

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## The solution?...



What do these numbers represent?

77.2



81.5



71.2



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# Life expectancy



Two methods:

Cohort – looks at the mortality rate of a 65yr old person in 2004, a 66yr old person in 2005 and so on

Period – looks at the mortality rates in a given period i.e. in 2004 the mortality rate of 65, 66 and 67yr olds was.....

**Period analysis assumes no change in mortality rates in future**

# Application to survival analysis



Long-term cancer patient survival achieved by the end of the 20th century: most up-to-date estimates from the nationwide Finnish cancer registry  
H. Brenner<sup>1</sup> and T. Hakulinen<sup>2</sup>

Long-term survival rates of cancer patients achieved by the end of the 20th century: a period analysis  
Hermann Brenner

Recent cancer survival in Europe: a 2000-02 period analysis of EURO CARE-4 data  
Adriano Verdecchia, Silvia Francini, Hermann Brenner, Gemma Catta, Andrea Micheli, Lucia Morgone, Ian Kurkie, and the EURO CARE-4 Working Group

Trends in breast cancer survival in Germany from 1976 to 2008—A period analysis by age and stage  
Bernd Holleczek<sup>1</sup>, Volker Arndt<sup>2</sup>, Christa Stegmaier<sup>3</sup>, Hermann Brenner<sup>4</sup>  
<sup>1</sup>International Cancer Registry, Immanuel-Helios-Klinik, D-10119 Berlin, Germany  
<sup>2</sup>German Cancer Research Center, Division for Clinical Epidemiology and Aging Research, Bergheimer Straße 20, 10115 Berlin, Germany

## Method



I have a  
method

Case mix  
problem?  
Sorted...

Results

## What did Bill do?



- Assigned a Trust 'first seen' to each tumour
  - Cancer Waiting Times (CWT)
  - WMCIU internal algorithm
    - ~97% match
- Common Cancers
- Trusts with large caseload
  - >8,000 cases across 4 common cancers
    - Diagnosed 1998-2009

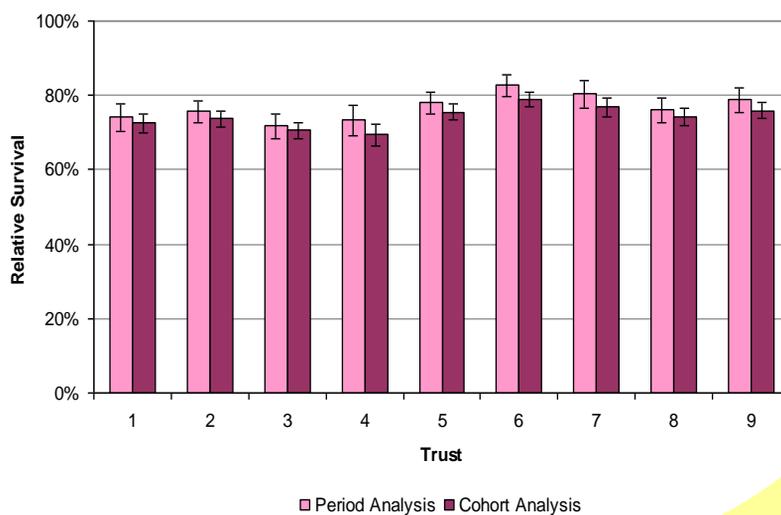


## What did Bill do?

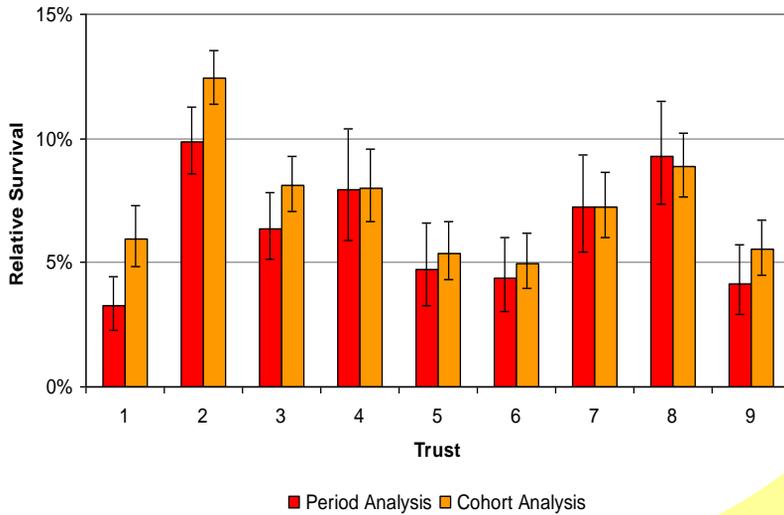
- Selected survival period 2007-2009
- Used deprivation specific life tables
- Investigated age standardised survival method
  - ❖ **Dropped from analysis**



## Results: 10 yr Breast RS

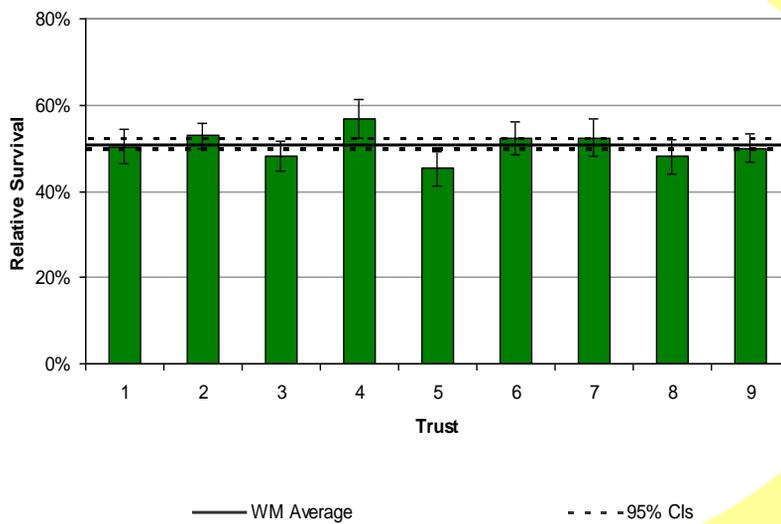


## Results: 5 yr Lung RS



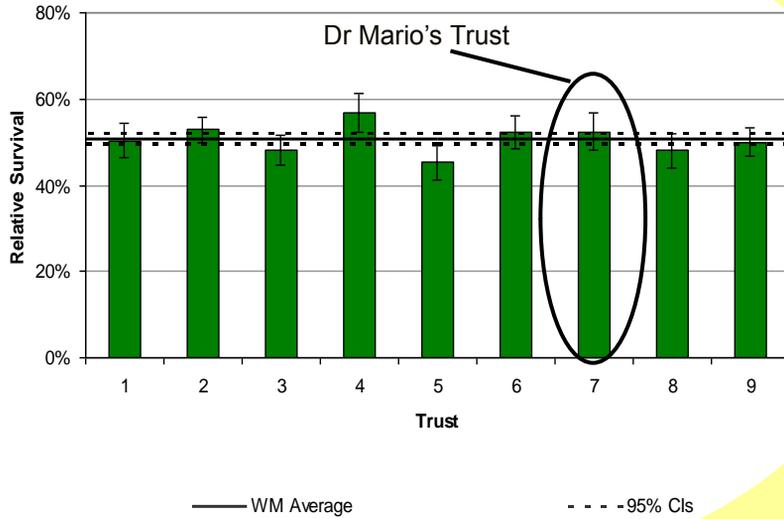
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## Results: 5 yr Bowel RS



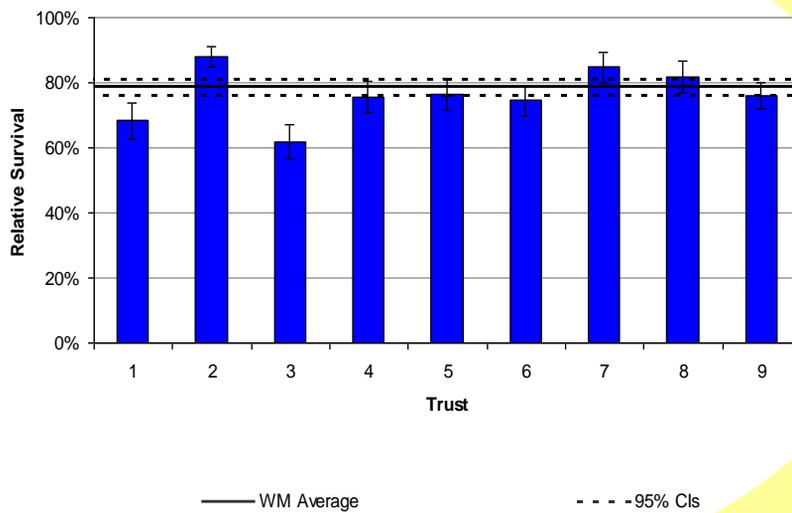
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## Results: 5 yr Bowel RS



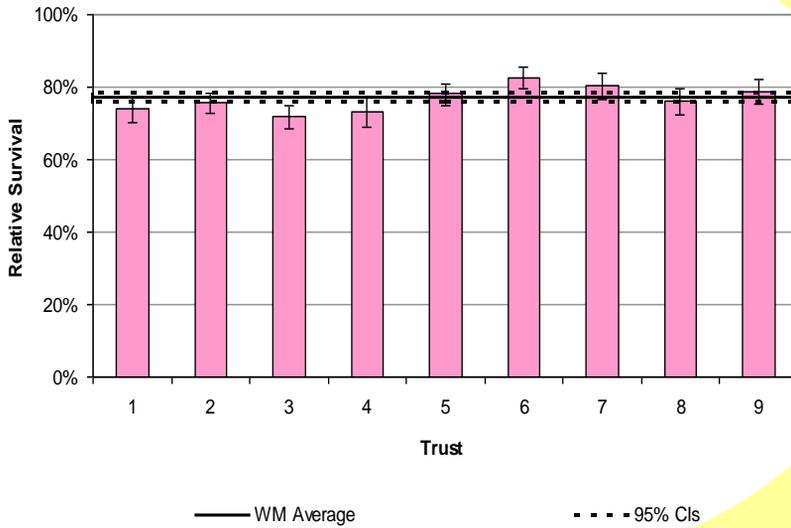
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## Results: 10 yr Prostate RS



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## Results: 10 yr Breast RS



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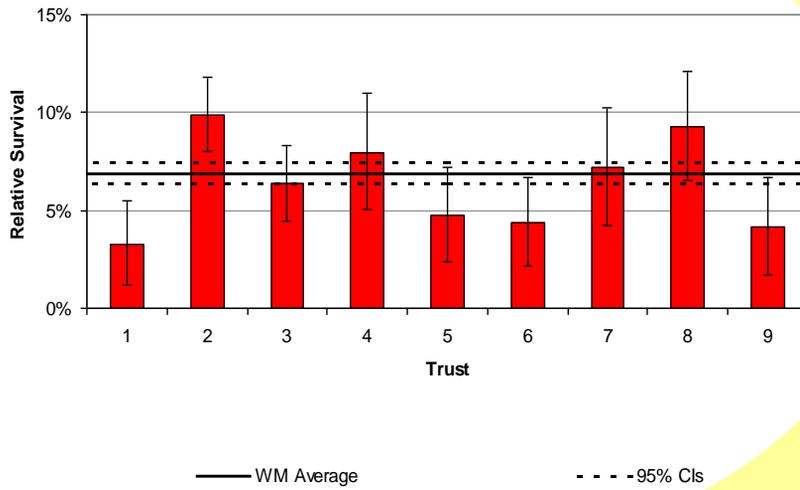
## Warning!



None of these data truly adjust for case mix

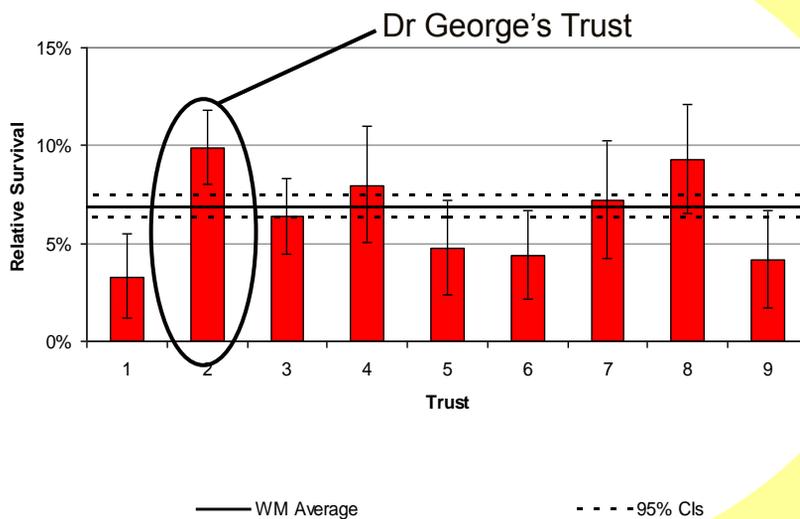
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## Results: 5 yr Lung RS



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## Results: 5 yr Lung RS

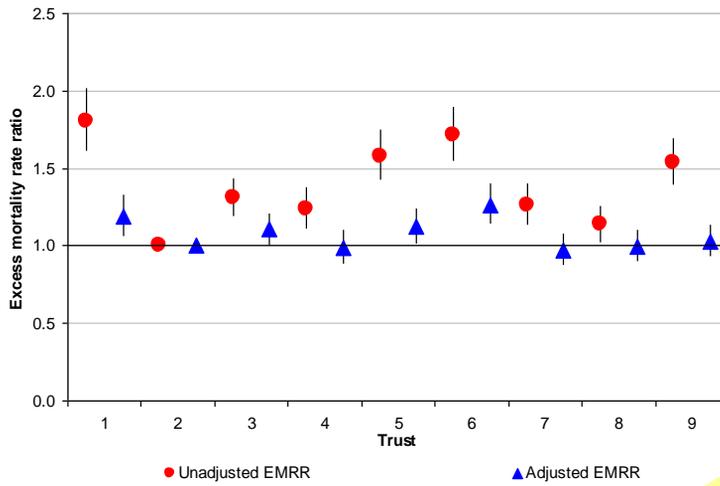


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# Excess mortality rate ratio



## Lung Cancer 0-5 Years

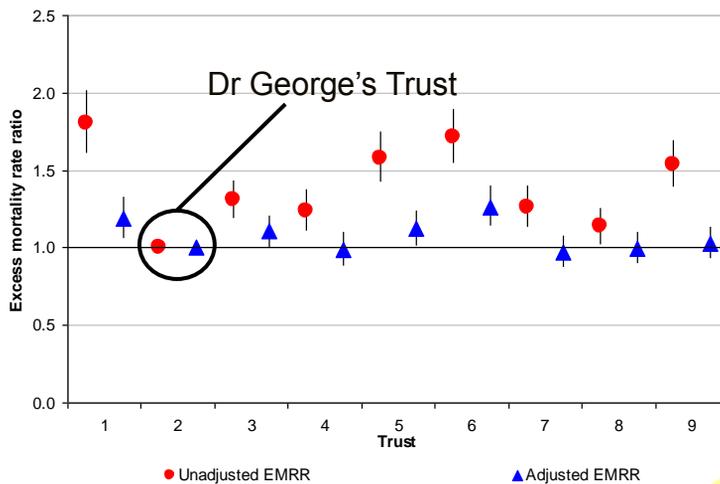


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# Excess mortality rate ratio



## Lung Cancer 0-5 Years



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# Conclusions: who is happiest?



Three characters:

Dr George



The Analyst - Bill



Dr Mario



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# Conclusions: who is happiest?



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The Analyst - Bill



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## Recap



Differences between period and cohort method

- Recency vs. statistical efficiency

- Cohort and period tell different story

Effect of small improvements in survival

Age standardisation

Further work

- Extension of EMRR to extract RS estimates

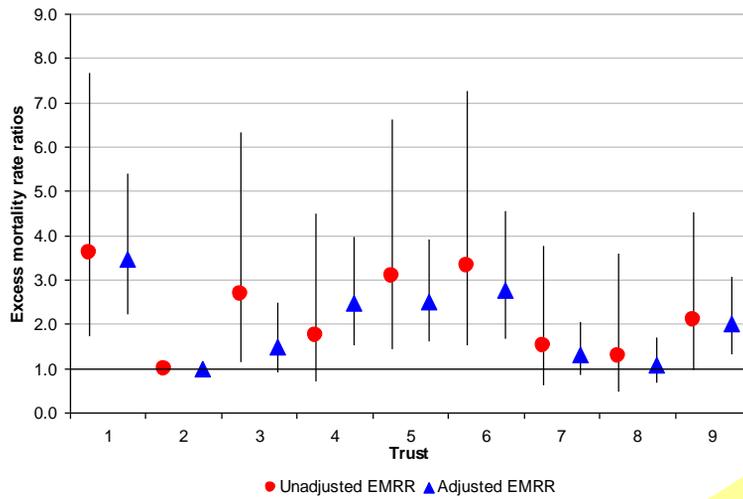
- Apply to Trust of surgery

## Thank you



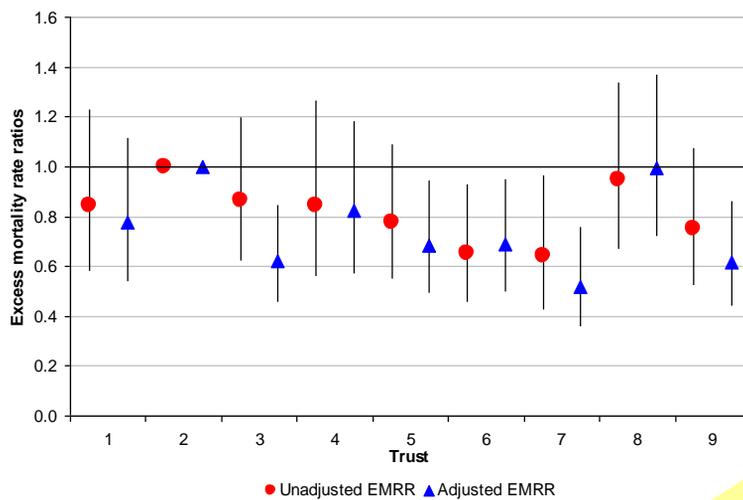
Any questions?

## Bonus Slides! – Prostate



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## Bonus Slides! – Breast



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## Bonus Slides! – Bowel

