



International Actuarial Association Health Section
2007 Colloquium

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Critical Illness – A global market overview “A UK perspective”

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Agenda for today

- **Update on UK claims experience**
(Source: Dave Grimshaw, “MOT or Cosmetic Surgery”, Staple Inn 6 December 2006)
- **Overview of SIAS paper “Exploring the Critical Path”**
(Source: Neil Robjohns, Staple Inn 6 December 2006)

Update on UK claims experience

- “A Critical Review”
- History of the CMI CI investigation
- Key challenges
- Recent progress
- Results
- Future work

“A Critical Review”

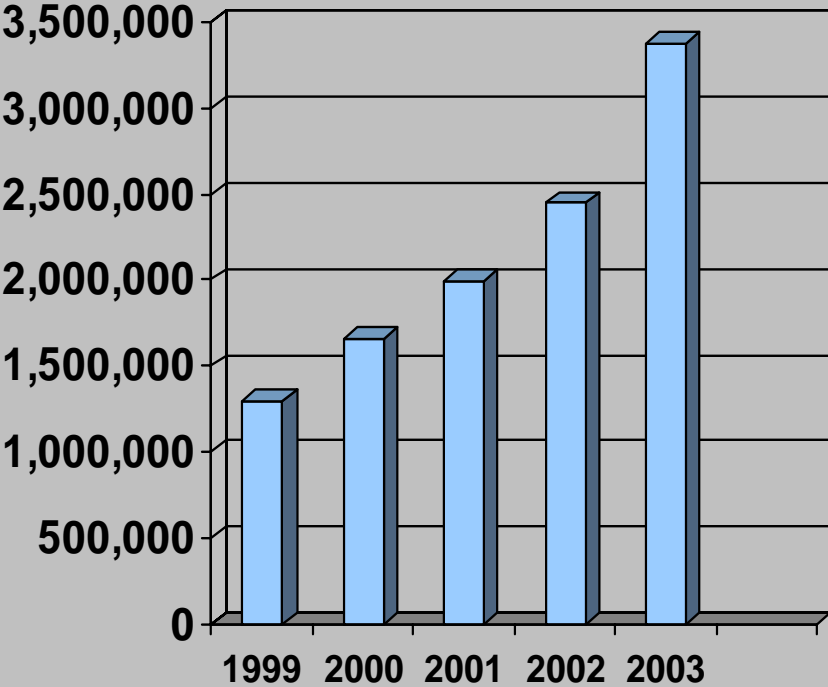
- Report of the Critical Illness Healthcare Study Group
- Presented at the Staple Inn March 2000 by Dinani et al
- The first UK CI insured experience study
- Covered 1991-97

History of the CMI CI investigation

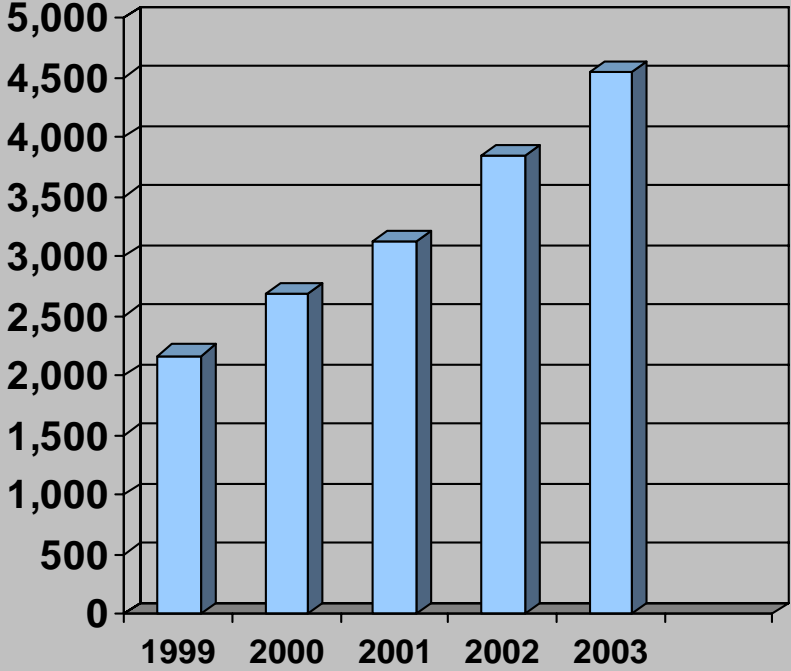
- First formed in 2005
- 1998, 1999 and 2000 results released in 2003
- 1999-2002 and quad results released in 2005
- 2003 results and draft 2004 results released in 2006
- Various working papers with methodology etc
 - Working Paper 14 – detailed methodology underlying 1999-2002 results and estimate of overall grossing-up factor
 - Working Paper 18 - responses to feedback on WP14
 - Working Paper 19 – “Per-Policy” data submission
- Ultimate aim is to produce a standard table

Key challenges - growing exposure 1999-2003

Exposure



Settled Claims

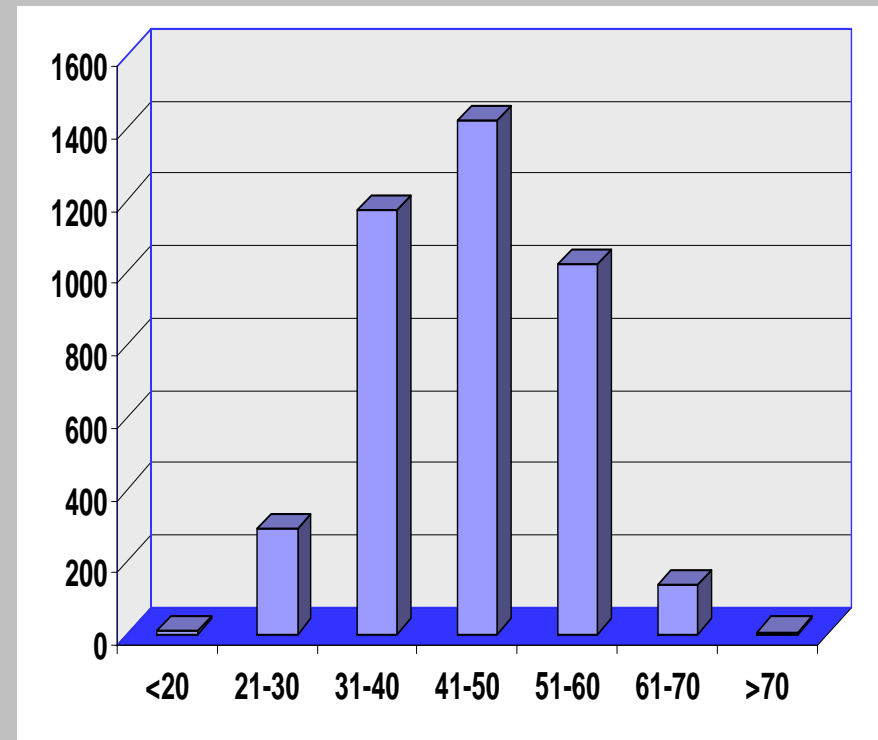
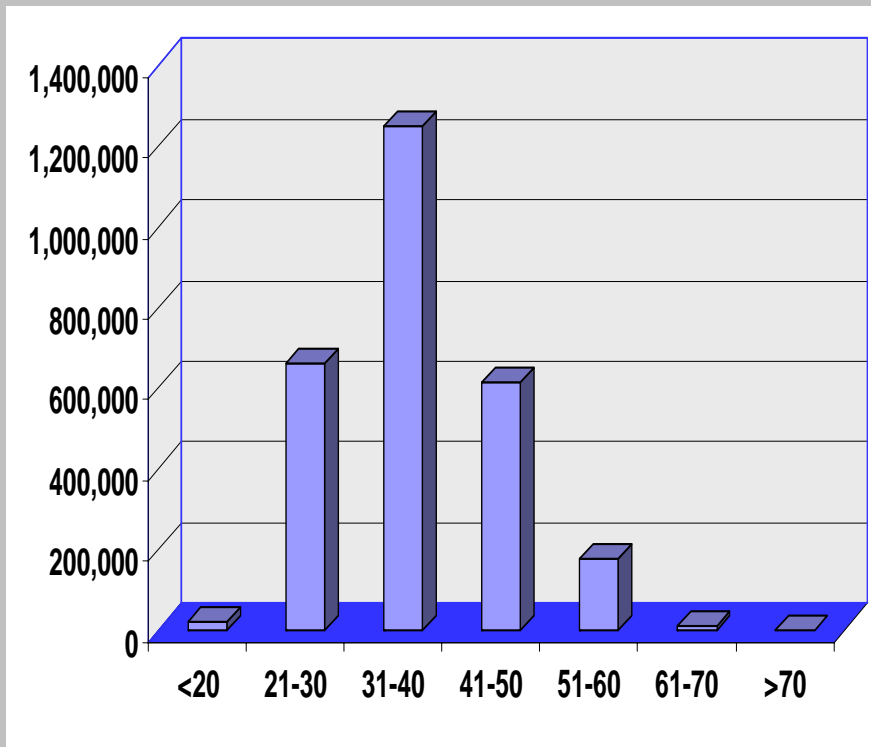


Key challenges - immature experience (by age)

2003

Exposure

Claims

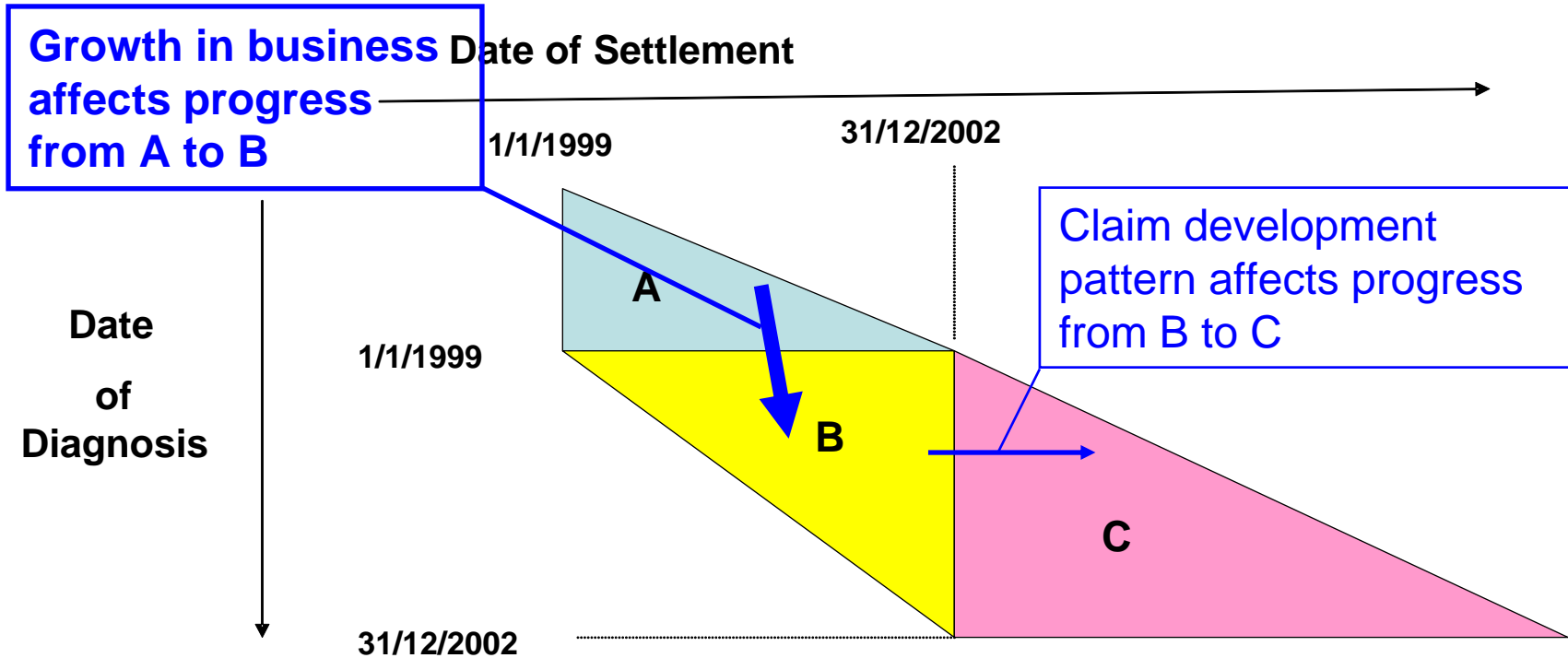


Key challenges – claim dates

- CMI request 4 dates for each claim: Date of Diagnosis, Date of Notification, Date of Admittance & Date of Settlement
- Date of diagnosis matches exposure and matches the risk incurred by the office
- But:
 - The claims we receive are those settled in the period.
 - Offices only supply date of diagnosis for some claims. In other cases we estimate it from the dates we are given:

	1999-2002	2003	2004
Actual Date of Diagnosis	56.3%	64.3%	74.9%
Estimated from Date of Settlement	42.3%	35.4%	23.5%
Estimated from Date of Admittance	1.2%	0%	0.1%
Estimated from Date of Notification	0.4%	0.3%	1.5%

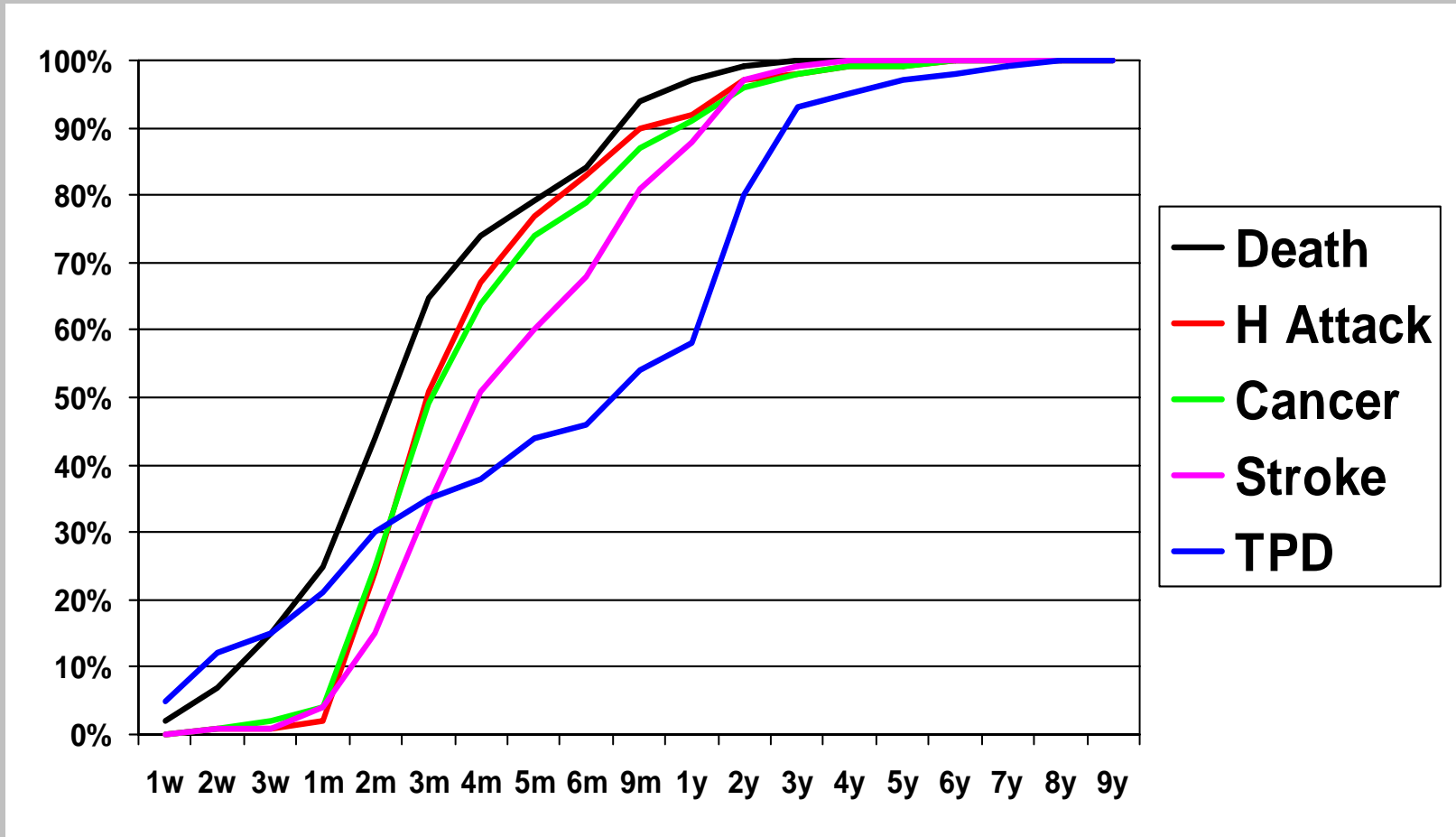
Key challenges - date of Diagnosis v Date of Settlement



$$(A + B) \times (1 + \text{grossing-up factor}) = (B + C)$$

Key challenges - observed claim delays by cause

Diagnosis to Settlement, 1999-2002 data



Key challenges – date of diagnosis

- What do we mean by “Date of diagnosis”?
- For some events it has a clear meaning (eg heart attack, surgical, death)
- For some events it is not clear what is meant by “Date of diagnosis” (eg cancer, MS)
- Variation between offices and assessors
- Consultation proposed definition:
 - The date of diagnosis is the date at which the CI definition was fulfilled
- Likely to lead to shorter delays as date of diagnosis will be later in many cases
- Will affect results over time

Recent progress – discussions with the Health Claims Forum

- Can we agree a clear definition of “Date of diagnosis”?
- Can we record “Date of diagnosis” more often?
- Can we record “Date of diagnosis” consistently?

Recent progress – estimation of grossing up factors

- Use claims where date of diagnosis and year of settlement are known to estimate claim development patterns
- Using development patterns derived from 1999-2003 data, overall grossing-up factor estimated to be around 15%
- Using development patterns derived from 1999-2002 data, overall grossing-up factor estimated to be around 18%
- Instability clearly an issue
- Also significant variation if split by gender, age, product type, duration etc

Results - by calendar year

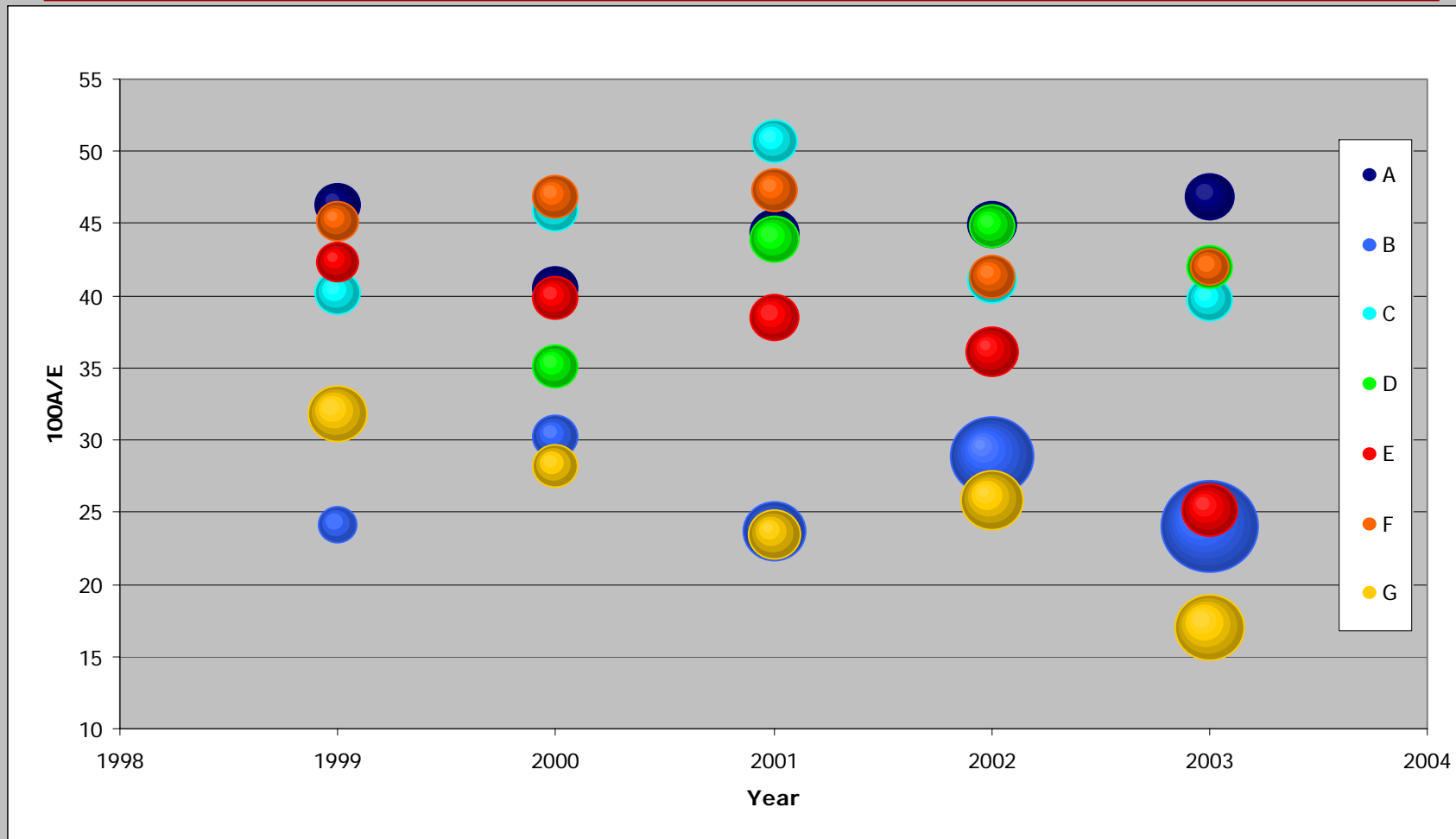
Accelerated business, all ages, all durations, Lives (E=CIBT93)

		1999- 2002	2003 orig	2003 rev	Draft 2004
Male	NS	38	31	31	34
	Sm	69	54	51	59
Female	NS	45	40	39	43
	Sm	57	53	53	56

Raw results - no Grossing-Up Factors applied

2003 results under-stated due to data error

Results - by office



Graph shows 100xA/E for 7 largest data contributors from 1999-2003 original + a large new contributor from 2003-4.

The size of each ball reflects its relative growth – all balls are equal size in 2000, except “new” office which takes base value in 2003.

Results - by duration

Accelerated business, Male Non-smoker only, all ages, Lives (E=CIBT93)

	1999- 2002	2003 orig	2003 rev	Draft 2004
Duration 0	31	27	25	36
Duration 1	37	25	25	37
Duration 2+	41	35	35	32
All Durations	38	31	31	34

Raw results - no Grossing-Up Factors applied

2003 results under-stated due to data error

Results – issues and learning points

- Consistency of data - data from “new” offices, data not received from “quad” offices
- Likely issue with 2003 results for one substantial office
- Importance of “date of claim”
- Nature of claim delays
- Impact of growth rate on grossing-up factors
- Trends in results may be due to changes in business mix
- Need to consider grossing-up factors before interpreting results

Future work

- 2004 final results and 2003 corrected results
- Further analysis of grossing-up factors
- Use GLM as graduation tool to produce individual age rates (quite a lot of GLM work done to date on raw claim rates)
- Working paper later this year?

“Exploring the Critical Path”

- CI Trends Research Group
- Population trends in CI incidence and mortality
- Insights into trends for insured lives
- CIBT02 and practical applications
- Observations and conclusions

CI trends research group (1)

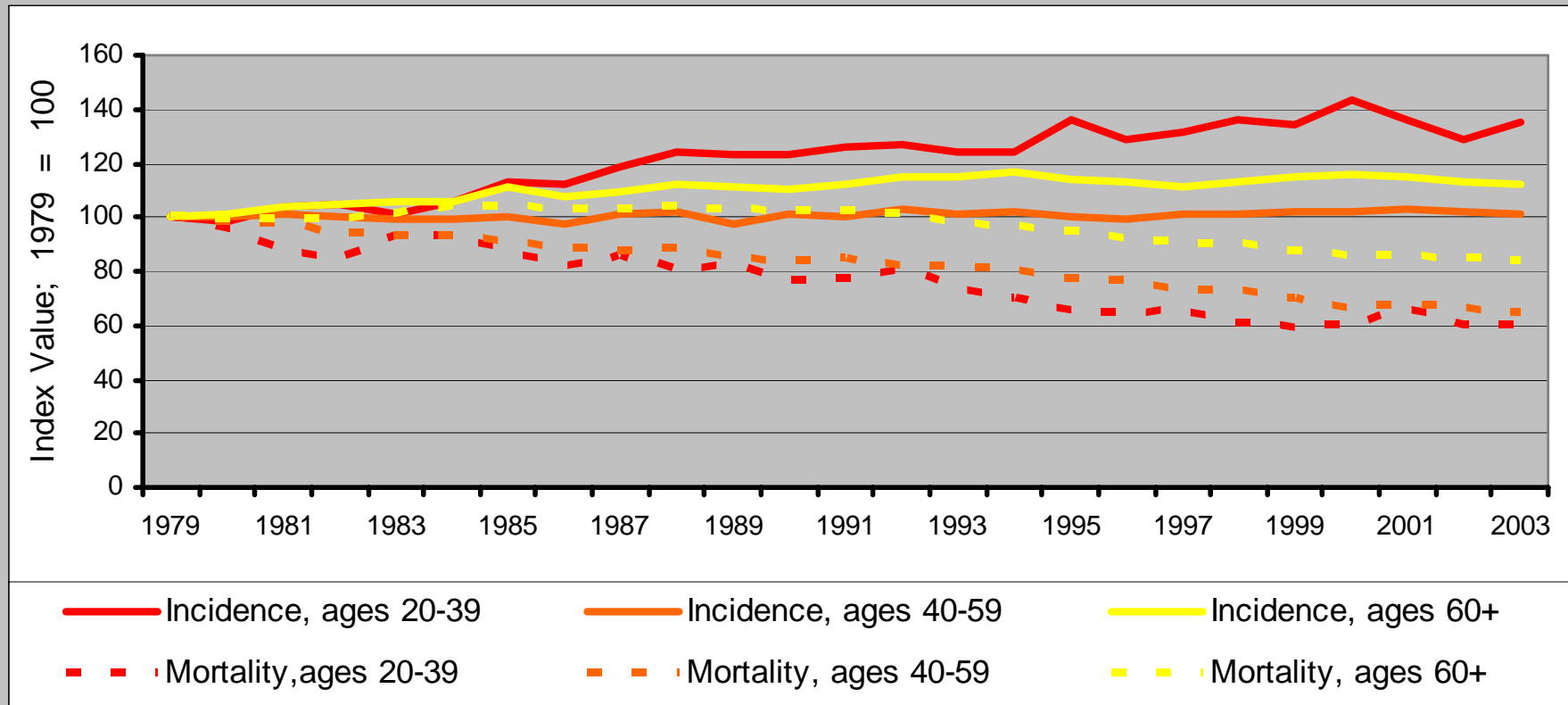
- Formed in 2001 with aim of examining underlying trends in factors influencing UK insured CI claim rates and from these to assess
 - historic trend in incidence and mortality rates for major CI's
 - pointers for future trends in standalone CI, mortality and hence accelerated CI
- Examples of focus of work
 - UK trends in cancer, heart attack and stroke (2001)
 - modelling lung cancer and cancer screening programs (2003)
 - development of CIBT02 (2006)

CI trends research group (2)

- Insured data – CMI CI experience study
 - relevant but limited in volume, age range etc
 - short time series and trends drowned out by noise
- Population data – CI Trends Research Group
 - large volume, full age range etc and long time series
 - clearly need to distil proxy for insured subset
 - combine with knowledge of medical developments to give a platform for understanding past
 - potentially projecting range of future outcomes

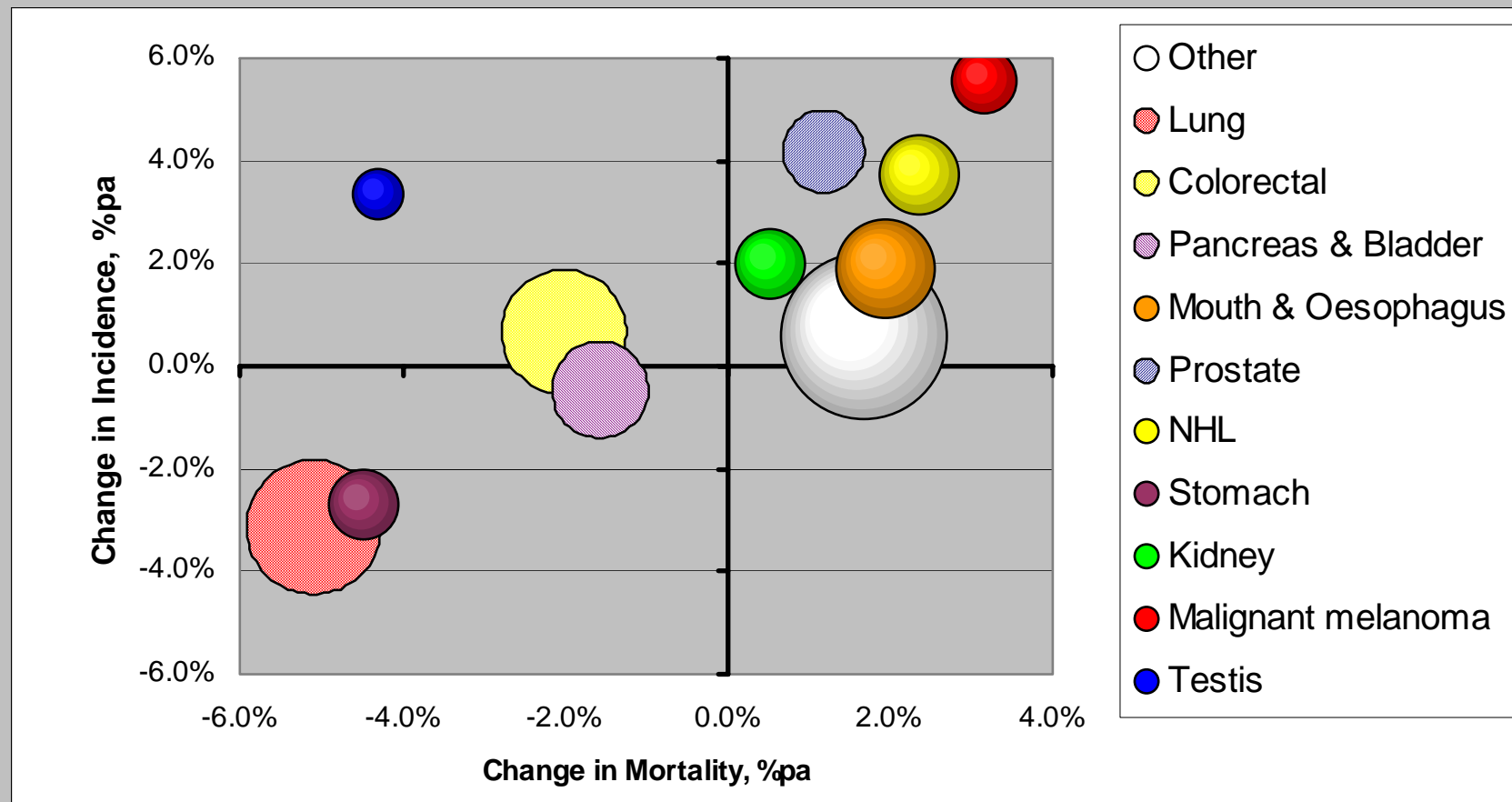
Population trends in CI incidence and mortality (1)

Population Trends: Cancer, Males Incidence & Mortality, by broad age-groups, 1979-2003



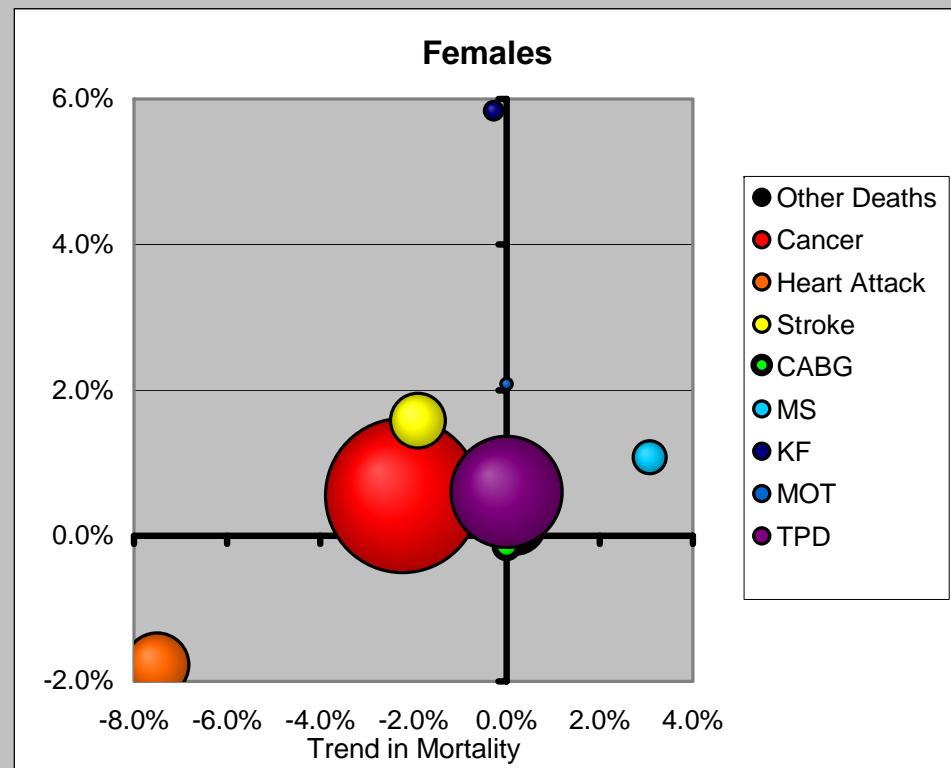
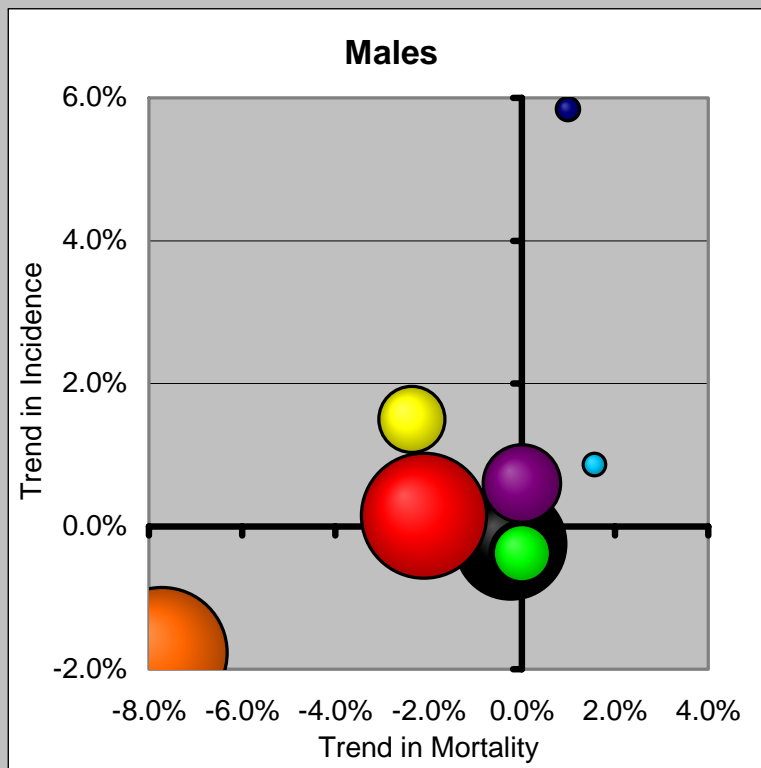
Population trends in CI incidence and mortality (2)

Population Trends: Cancer, Males, Incidence & Mortality
Average Change % pa, Ages 40 - 59, over 1971 - 97



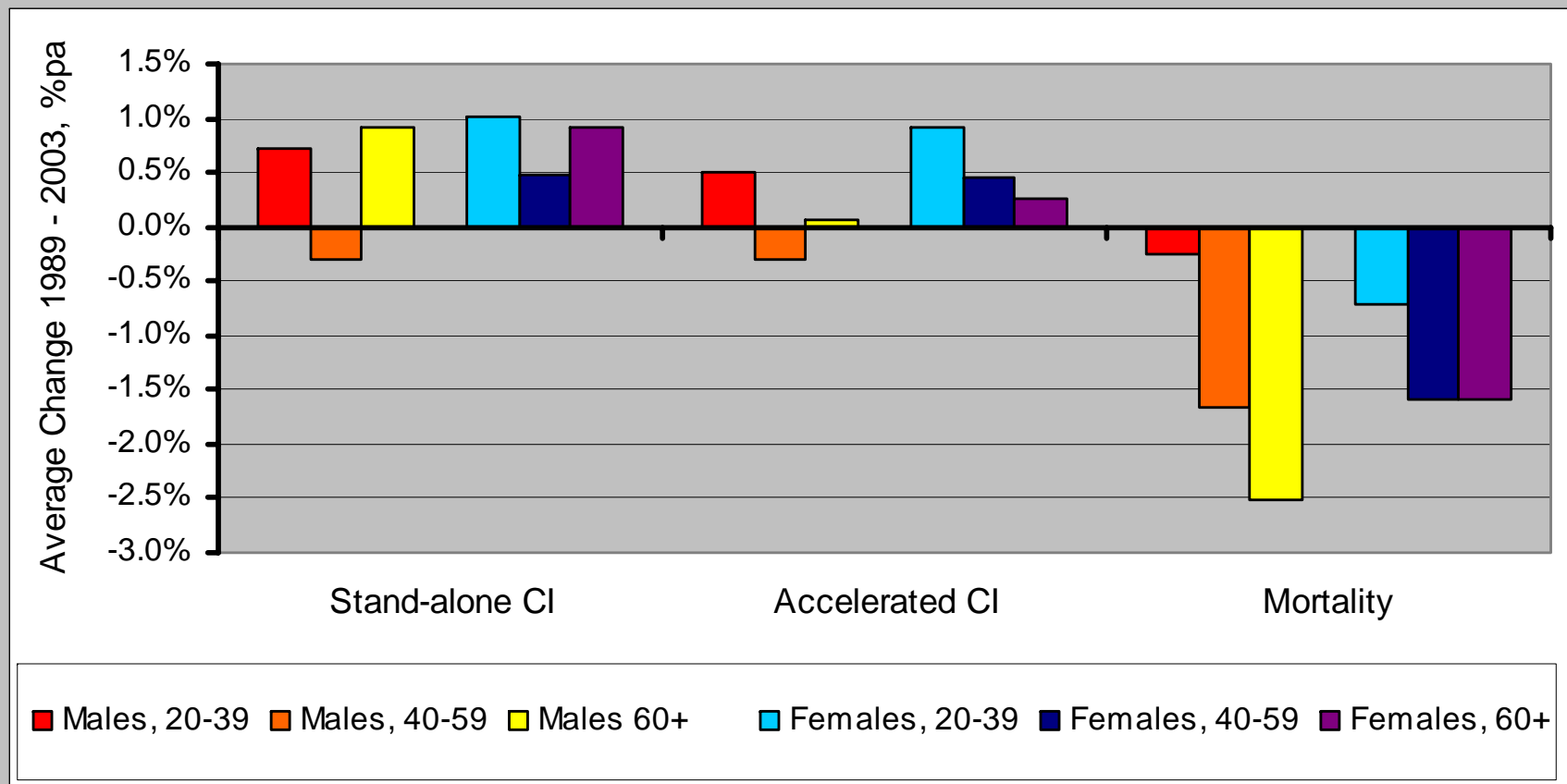
Population trends in CI incidence and mortality (3)

Population Trends: Summary - Ages 40-59 %pa change in Incidence & Mortality, 1989-2003



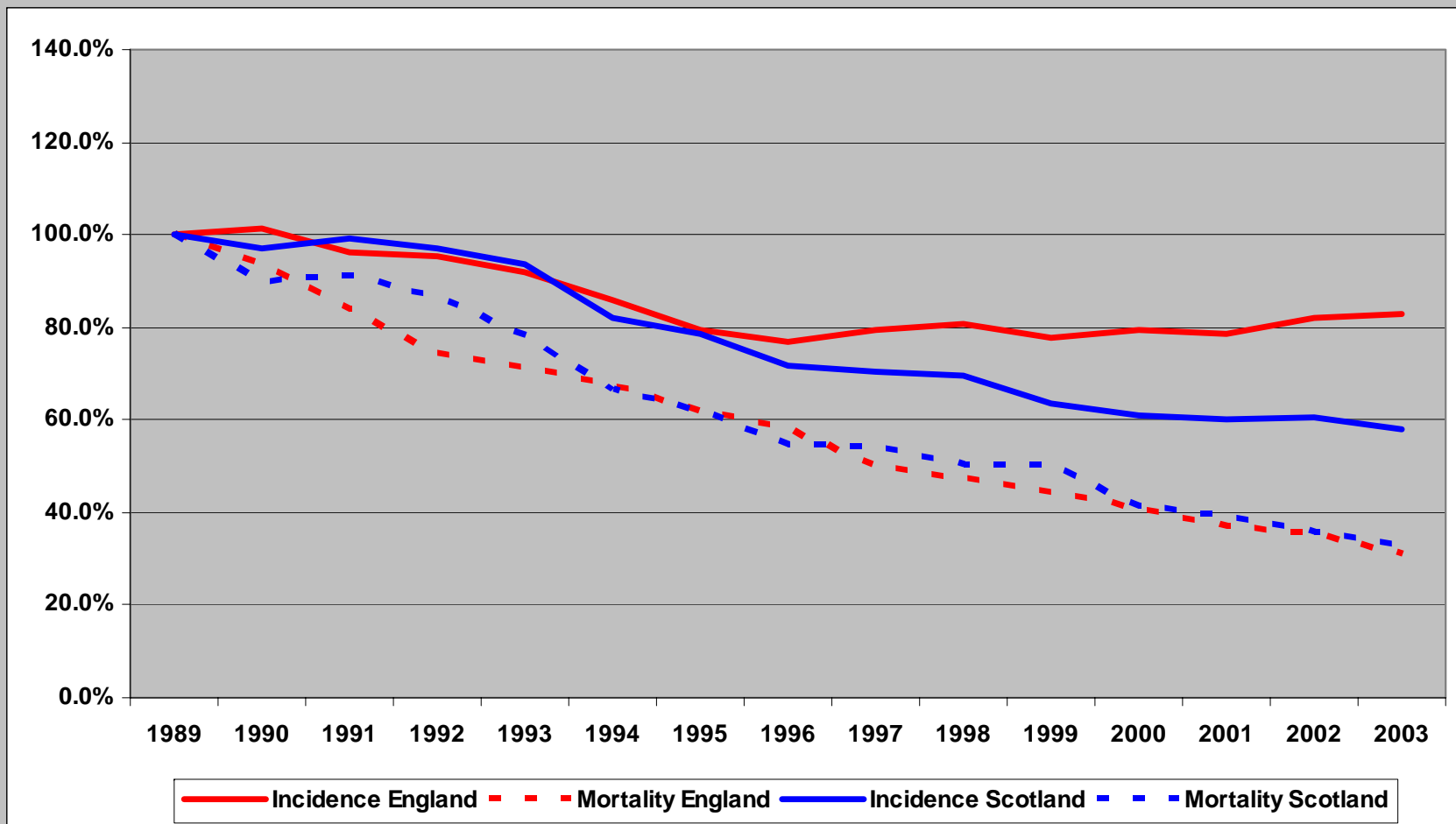
Population trends in CI incidence and mortality (4)

Population Trends: Summary, by Type of Cover Overall Change, by broad age-groups, 1989-2003



Population trends in CI incidence and mortality (5)

**Sub-population Trends: England v Scotland
Incidence & Mortality, Heart Attack, Males, Ages 40-59, 89-03**



CIBT02 & practical applications – an update to CIBT93

- Absence of an insured lives table
- Emergence of new and better data for producing population CI table
- New table allows updates on shape by age, breakdown of total incidence by cause etc
- Successes (eg better quality data and information for adjustments)
- Some problems (eg inconsistencies, TPD)
- Caveats (uncertainty in adjustments and reconciliations to insured experience)

CIBT02 & practical applications – derivation of CIBT02

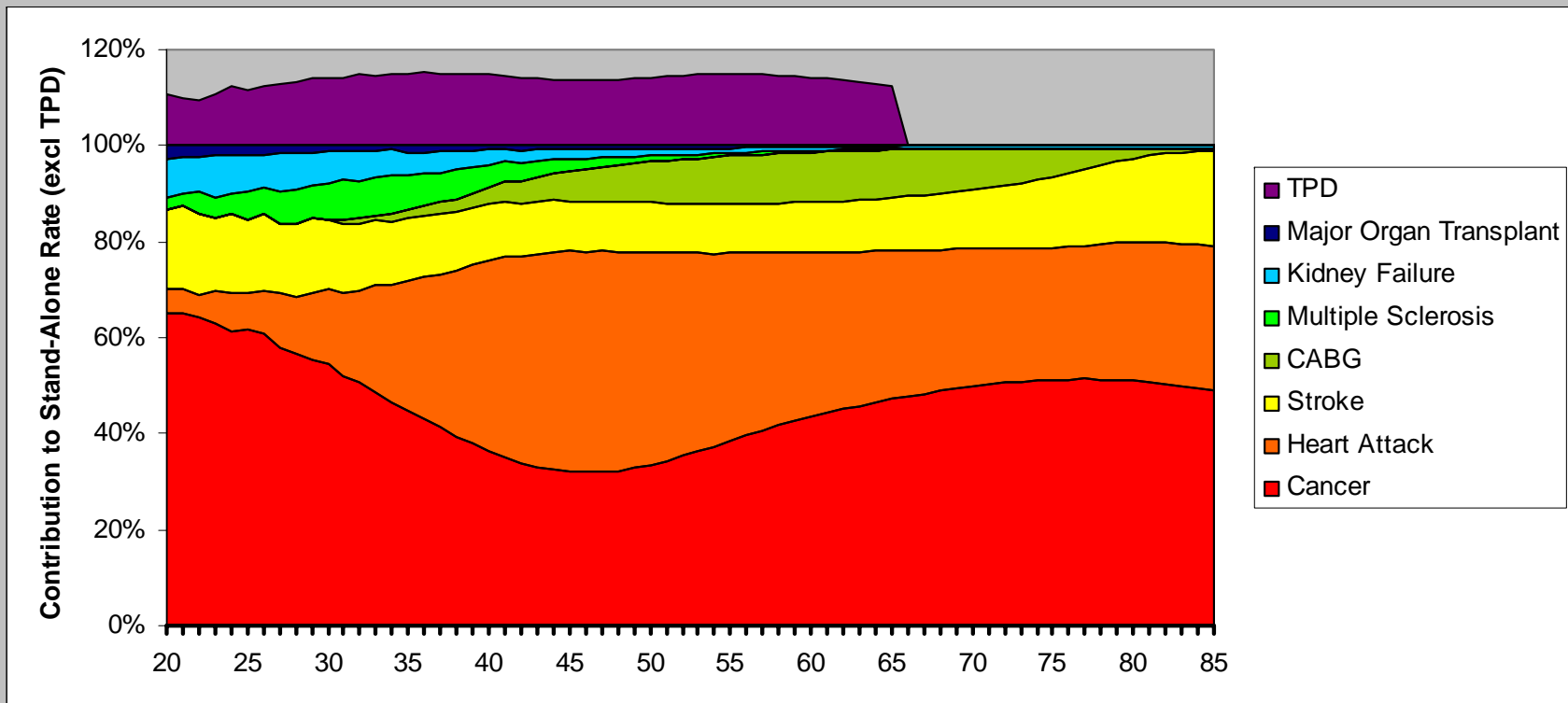
- Derive crude rates from incidence count and population data
- Adjust to ‘first ever’ incidence
- Gross-up for missing ‘sudden deaths’
- Remove overlap with other CI’s
- Adjust for prevalence to ‘healthy population’ rate
- Graduate resulting pure CI incidence rate I
- Remove deaths in survival period to calculate standalone CI rate I'
- Calculate mortality rate for CI = kq
- Derive accelerated CI rate as $I + (1-k)q$

CIBT02 & practical applications – CIBT02 coverage

- CIBT02 Core matches CIBT93 coverage
 - Cancer, heart attack, stroke, CABG, MS, KF, MOT and TPD
 - Standalone and accelerated
- CIBT02 Extended adds other commonly covered CI's
 - ABI SOBP definitions and angioplasty
 - Terminal illness for accelerated CI only

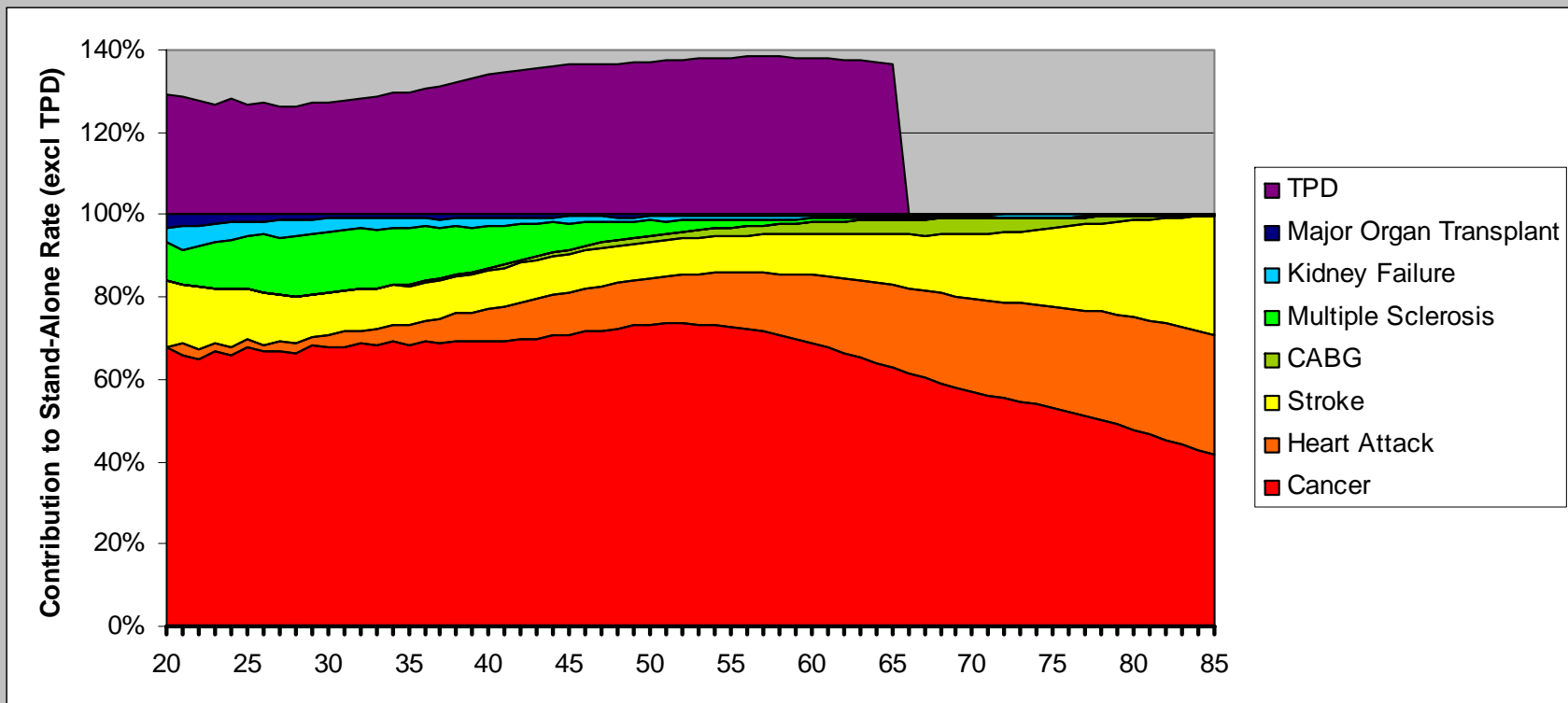
CIBT02 & practical applications

Contribution of each CI - Males CIBT02 Core Stand-Alone Rates (I') (excl TPD)



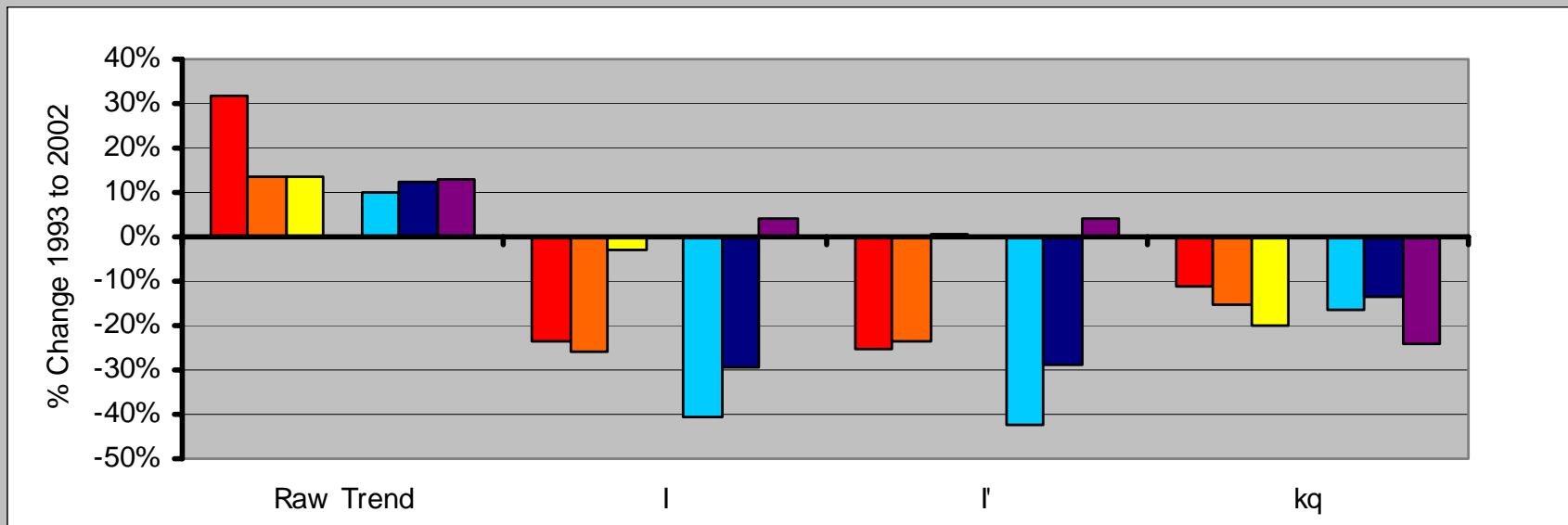
CIBT02 & practical applications

Contribution of each CI - Females CIBT02 Core Stand-Alone Rates (I') (excl TPD)



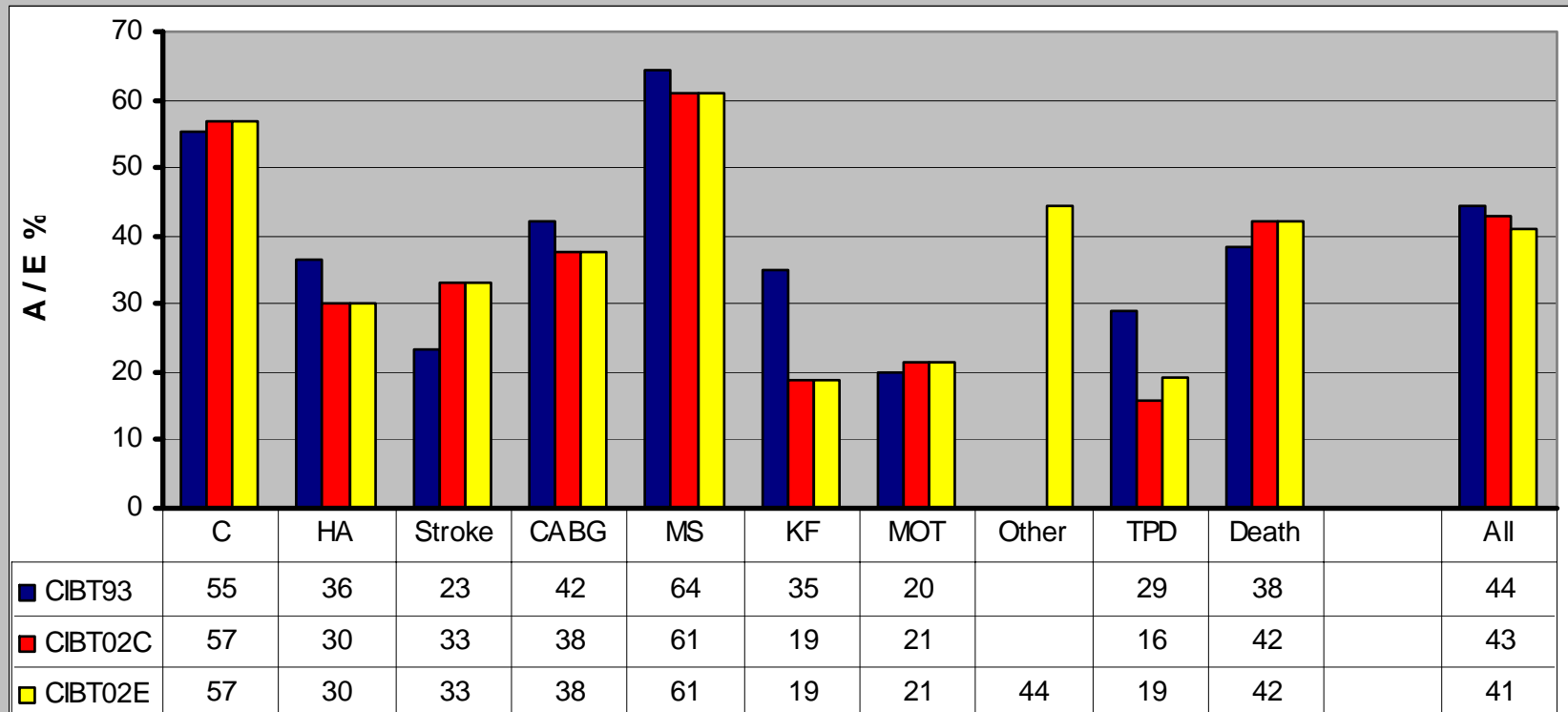
CIBT02 & practical applications

Raw Trend and Overall Change - Stroke Incidence (I), Stand-Alone (I'), and Mortality Rates



CIBT02 & practical applications

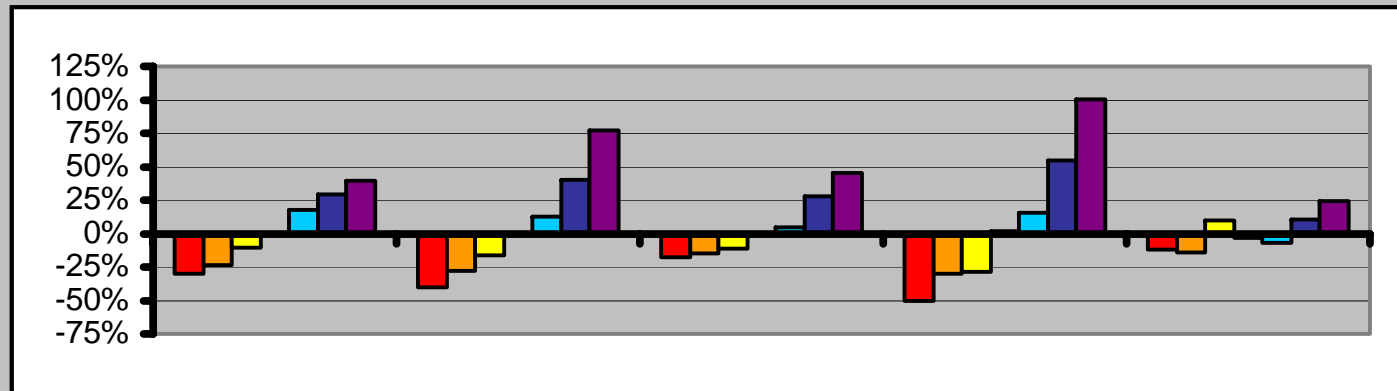
Crude CMI CI Experience using CIBT93 & CIBT02 By Critical Illness, for Males



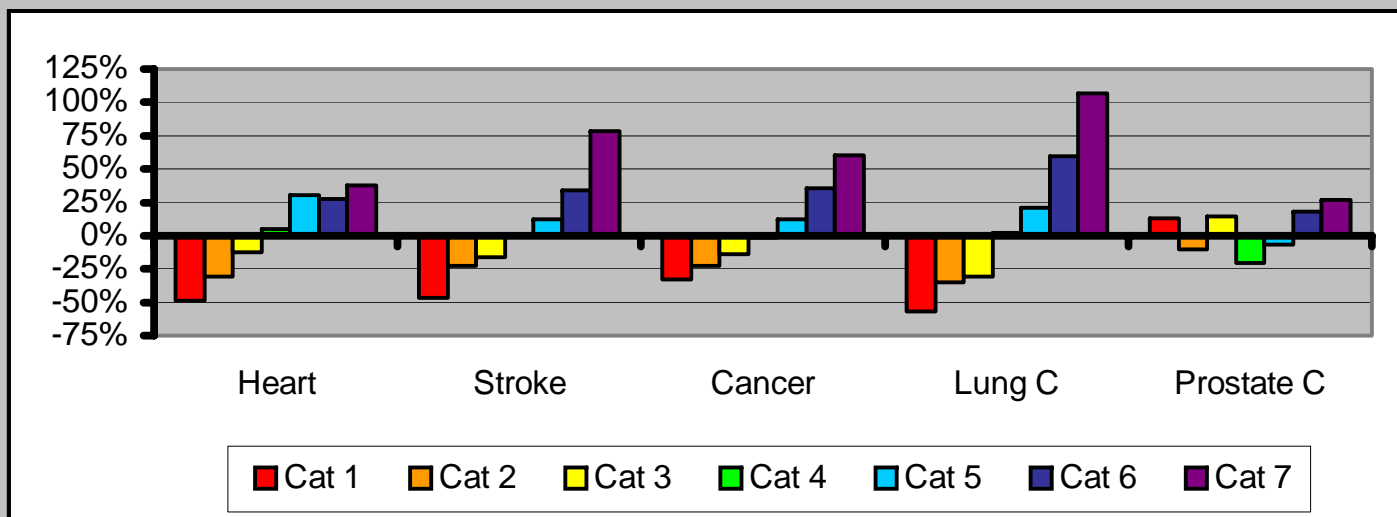
CIBT02 & practical applications

Relative CI Rates by Deprivation Category Scotland, 1989 – 93, Ages 40 – 59, Males

Incidence

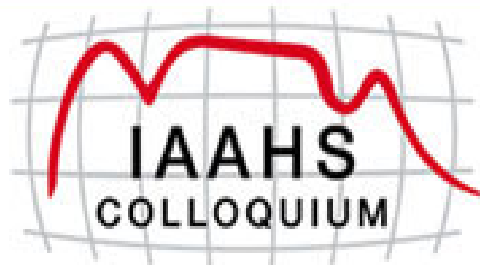


Mortality



CIBT02 & practical applications – observations & conclusions

- Trend in raw incidence of major CI's at population level is gently upwards (particularly for cancer)
- Trends for insured subset likely to be worse
 - dominance of cancer
 - removal of benefit of falling smoker prevalence
 - possible narrowing of socio-economic differences
- CIBT02 fits CMI CI experience a little better than CIBT93
- Raw CMI CI experience needs significant grossing up
- CIBT02 tables should be useful benchmark



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