



Institute  
and Faculty  
of Actuaries

## Cancer –

### A Review of the Latest Data & Trends for Incidence & Survival

Matthew Smith

06 November 2014

## Aims of the Presentation

|                              |                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------|
| <b>Trends</b>                | A site by site analysis of trends in incidence, mortality & survival                |
| <b>Worldwide perspective</b> | Scenario based analysis of cancer incidence from around the World                   |
| <b>Insured vs Population</b> | A review of the key differences between the population as a whole and insured lives |
| <b>Consumer Survey</b>       | Connecting observed statistics with consumer views                                  |



Institute  
and Faculty  
of Actuaries

# Background

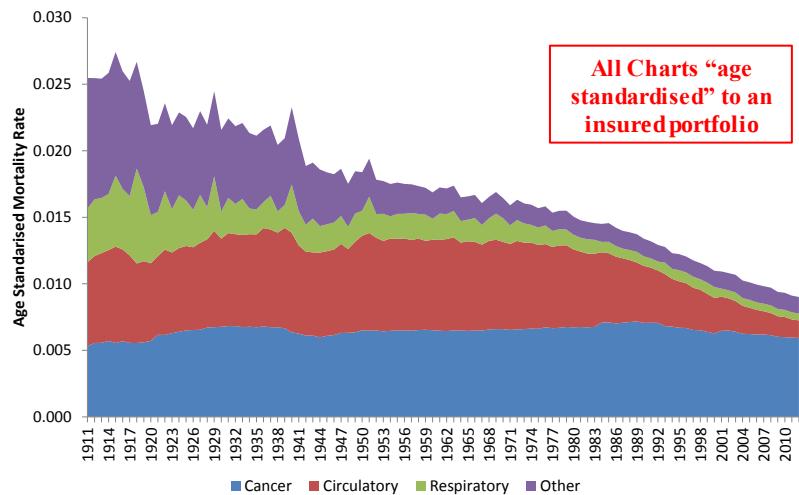
Why cancer is important

Artisan  
Sponsorship  
Thought leadership  
Progress  
Community  
Sessional Meetings  
Education  
Working parties  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Support

06 November 2014

## Cancer is increasingly important

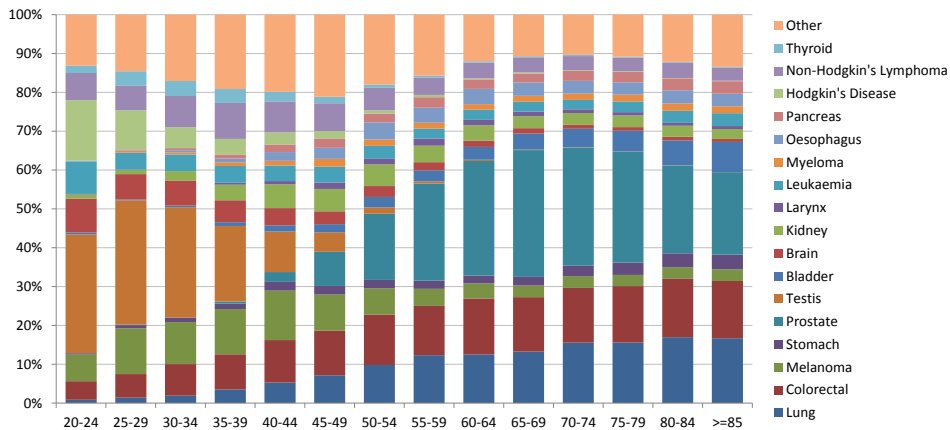
- As a cause of mortality



06 November 2014

## Cancer is many different conditions

- Affecting different ages (male)

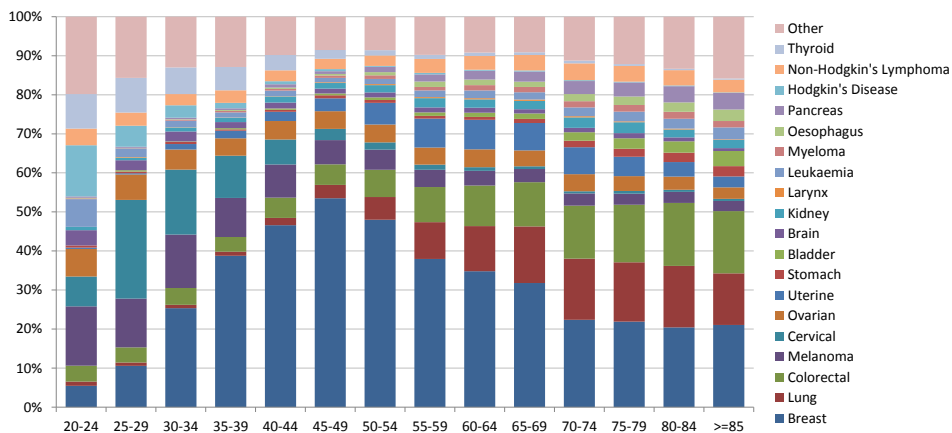


06 November 2014

5

## Cancer is many different conditions

- Affecting different ages (female)

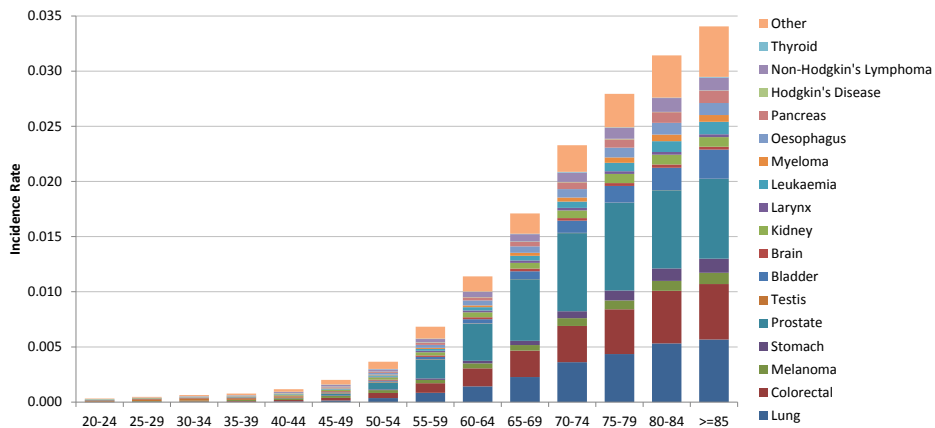


06 November 2014

6

## Cancer is many different conditions

- But largely an older age condition (male)

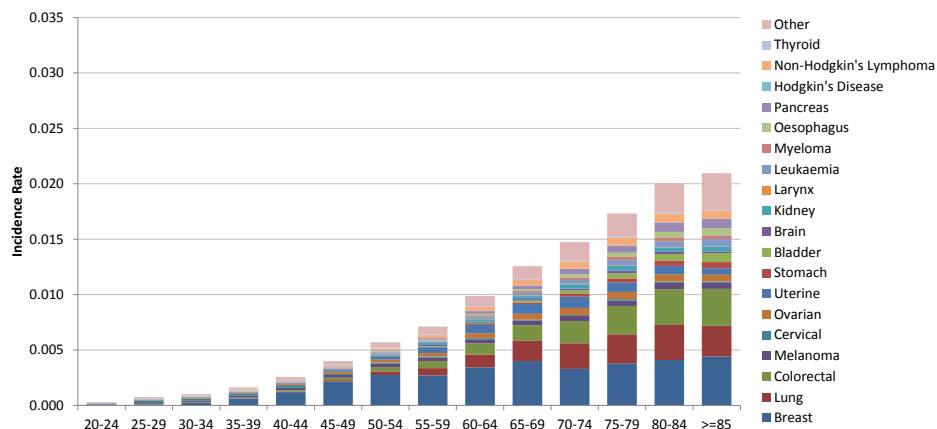


06 November 2014

7

## Cancer is many different conditions

- But largely an older age condition (female)

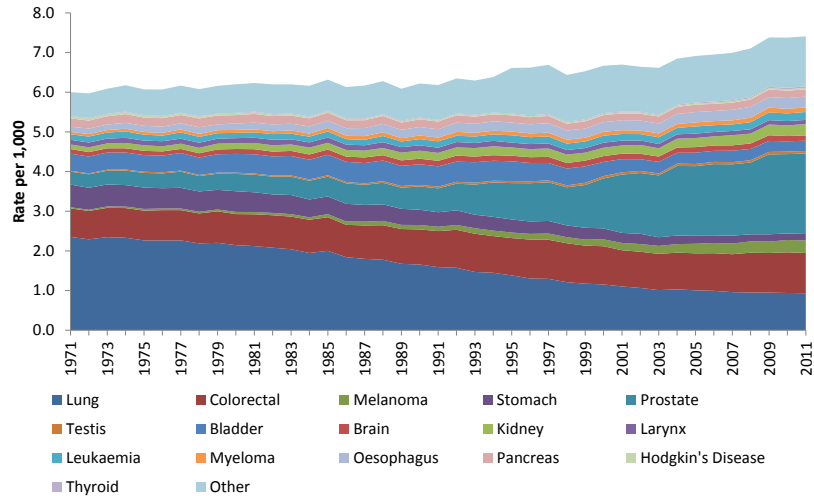


06 November 2014

8

## Cancer is evolving

- In different ways (male)

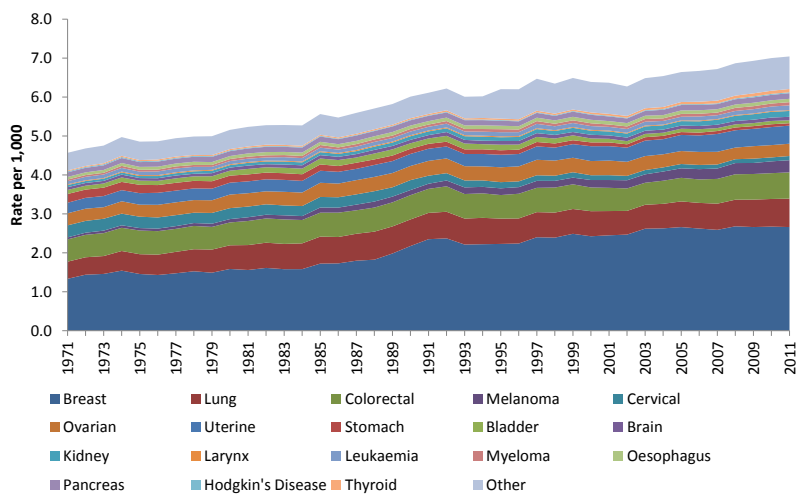


06 November 2014

9

## Cancer is evolving

- In different ways (female)

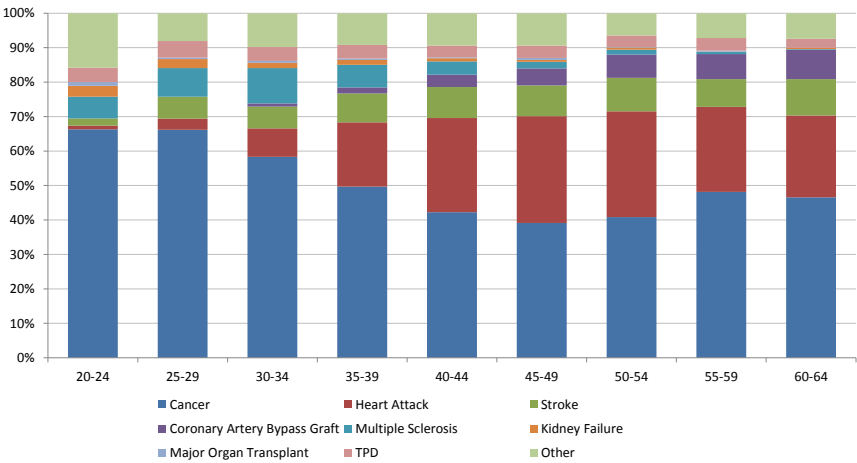


06 November 2014

10

# Cancer is dominant

- As a cause of claim for critical illness insurance (male)

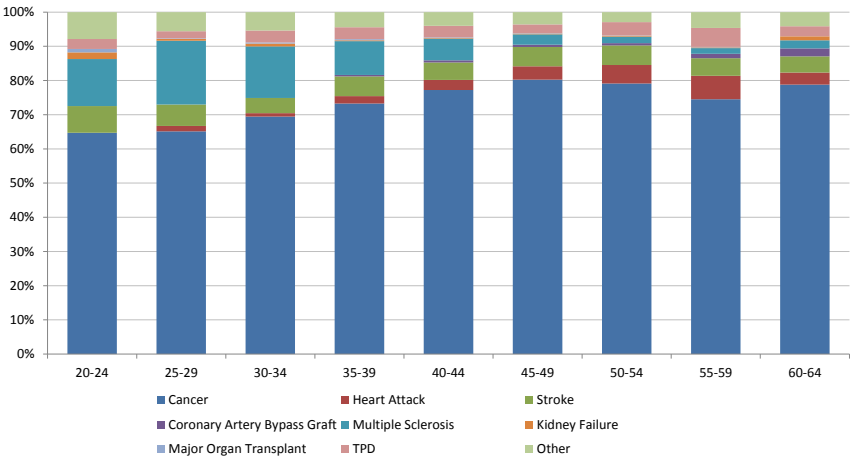


06 November 2014

11

# Cancer is dominant

- As a cause of claim for critical illness insurance (female)



06 November 2014

12

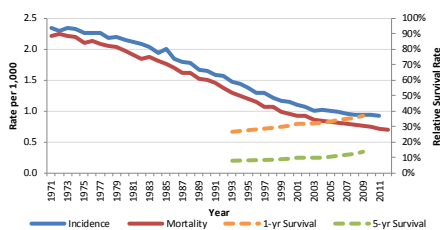
# Incidence, Mortality, survival

Trends by site

06 November 2014

## Lung Cancer (male)

### General Trends



### Key Facts

% of all male cancers: 10%-15%

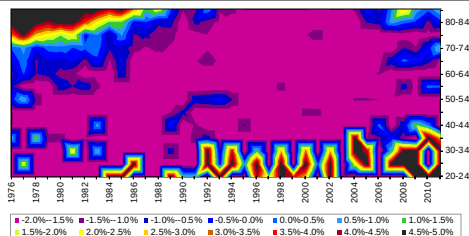
% of all male cancer CI claims: 5%-10%

% of all male cancer deaths: 20%-25%

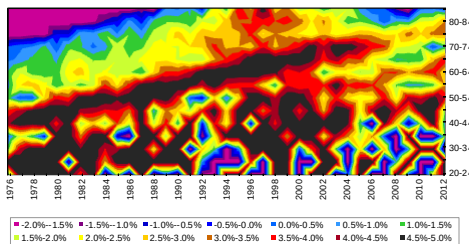
### Known Drivers:

Smoking prevalence

### Incidence Deteriorations

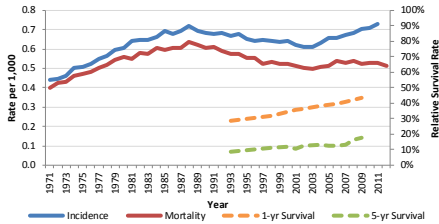


### Mortality Improvements

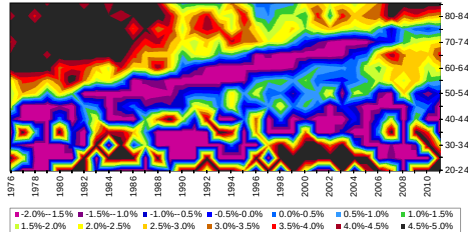


# Lung Cancer (female)

## General Trends



## Incidence Deteriorations



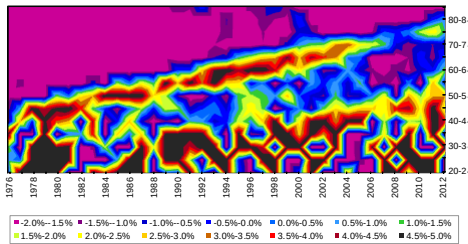
## Key Facts

% of all female cancers: 10%-15%  
% of all female cancer CI claims: 2.5%-5%  
% of all female cancer deaths: 20%-25%

### Known Drivers:

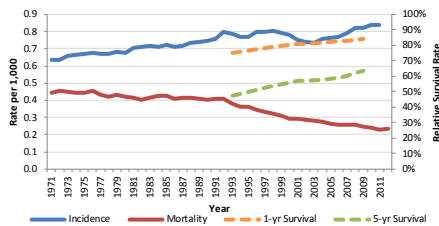
Smoking prevalence

## Mortality Improvements

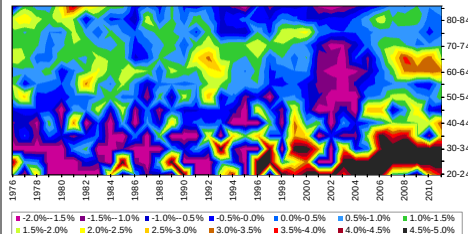


# Colorectal Cancer (both)

## General Trends



## Incidence Deteriorations



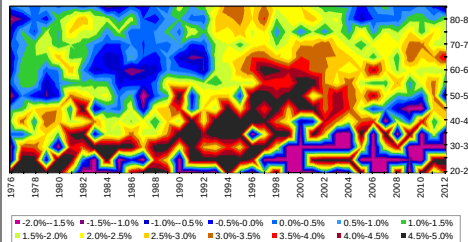
## Key Facts

% of all cancers: 10%-15%  
% of all cancer CI claims: 5%-10%  
% of all cancer deaths: 5%-10%

### Known Drivers:

Screening, diet

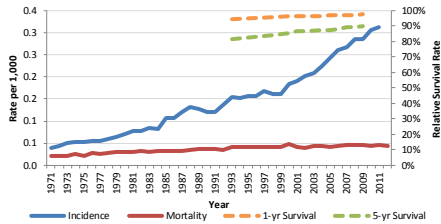
## Mortality Improvements



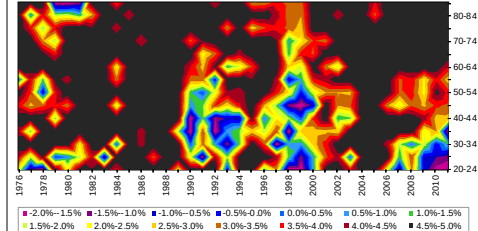


## Melanoma (both)

### General Trends



### Incidence Deteriorations



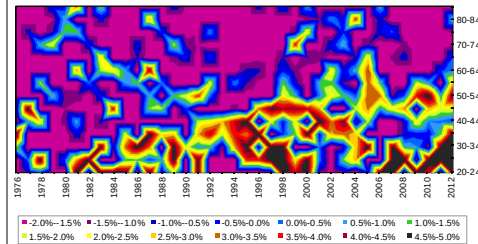
### Key Facts

% of all cancers: 2.5%-5%  
 % of all cancer CI claims: 5%-10%  
 % of all cancer deaths: 1%-2.5%

#### Known Drivers:

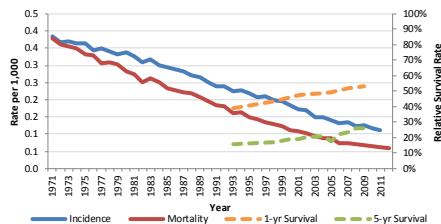
Sun-related behaviour

### Mortality Improvements

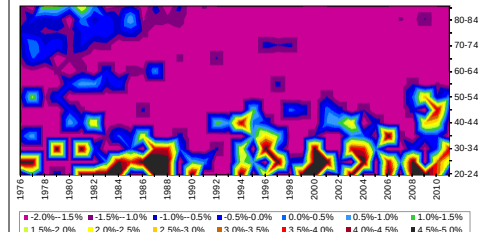


## Stomach Cancer (both)

### General Trends



### Incidence Deteriorations



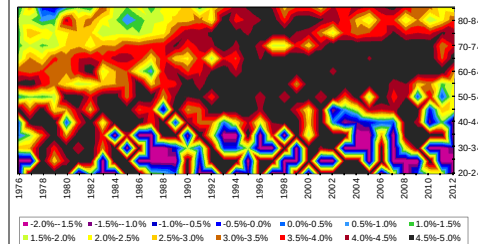
### Key Facts

% of all cancers: 1%-2.5%  
 % of all cancer CI claims: 1%-2.5%  
 % of all cancer deaths: 1%-2.5%

#### Known Drivers:

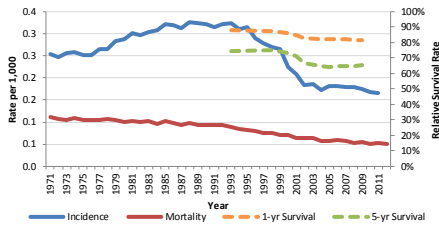
Refrigeration/prevalence of *H. pylori*

### Mortality Improvements

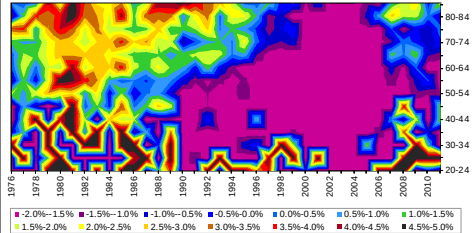


# Bladder Cancer (both)

## General Trends



## Incidence Deteriorations



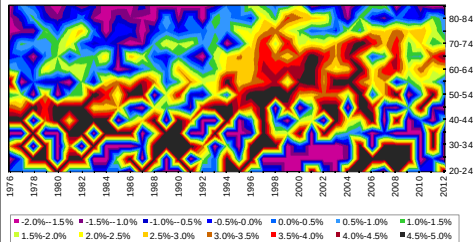
## Key Facts

% of all cancers: 1%-2.5%  
% of all cancer CI claims: 1%-2.5%  
% of all cancer deaths: 1%-2.5%

### Known Drivers:

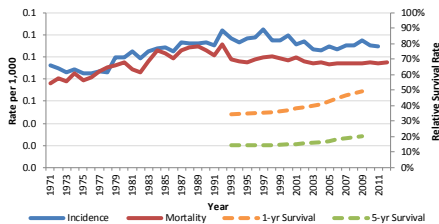
Smoking, occupational carcinogens, classification change

## Mortality Improvements

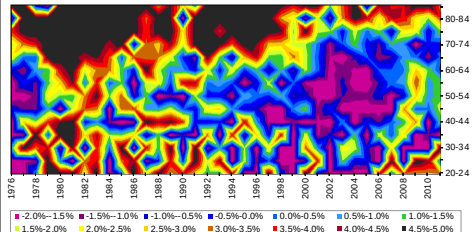


# Brain Cancer (both)

## General Trends



## Incidence Deteriorations



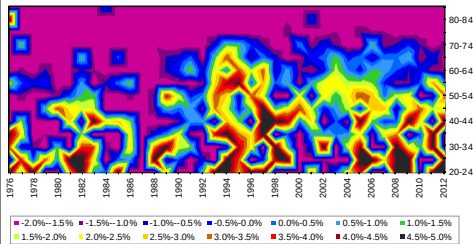
## Key Facts

% of all cancers: 1%-2.5%  
% of all cancer CI claims: 1%-2.5%  
% of all cancer deaths: 2.5%-5%

### Known Drivers:

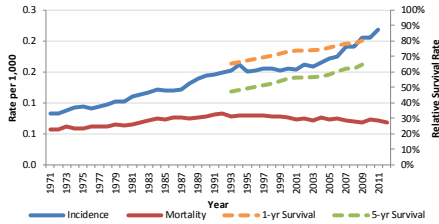
Diagnostics, coding changes

## Mortality Improvements

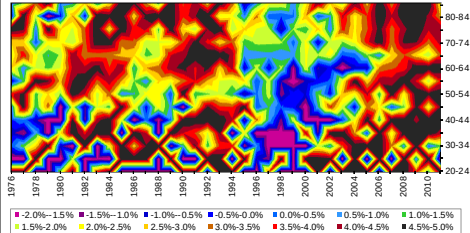


# Kidney Cancer (both)

## General Trends



## Incidence Deteriorations



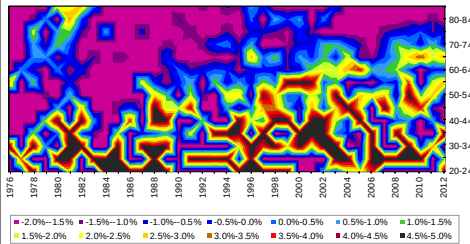
## Key Facts

% of all cancers: 2.5%-5%  
% of all cancer CI claims: 2.5%-5%  
% of all cancer deaths: 2.5%-5%

### Known Drivers:

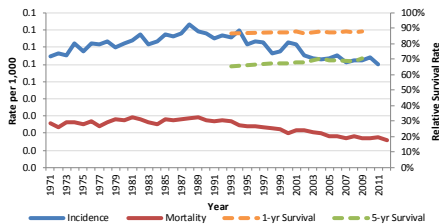
Imaging, smoking/obesity

## Mortality Improvements

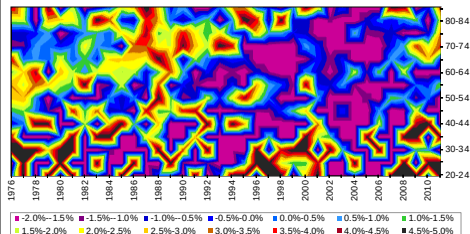


# Larynx Cancer (both)

## General Trends



## Incidence Deteriorations



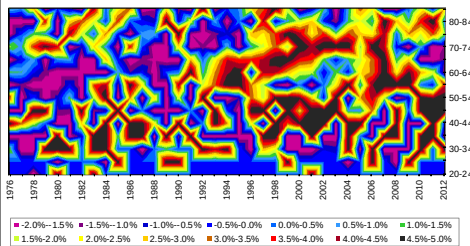
## Key Facts

% of all cancers: 0.5%-1%  
% of all cancer CI claims: 0.5%-1%  
% of all cancer deaths: 0.5%-1%

### Known Drivers:

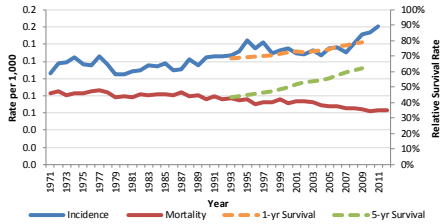
Smoking prevalence, fruit/veg

## Mortality Improvements

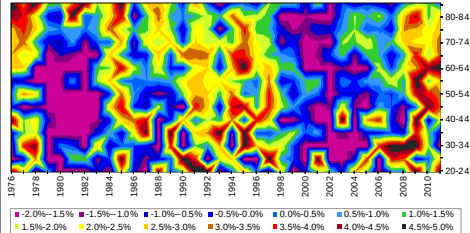


# Leukaemia (both)

## General Trends



## Incidence Deteriorations



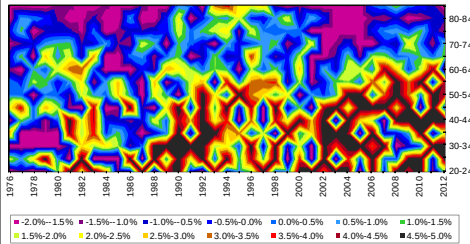
## Key Facts

% of all cancers: 1%-2.5%  
% of all cancer CI claims: 2.5%-5%  
% of all cancer deaths: 1%-2.5%

## Known Drivers:

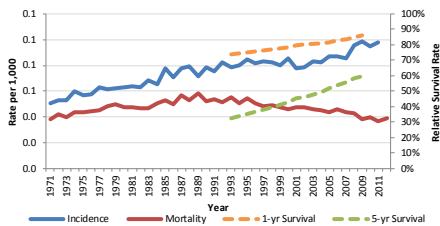
## Classification

## Mortality Improvements

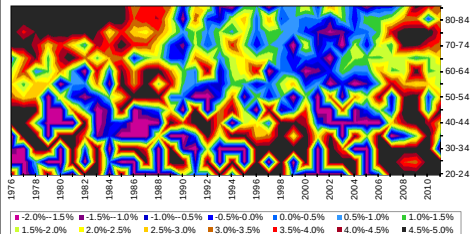


# Myeloma (both)

## General Trends



## Incidence Deteriorations



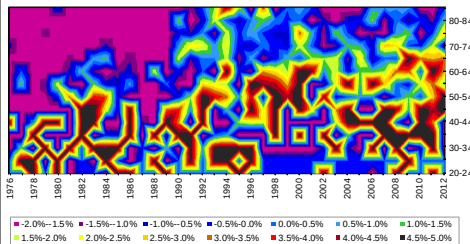
## Key Facts

% of all cancers: 1%-2.5%  
% of all cancer CI claims: 1%-2.5%  
% of all cancer deaths: 1%-2.5%

## Known Drivers:

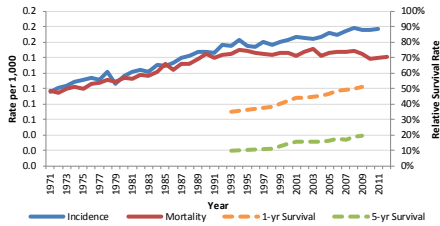
## Diagnostics/classification

## Mortality Improvements

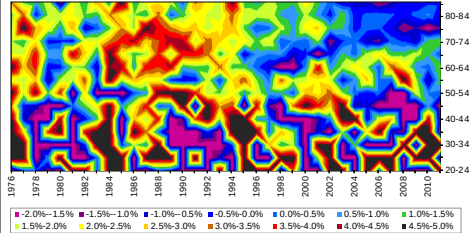


# Oesophageal Cancer (both)

## General Trends



## Incidence Deteriorations



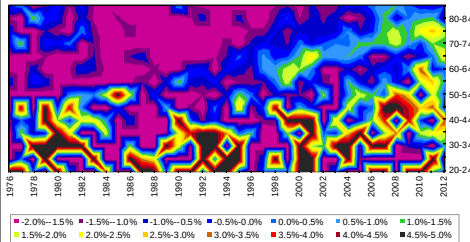
## Key Facts

% of all cancers: 1%-2.5%  
% of all cancer CI claims: 1%-2.5%  
% of all cancer deaths: 5%-10%

### Known Drivers:

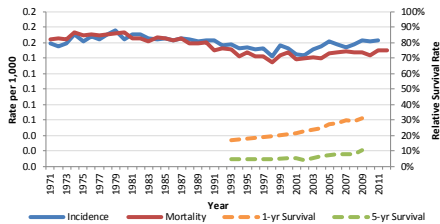
Smoking, diet, alcohol

## Mortality Improvements

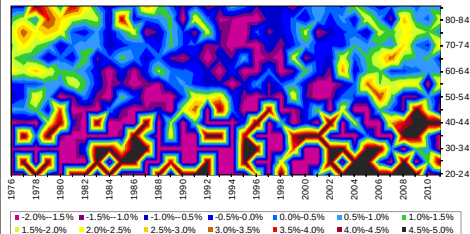


# Pancreatic Cancer (both)

## General Trends



## Incidence Deteriorations



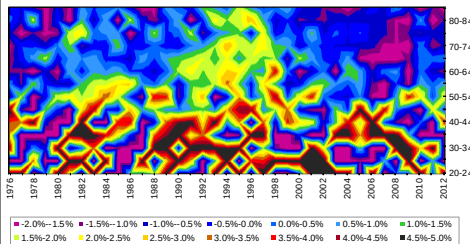
## Key Facts

% of all cancers: 1%-2.5%  
% of all cancer CI claims: 0.5%-1%  
% of all cancer deaths: 5%-10%

### Known Drivers:

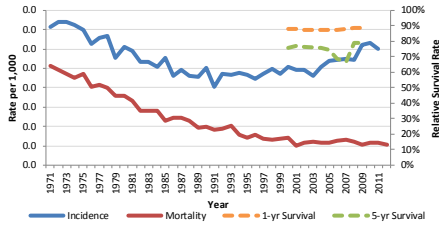
Smoking, obesity

## Mortality Improvements

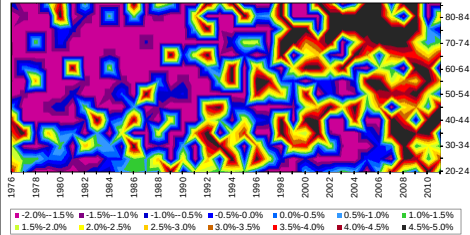


# Hodgkin's Disease (both)

## General Trends



## Incidence Deteriorations



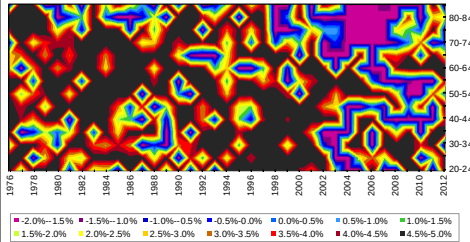
## Key Facts

% of all cancers: <0.5%  
% of all cancer CI claims: 0.5%-1%  
% of all cancer deaths: <0.5%

### Known Drivers:

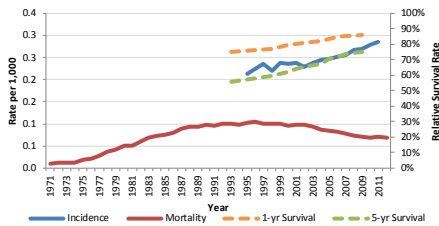
Diagnostics, classification

## Mortality Improvements

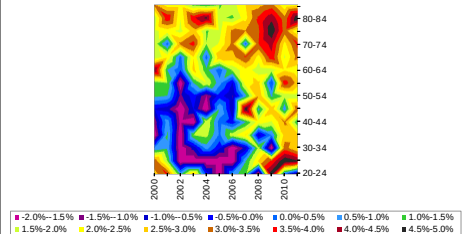


# Non-Hodgkin's Lymphoma (both)

## General Trends



## Incidence Deteriorations



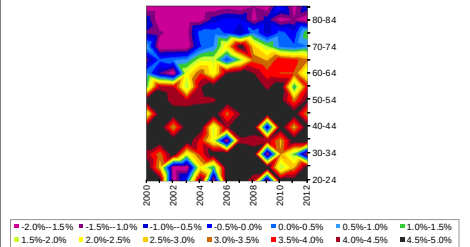
## Key Facts

% of all cancers: 2.5%-5%  
% of all cancer CI claims: 5%-10%  
% of all cancer deaths: 2.5%-5%

### Known Drivers:

Diagnostics, classification

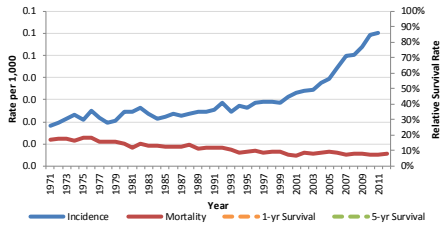
## Mortality Improvements



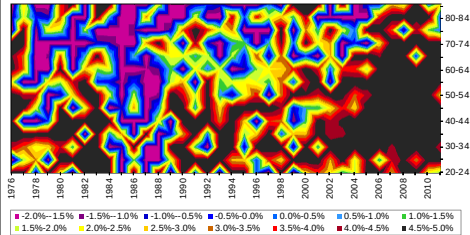


# Thyroid Cancer (both)

## General Trends



## Incidence Deteriorations



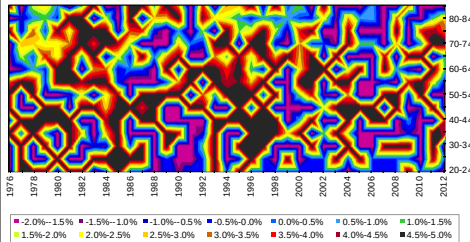
## Key Facts

% of all cancers: 0.5%-1%  
% of all cancer CI claims: <0.5%  
% of all cancer deaths: <0.5%

### Known Drivers:

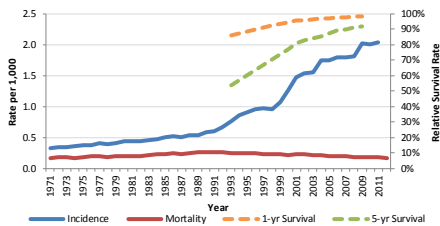
Incidental/ultrasound, radiation, obesity

## Mortality Improvements

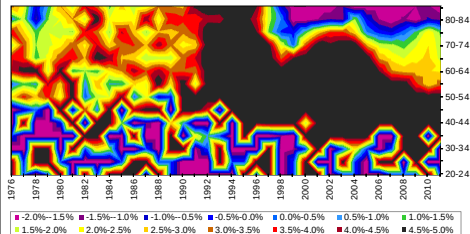


# Prostate Cancer (male)

## General Trends



## Incidence Deteriorations



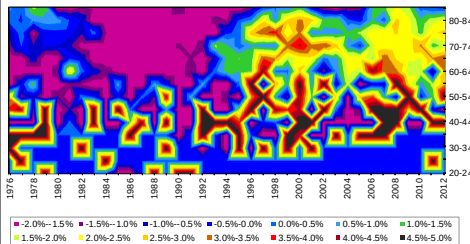
## Key Facts

% of all male cancers: 25%-30%  
% of all male cancer CI claims: 10%-15%  
% of all male cancer deaths: 5%-10%

### Known Drivers:

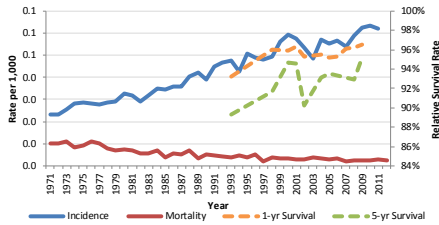
TURP/PSA Testing

## Mortality Improvements

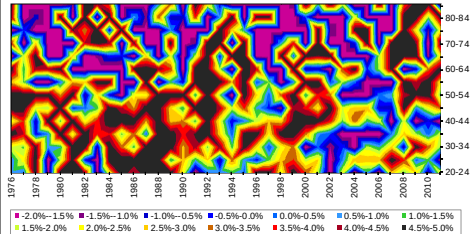


# Testicular Cancer (male)

## General Trends



## Incidence Deteriorations



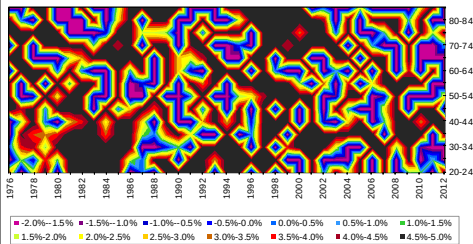
## Key Facts

% of all male cancers: 0.5%-1%  
% of all male cancer CI claims: 10%-15%  
% of all male cancer deaths: <0.5%

### Known Drivers:

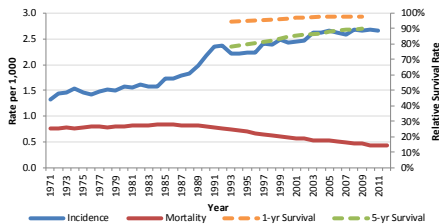
Unknown/environmental, awareness

## Mortality Improvements

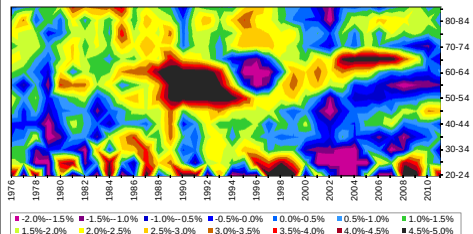


# Breast Cancer (female)

## General Trends



## Incidence Deteriorations



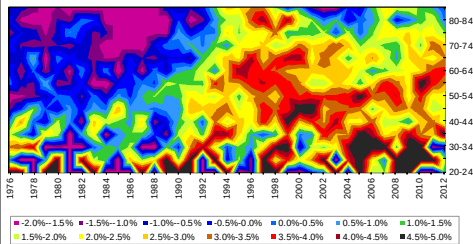
## Key Facts

% of all female cancers: 30%-40%  
% of all female cancer CI claims: 50%-60%  
% of all female cancer deaths: 15%-20%

### Known Drivers:

Screening, HRT

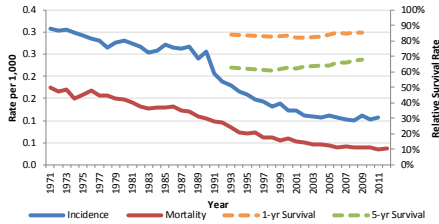
## Mortality Improvements



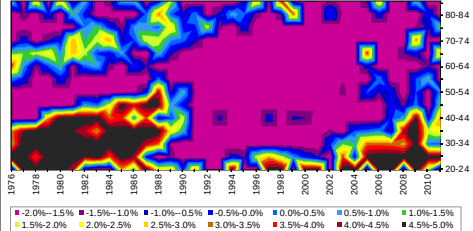


# Cervical Cancer (female)

## General Trends



## Incidence Deteriorations



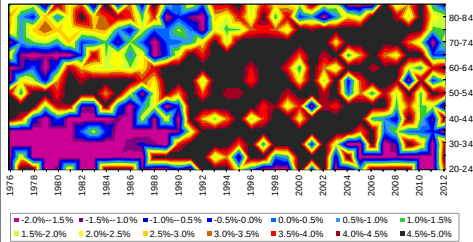
## Key Facts

% of all female cancers: 1%-2.5%  
% of all female cancer CI claims: 1%-2.5%  
% of all female cancer deaths: 1%-2.5%

### Known Drivers:

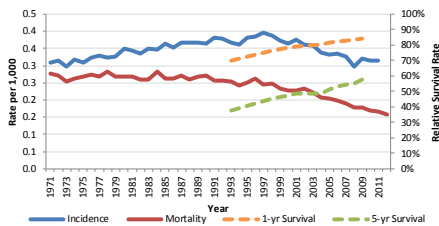
Screening, Jade Goody, vaccine

## Mortality Improvements

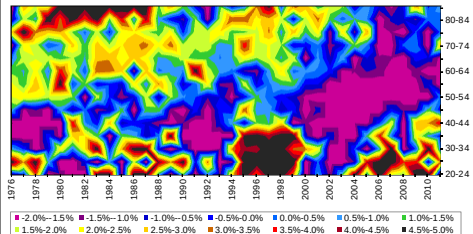


# Ovarian Cancer (female)

## General Trends



## Incidence Deteriorations



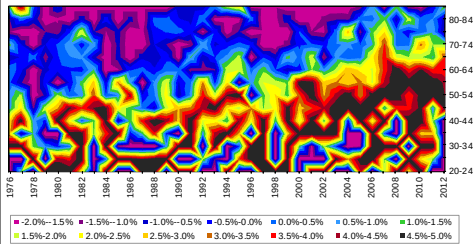
## Key Facts

% of all female cancers: 2.5%-5%  
% of all female cancer CI claims: 2.5%-5%  
% of all female cancer deaths: 5%-10%

### Known Drivers:

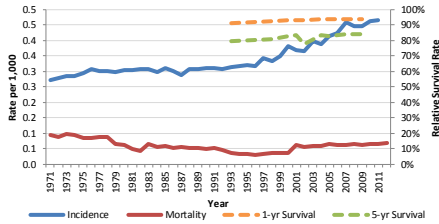
Contraceptive pill

## Mortality Improvements

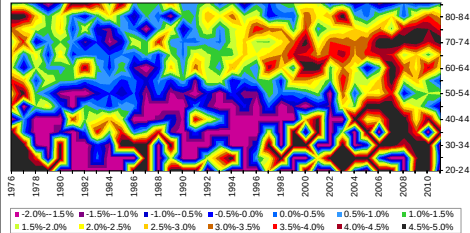


# Uterine Cancer (female)

## General Trends



## Incidence Deteriorations



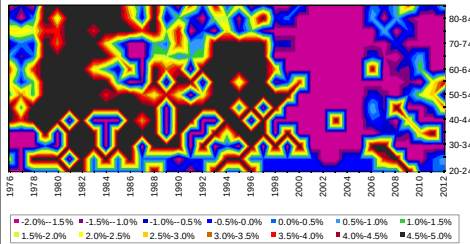
## Key Facts

% of all female cancers: 5%-10%  
% of all female cancer CI claims: 5%-10%  
% of all female cancer deaths: 2.5%-5%

### Known Drivers:

Obesity, reproductive behaviour

## Mortality Improvements



Institute  
and Faculty  
of Actuaries

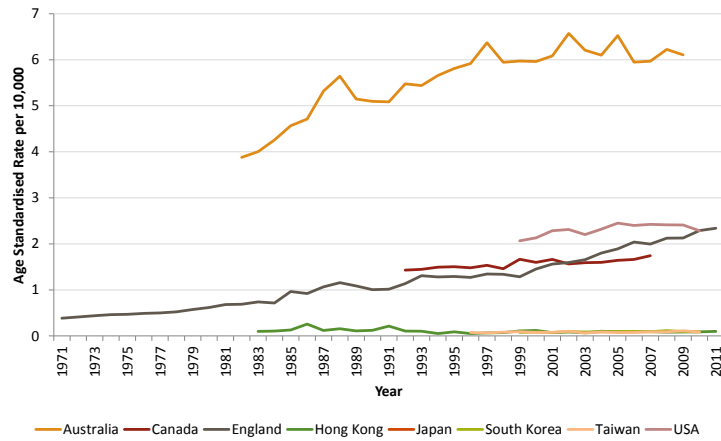
## Incidence

A Worldwide Perspective

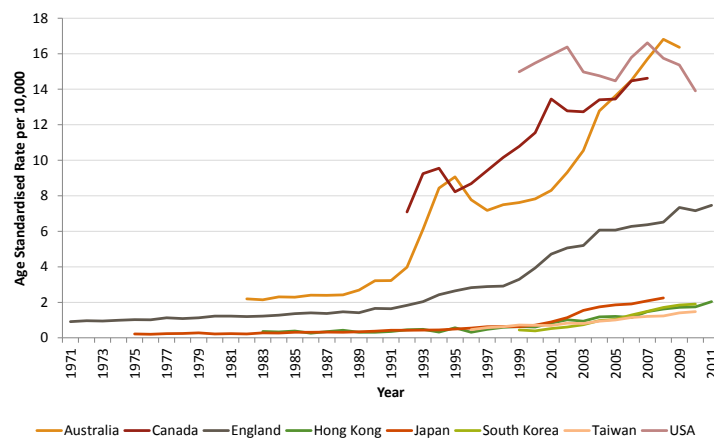
artise  
nsorship  
Thought leadership  
Progress  
Community  
Sessional Meetings  
Education  
Working parties  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Support

06 November 2014

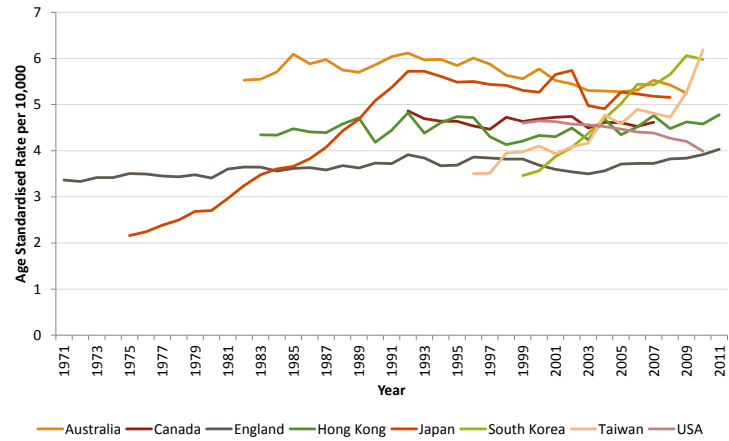
## Melanoma



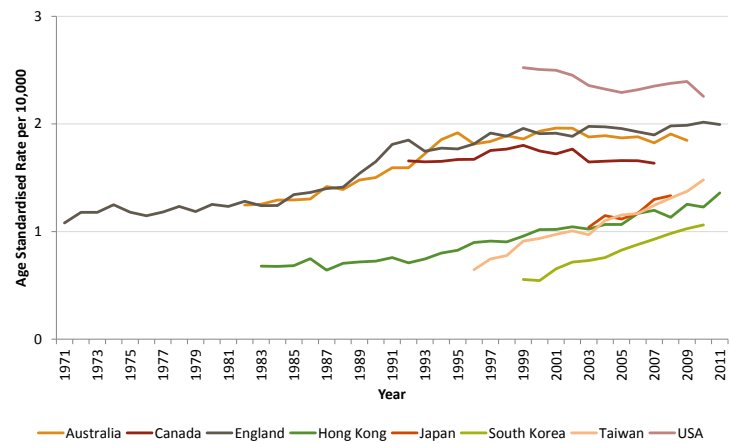
## Prostate Cancer



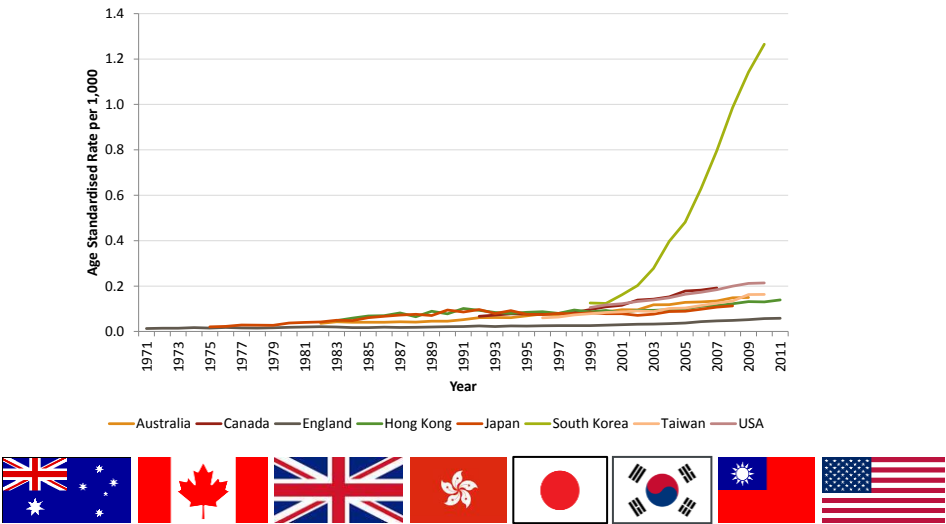
# Colorectal Cancer



# Breast Cancer



# Thyroid Cancer



Institute  
and Faculty  
of Actuaries

## Incidence

An insured perspective

06 November 2014

Artise  
Mentorship  
Thought leadership  
Progress  
Community  
Sessional Meetings  
Education  
Working parties  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Support

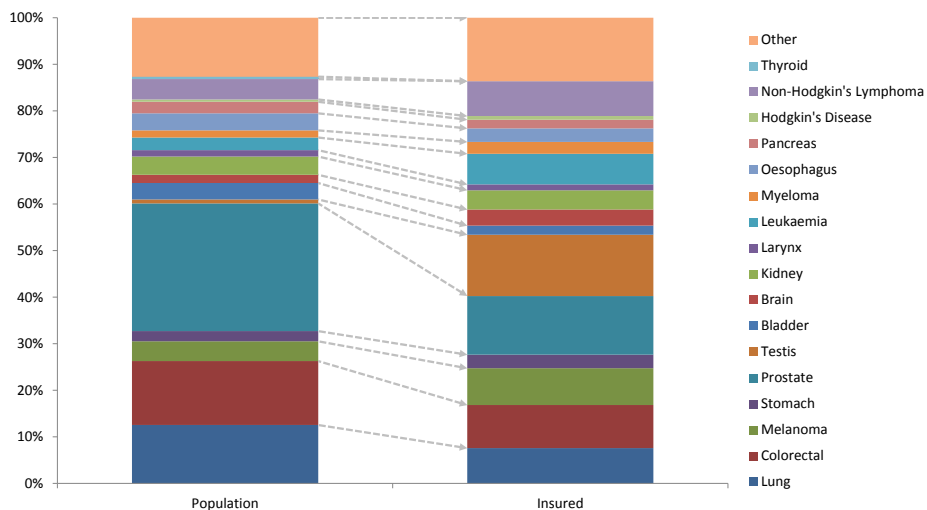
## Insured vs Population

### - Key differences

|                             |                                                                                                                                            |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Socio-economic Class</b> | Generally speaking insured products are sold to lives of a higher socio-economic class than the general population                         |
| <b>Anti-selection</b>       | Critical illness insurance can be anti-selective particularly for some causes of claim                                                     |
| <b>Risk Classes</b>         | Insurance products are usually segregated into risk classes such as smokers/non-smokers and sub-standard lives generally attract a loading |

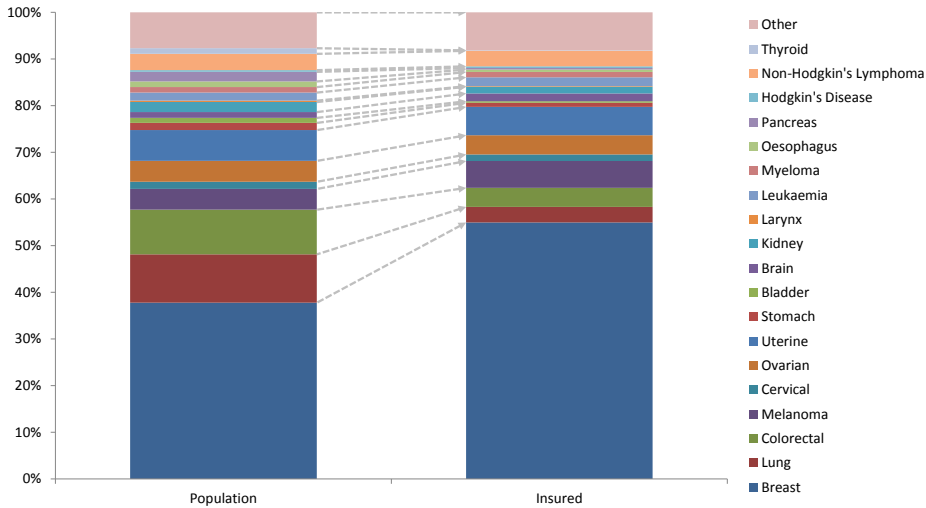
## Insured vs Population

### - Cause of Claim (male)



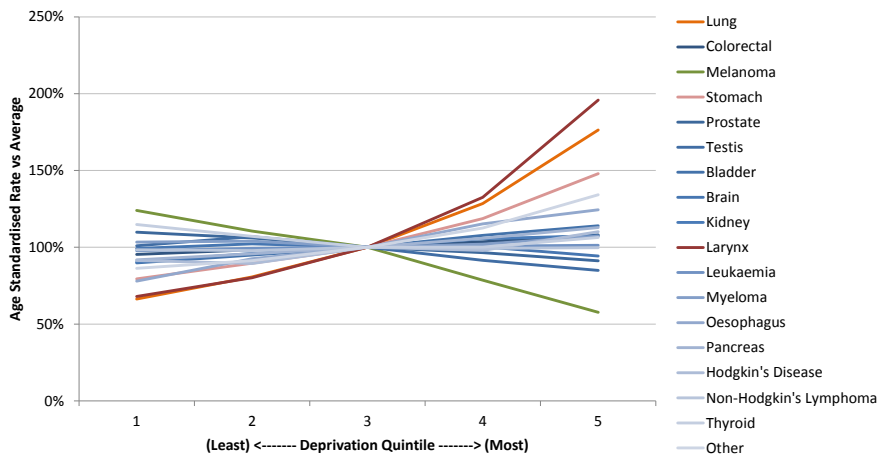
## Insured vs Population

- Cause of Claim (female)



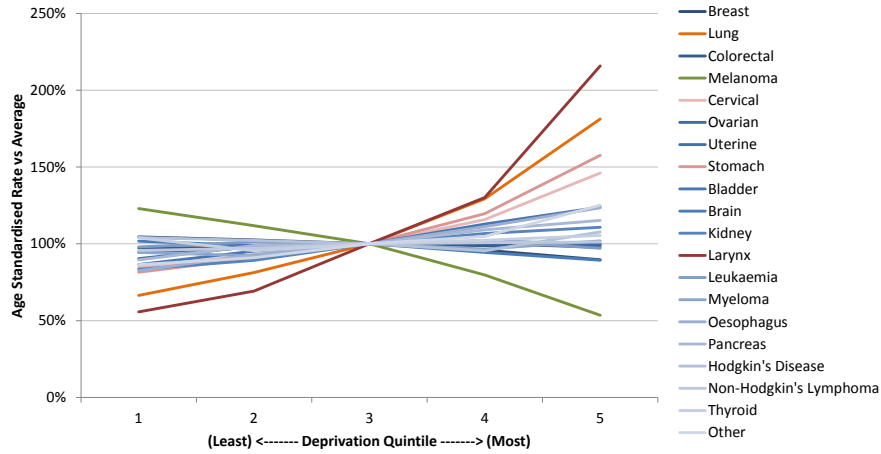
## Insured vs Population

- Socio-economic class (male)



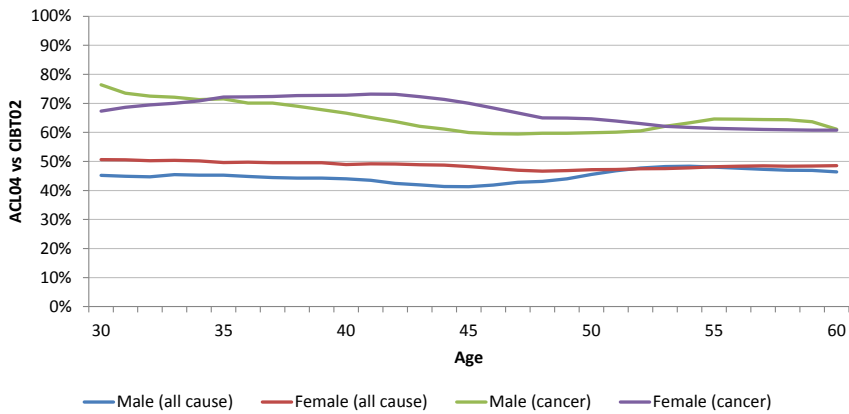
# Insured vs Population

- Socio-economic class (female)



# Insured vs Population

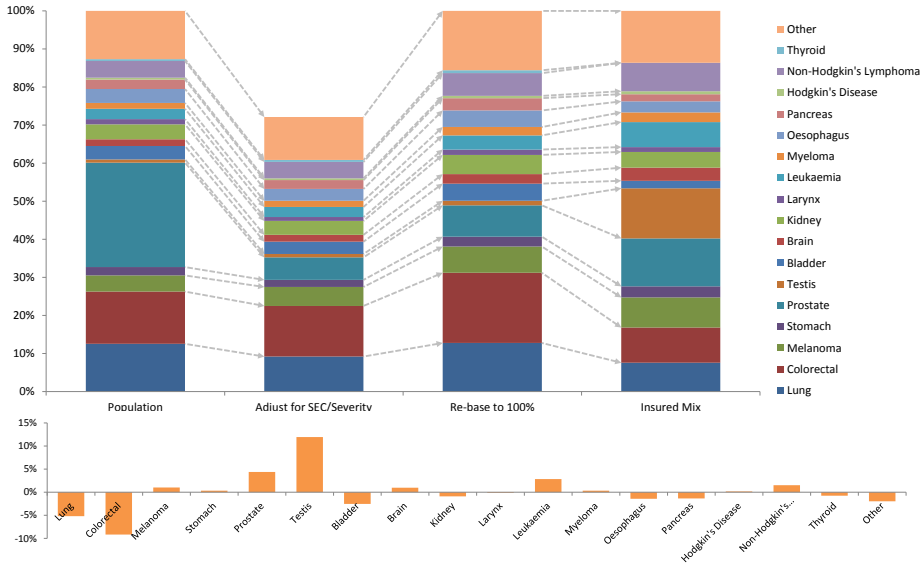
- All Cause/cancer experience





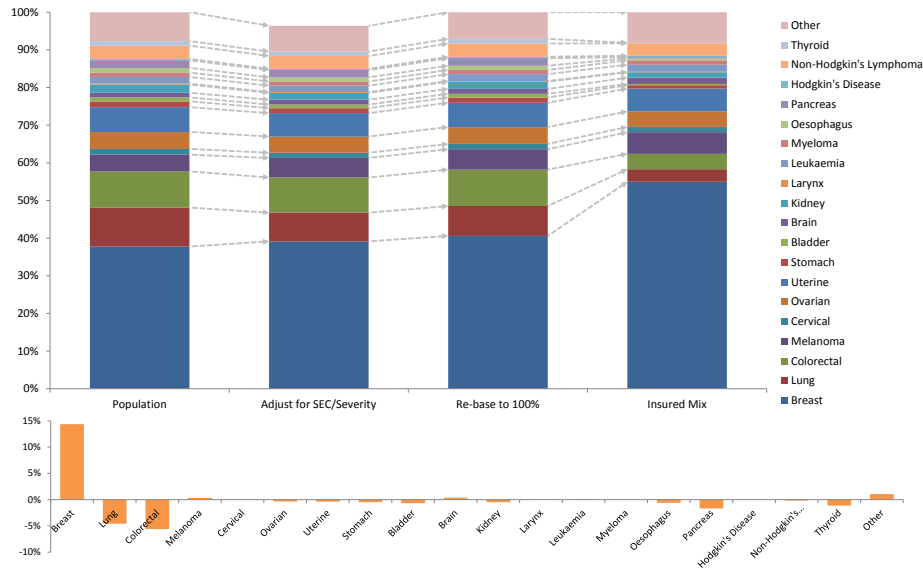
## Insured vs Population

- Residual Differences/Anti-selection (male)



## Insured vs Population

- Residual Differences/Anti-selection (female)





Institute  
and Faculty  
of Actuaries

# The Customer

## Consumer Survey Results

06 November 2014

Artise  
Sponsorship  
Thought leadership  
Progress  
Community  
Sessional Meetings  
Education  
Working parties  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Support

# The Customer

## - Consumer Survey, description

|                  |                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Questions</b> | 21 questions investigating consumer attitudes towards purchasing life insurance                                               |
| <b>Themes</b>    | Needs, attitude to questions, application process, barriers, claims, underwriting evidence, perception of risk                |
| <b>When</b>      | Carried out in April 2014 and weighted to be nationally representative of adults in Great Britain (conducted by ICM research) |

## The Customer

### - Consumer Survey, selected results

*Question: Which one of the following forms of Cancer do you think is the most common?*

| Cancer     | Survey Results | Approx % of Claims | Actual Rank (of subset) |
|------------|----------------|--------------------|-------------------------|
| Breast     | 29%            | 33%                | 1                       |
| Skin       | 13%            | 7%                 | 2                       |
| Bowel      | 13%            | 6%                 | 3                       |
| Prostate   | 12%            | 5%                 | 4                       |
| Liver/Lung | 11%            | 5%                 | 5                       |
| Cervix     | 1%             | 1%                 | 6                       |
| Don't Know | 21%            | -                  | -                       |

---

## The Customer

### - Consumer Survey, selected results

*Question: Which one of the following forms of Cancer do you think is the most life threatening?*

| Cancer     | Survey Results | Survival Rank | Mortality Rank |
|------------|----------------|---------------|----------------|
| Liver/Lung | 47%            | 1             | 1              |
| Don't Know | 22%            | -             | -              |
| Bowel      | 13%            | 2             | 3              |
| Prostate   | 8%             | 6             | 4              |
| Cervix     | 4%             | 3             | 6              |
| Breast     | 3%             | 4             | 2              |
| Skin       | 2%             | 5             | 5              |

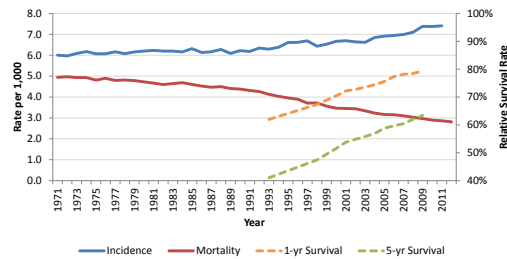
---

## The Customer

### - Consumer Survey, selected results

*Question: Do you think more people are being diagnosed with Cancer now than 5 years ago?*

| Cancer     | Survey Results |
|------------|----------------|
| Yes        | 67%            |
| No         | 8%             |
| Don't Know | 25%            |



## Summary & Conclusions

### Cancer is Important

- Cancer is the most important cause of death and cause of claim for most insurance products
- Cancer is changing and it is important to monitor & understand for assessing future claims cost and capital calibration

### Learning from around the globe

- We should learn from events overseas for calibrating our 1 in 200 events
- Policy wordings can always be improved

### Understanding the Customer

- Customers are more knowledgeable than we think
- Attitudes and behaviors are opportunities for product development
- But we should always be aware of anti-selection



Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

---

06 November 2014

57

## Appendix

### - Data Sources

|                             |                                                                                                                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Cancer Registrations</b> | ONS Cancer Registrations in England 1971-2011                                                                              |
| <b>Death Registrations</b>  | ONS Death Registrations by Cause 1911-2012 ("Mortality in the 20 <sup>th</sup> and 21 <sup>st</sup> Century" publications) |
| <b>Population Estimates</b> | ONS Population Estimates in the United Kingdom 1911-2012                                                                   |
| <b>Survival Rates</b>       | Cancer Survival in England ONS Series 1991-1995 to 2007-2011                                                               |
| <b>Non-UK Data</b>          | Relevant territory's government statistical website                                                                        |
| <b>Age Standardisation</b>  | Weighted towards an insured portfolio where relevant                                                                       |

*All data in this publication: Adapted from data from the Office for National Statistics licensed under the Open Government Licence v2.0.*