The Actuarial Profession
making financial sense of the future

Current Issues in Health & Care

An Update from the CMI on IP and CI

Neil Robjohns
Secretary of CMI Income Protection Committee
Member of CMI Critical Illness Committee

Staple Inn Hall, London; 28th October 2009

Agenda

- Critical Illness (individual business)
  - Recent results
  - Towards CI diagnosis rates
- Income Protection (individual business)
  - Recent results
  - Graduation of IP claim inception rates
- Gender Differentials
- Changes in Data Formats
- Forthcoming Attractions

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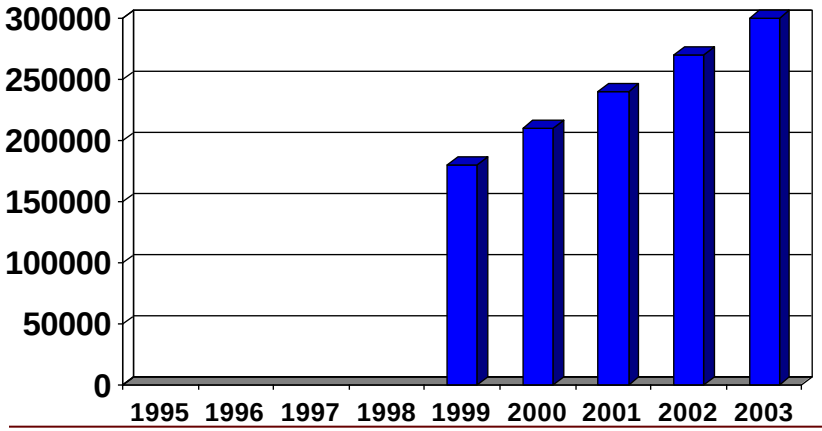
CI Experience Summary - Timeline

- May 05: Results for 1999, 2000, 2001, 2002
- May 05: WP14 - Initial methodology & flag CMI CI issues
- Dec 05: WP18 - Feedback on WP14 & future work
- Apr 07: 2003 (Revised) and 2004 Results
- Jul 07: WP28 - Towards improved methodology
- Jul 08: WP33 - A new methodology (Adjusted Results)
- Jul 08: 1999-2004 Adjusted Results
- Oct 08: 2005 Results and Adjusted Results
- Oct 09: 2006 Results and Adjusted Results

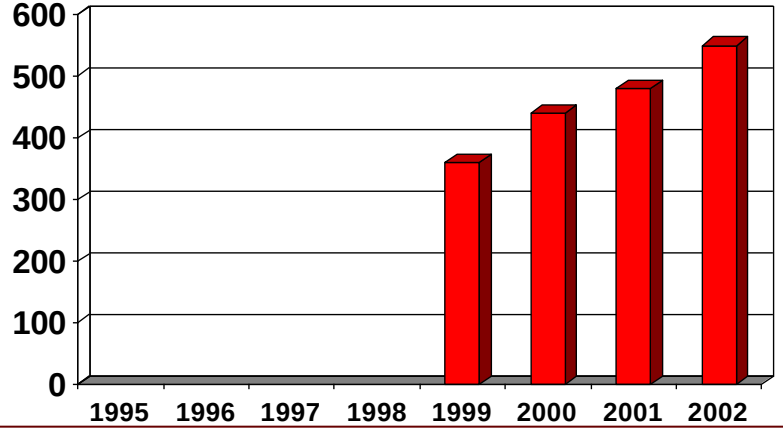
CI Experience Summary - Methodology

- CMI CI data / analysis problem:
  - Claims collected by year of settlement; diagnosis date often unknown; material lag from diagnosis to settlement
- Start with the known in-force and settled claims

In Force at 1 Jan

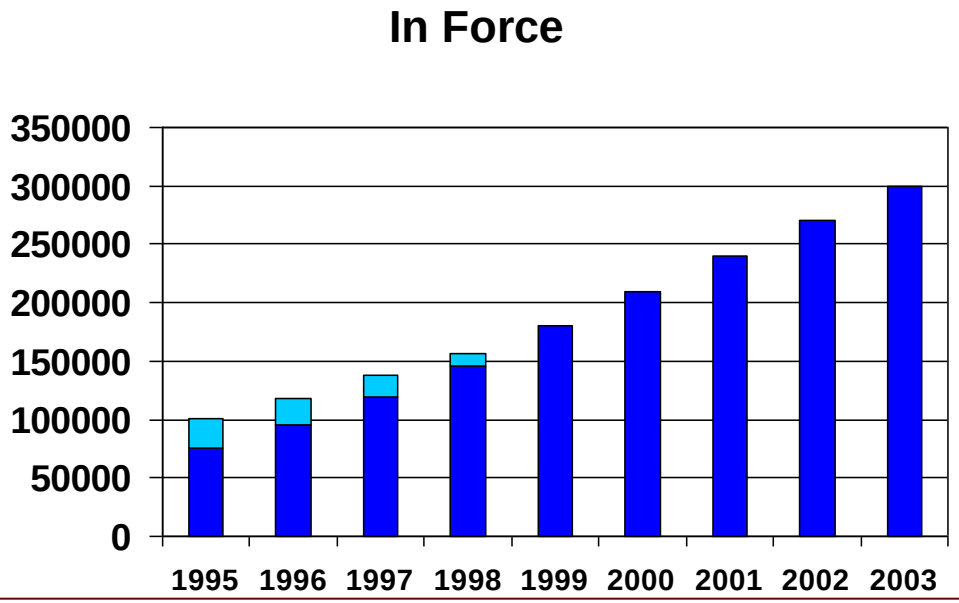


Settled Claims



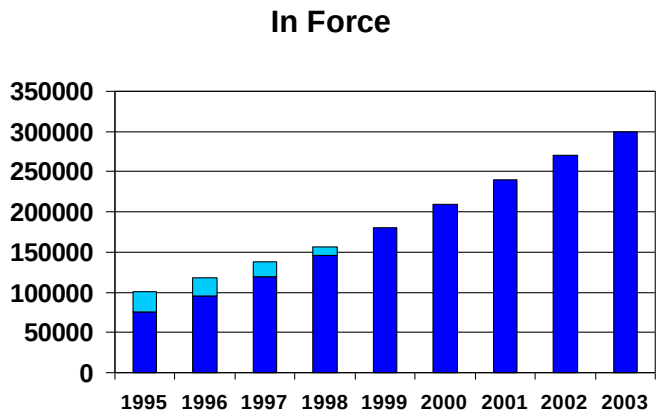
CI Experience Summary - Methodology

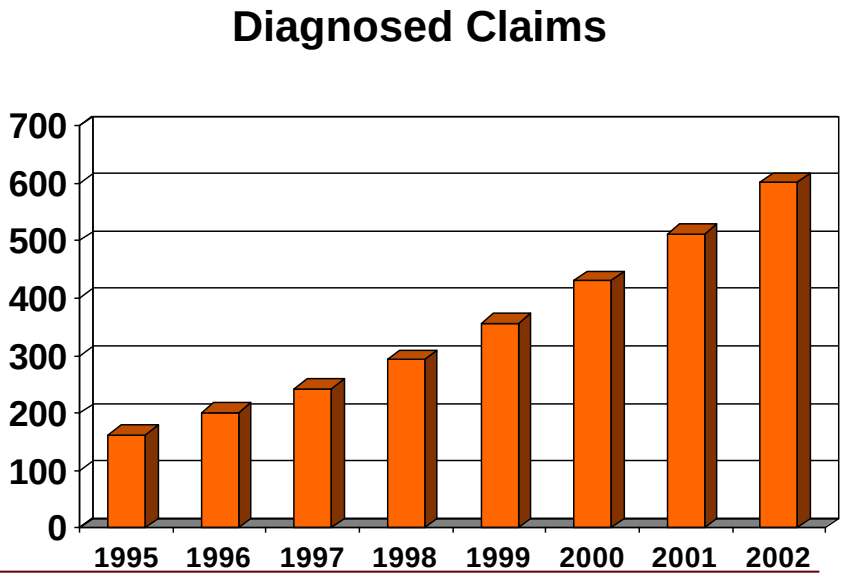
- From known in-force, estimate prior years in-force
  - Roll back known data (over time, age and duration)
  - Add back an estimate of business exiting before census



CI Experience Summary - Methodology

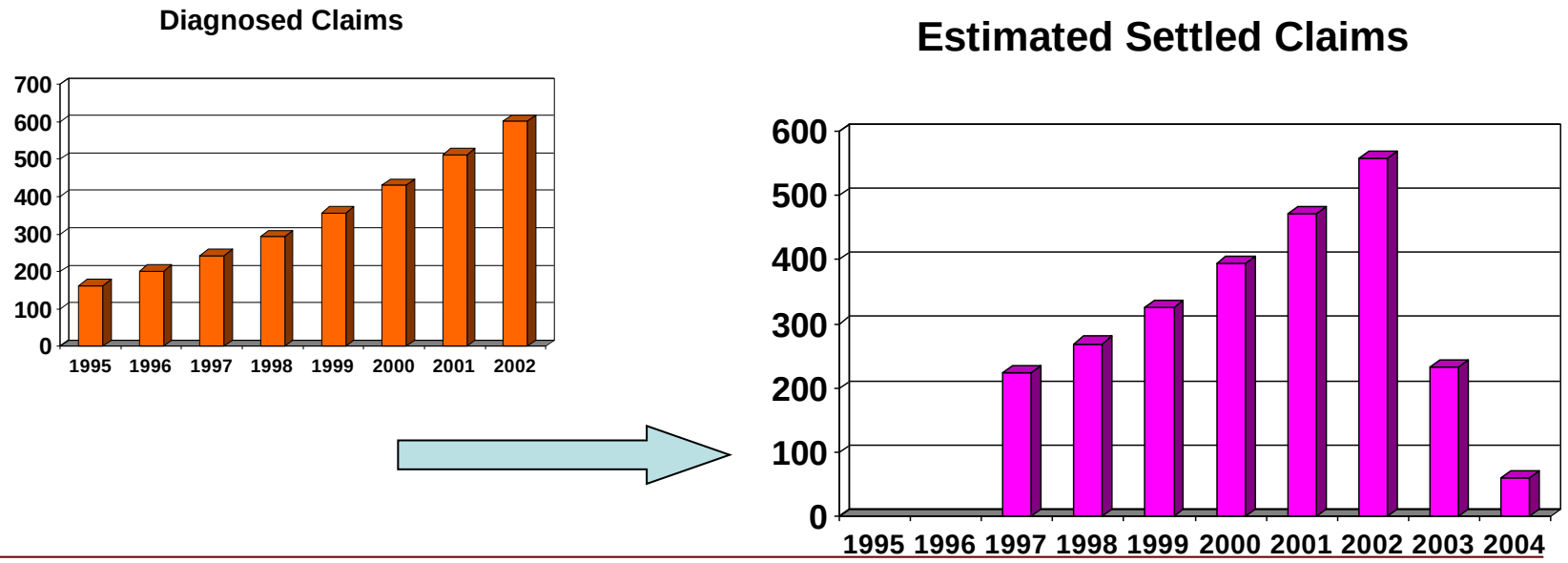
- From the in-force, estimate exposure in each year, then estimate diagnosed claims by year (at each age & duration) using an initial set of claim rates





CI Experience Summary - Methodology

- From estimated diagnosed claims by year, estimate settled claims by year (by age & duration) using an assumed claim development distribution

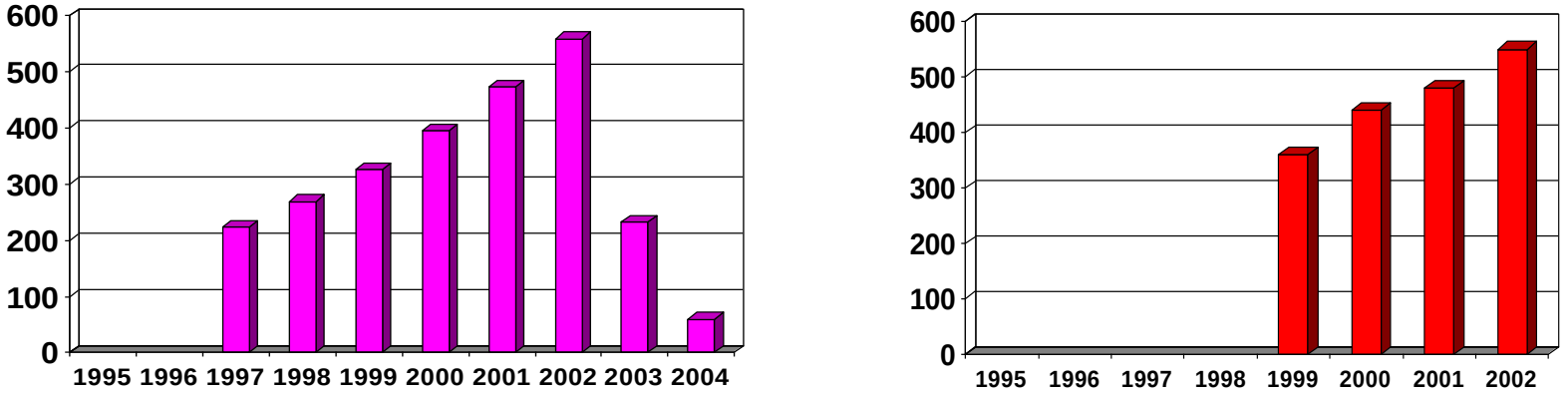


NB Max interval from diagnosis to settlement
= 2 years in this illustration

CI Experience Summary - Methodology

- Compare estimated settled claims with known settled claims by year, age and duration

Estimated Settled Claims ⟷ **Settled Claims**



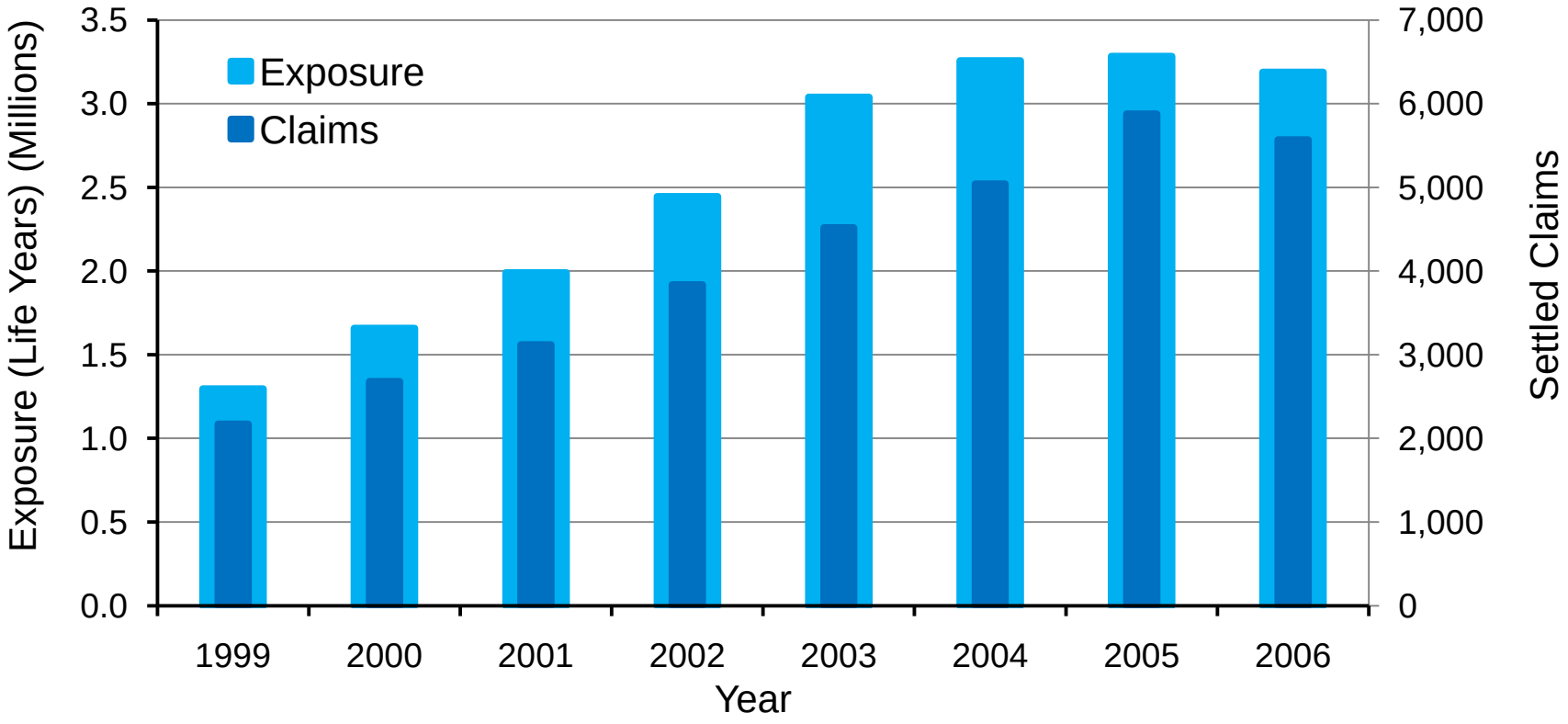
- Can be used to present the 'adjusted' results (for a given base table and claim development distribution)
- Can iterate assumption regarding claim rates to derive the a set of 'best fit' CI claim 'diagnosis' rates

CI Experience Summary - Methodology

- 'Unadjusted Results' / WP14 methodology
  - Actual Settled Claims vs Expected Diagnosed Claims
  - Mismatch by year; some adjustment by age & duration
- 'Adjusted Results' / WP33 methodology
  - Actual Settled Claims vs Expected Settled Claims
  - Match A & E, but presented using settlement timing
- Derived CI 'Diagnosis' Rates
  - Derive from 'Adjusted Results' / WP33 methodology
  - Smoothed, fitted rates in desired 'diagnosis' form

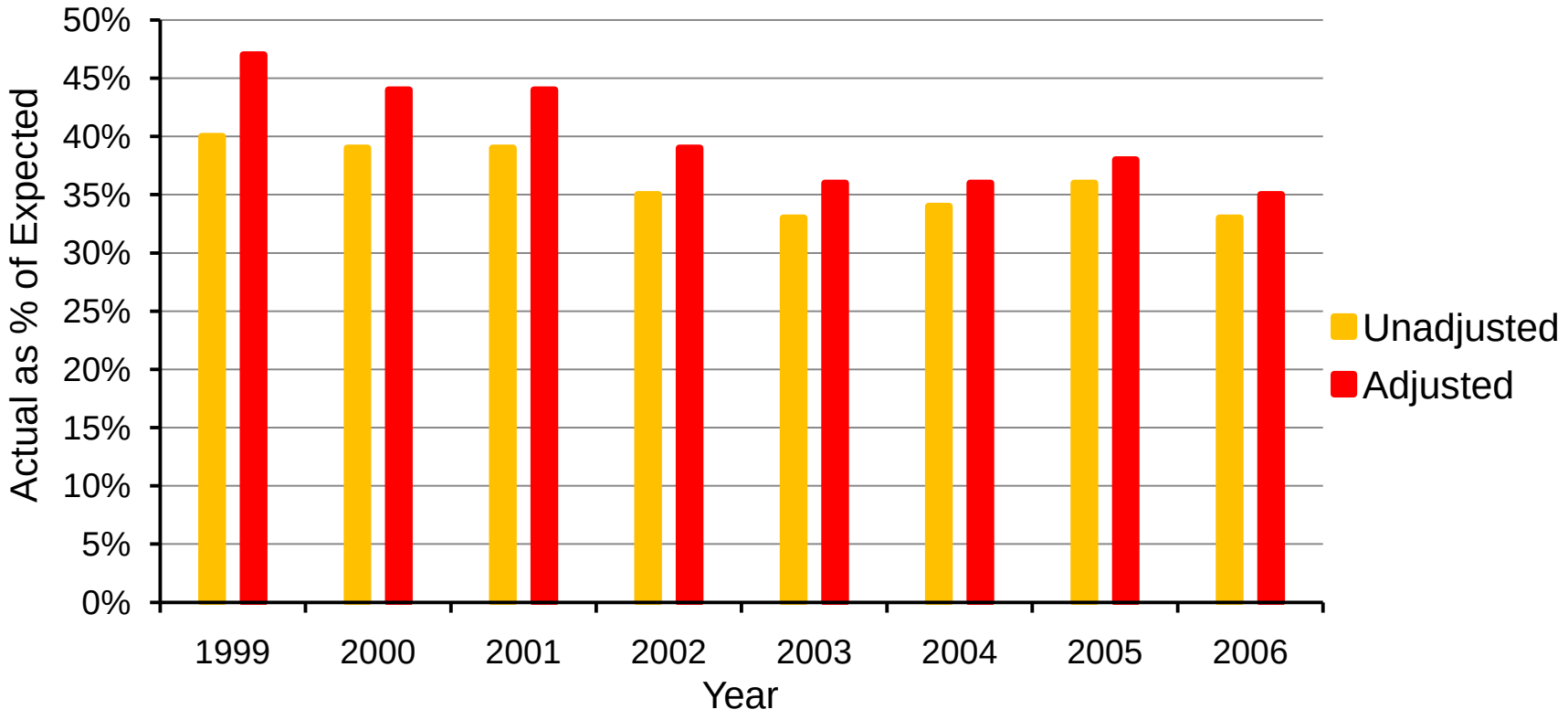
CI Experience Summary - Data Volumes

Exposure and Claims by Calendar Year
All ages, genders, smoker status and durations combined



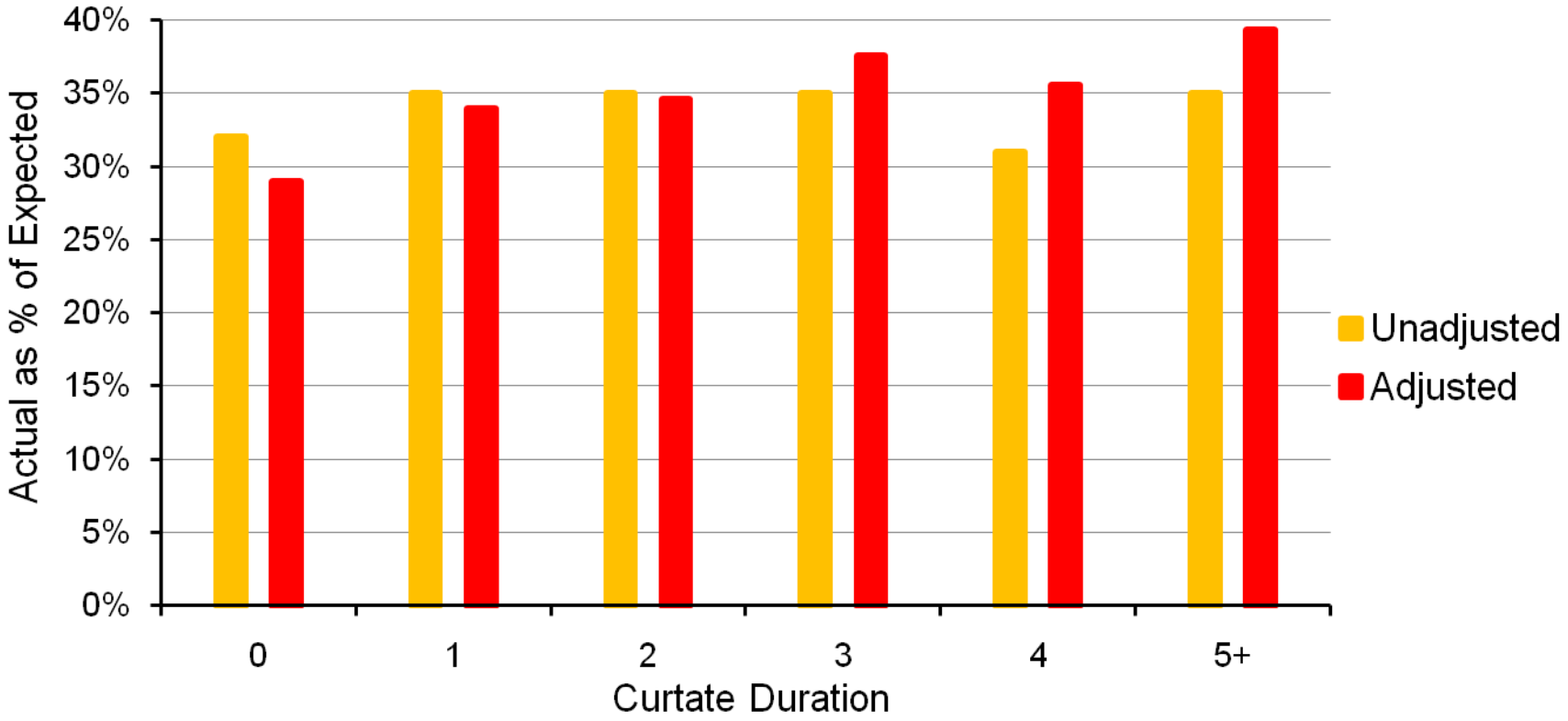
CI Experience Summary - by Year

Accelerated CI; Settled Claims; A÷E using CIBT93
Males; Non-Smokers; All ages and durations combined



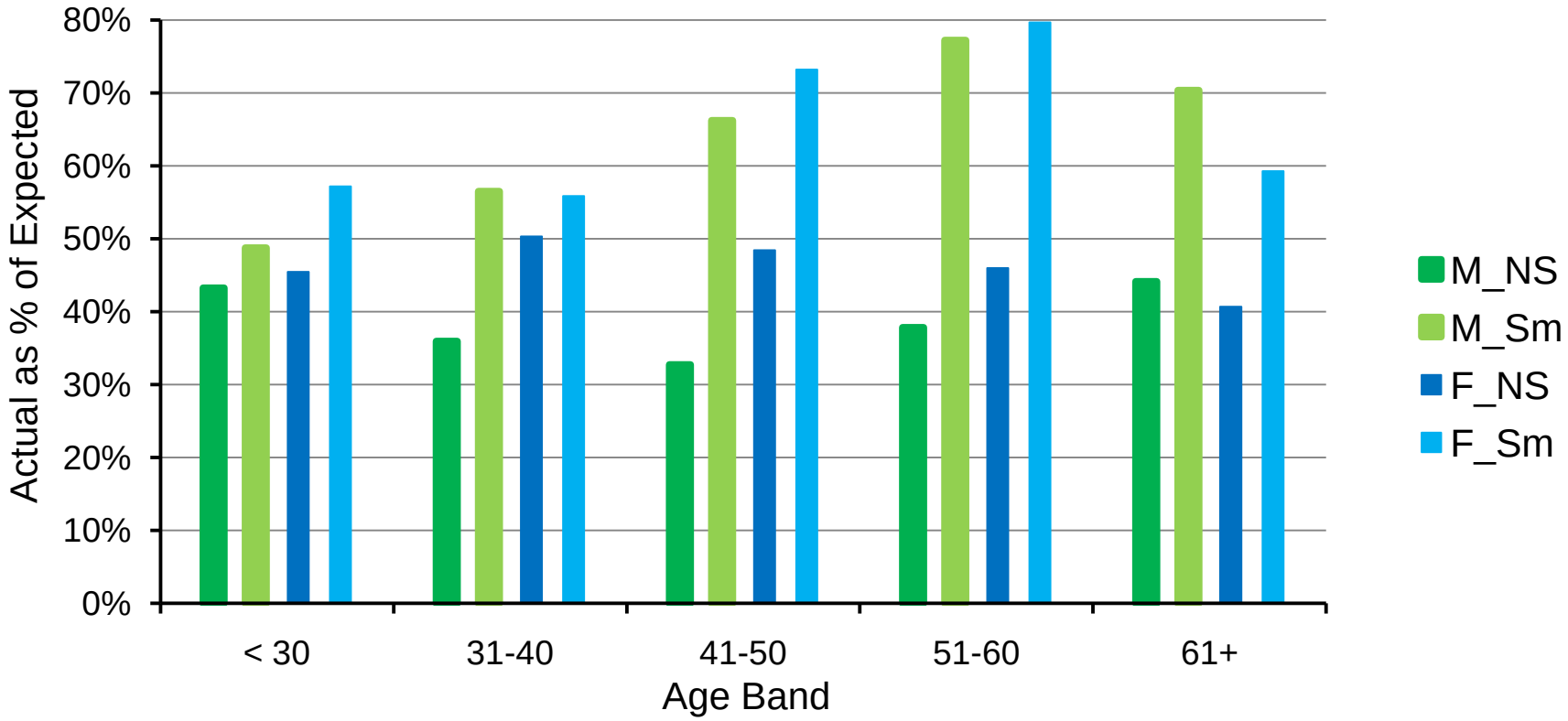
CI Experience Summary - by Duration

Accelerated CI; Settled Claims; A÷E using CIBT93
Males; Non-Smokers; All ages combined; 2003-06



CI Experience Summary - by Age Band

Accelerated CI; Settled Claims; A÷E using CIBT93
Adjusted Results; All durations combined; 2003-06

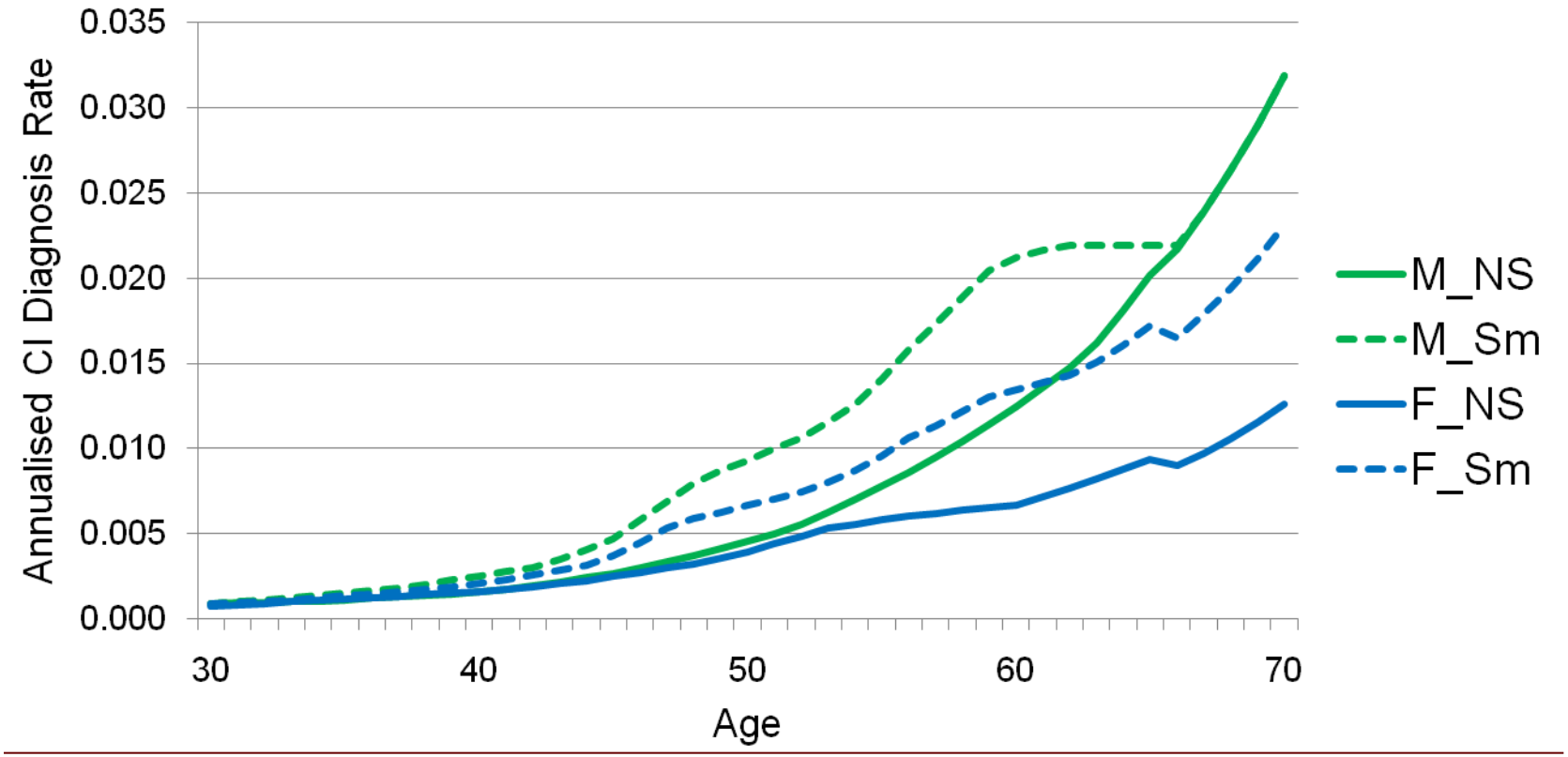


CI Experience - Deriving Diagnosis Rates

- Extension of WP33 methodology
- Pragmatic approach (not mathematical model)
- Judgement required on many aspects:
  - selection / application of constraints (prior beliefs)
  - smoothness versus goodness-of-fit
  - identifying viable age range (and how to extend rates)
  - identifying variations in rates by duration
  - analysis of subsets (gender, smoker status, cause, ...)
  - derivation of CDD(s)

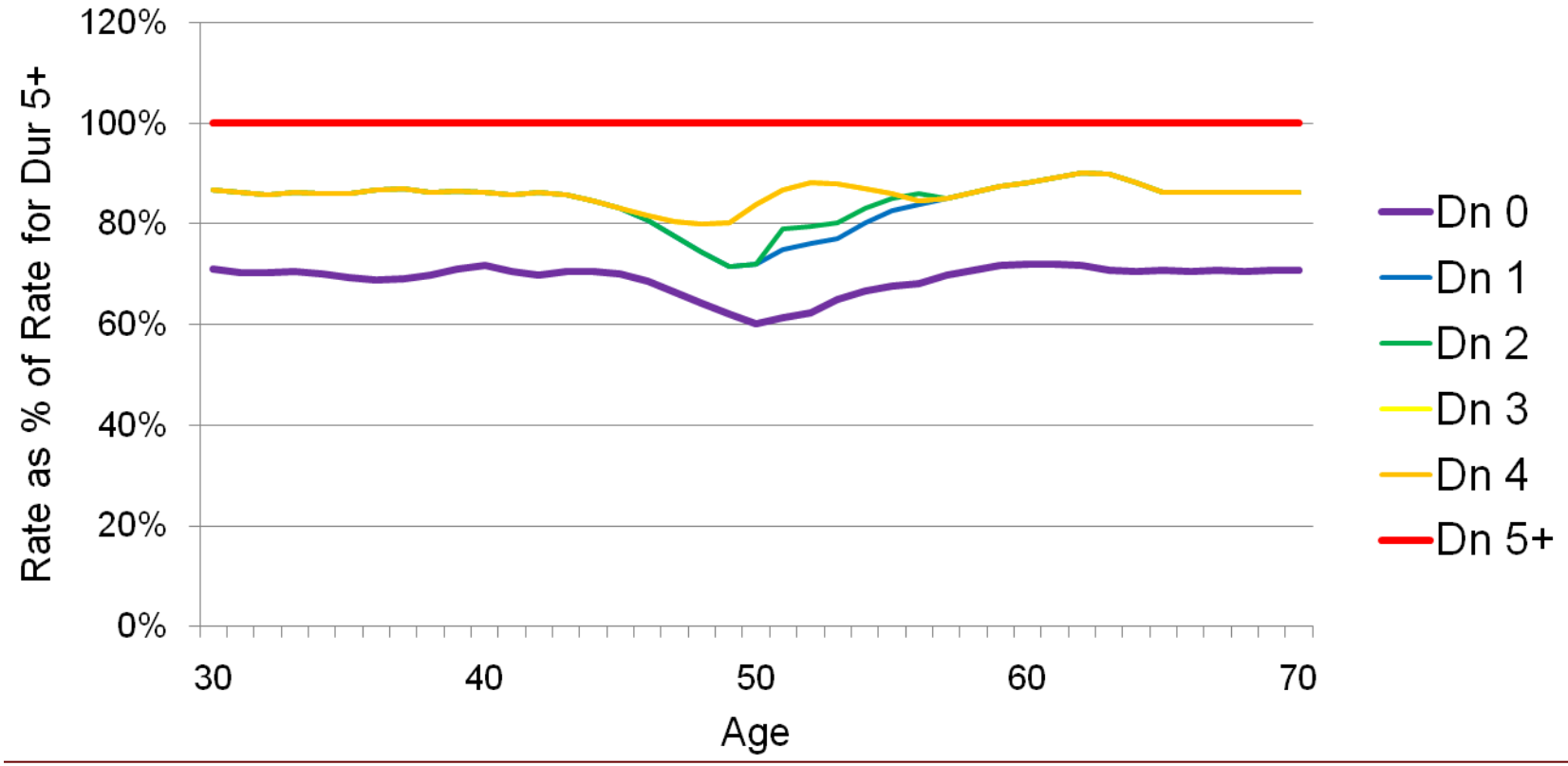
CI Experience - Derived Diagnosis Rates

Draft Smoothed Annualised CI Diagnosis Rates
by Gender and Smoker Status; Accelerated CI; 1999-2004



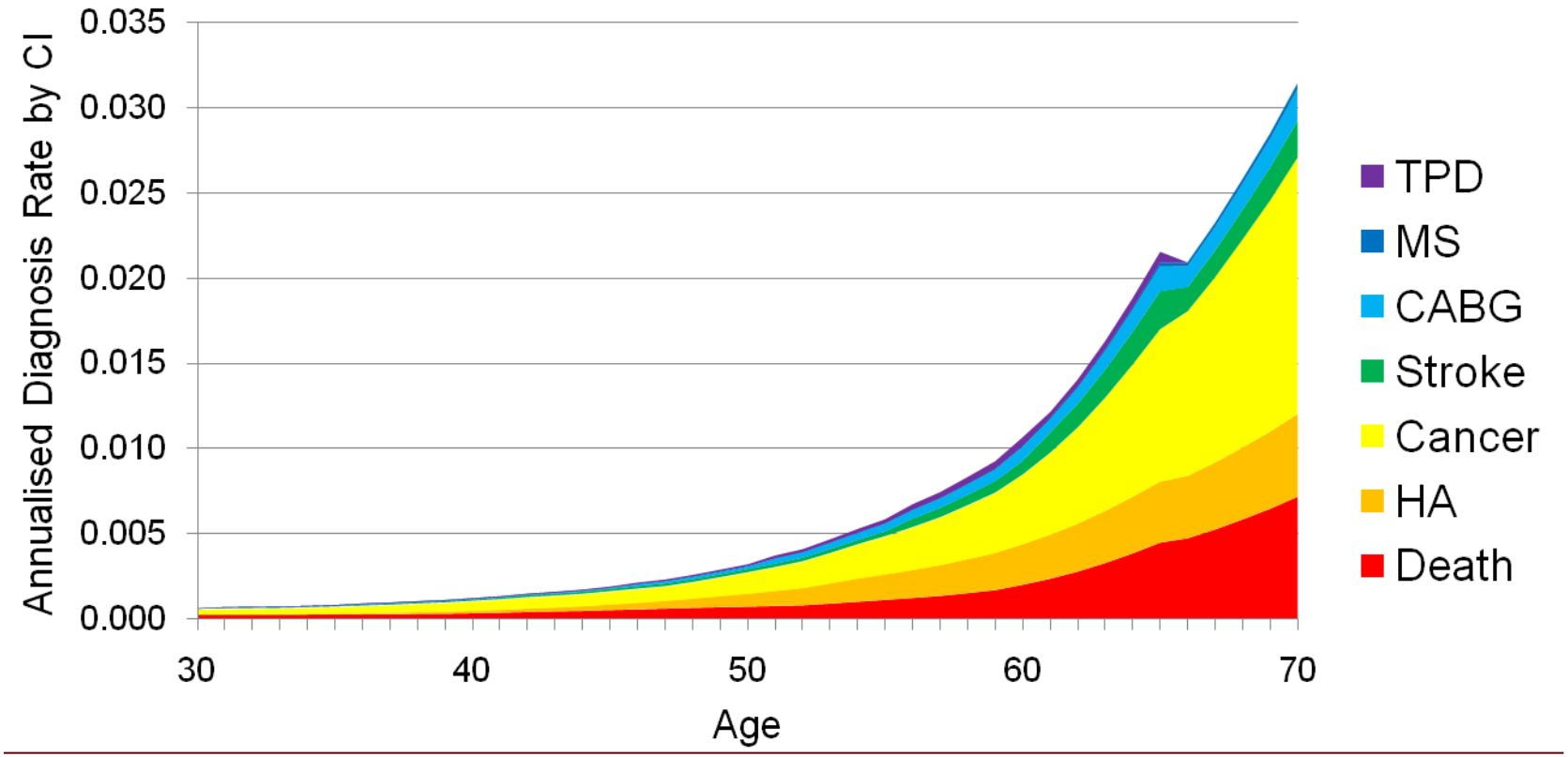
CI Experience - Derived Diagnosis Rates

Draft Smoothed Annualised CI Diagnosis Rates by Age & Duration
Accelerated CI; Males; Non-Smokers; 1999-2004



CI Experience - Derived Diagnosis Rates

Draft Smoothed Annualised CI Diagnosis Rates by Cause
Accelerated CI; Males; Non-Smokers; 1999-2004



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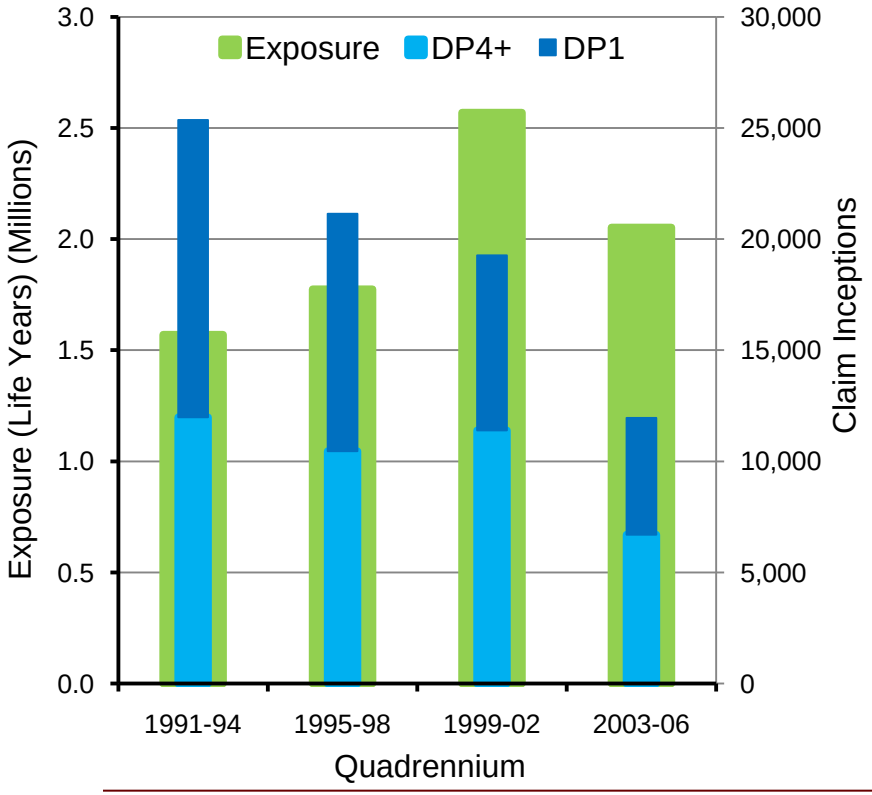
IP Experience Summary - Timeline

- May 04: WP5-7 - Graduation of termination rates, 91-98
- Nov 05: CMIR22 - 1999-2002 Quad Report
- Aug 06: WP23 - Analysis of IIP Claims by cause, 91-02
- Feb 07: 2003 Results
- Oct 07: 2004 Results
- Dec 08: 2005 Results
- Jul 09: 2006 Results

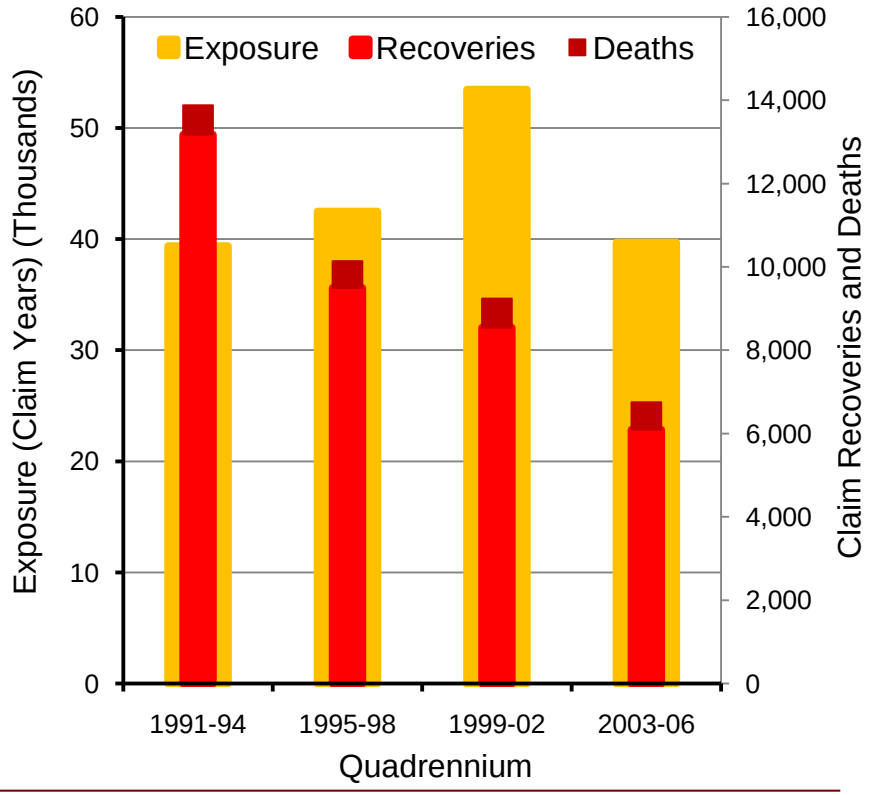
IP Experience Summary - Data Volumes

Exposures and Claim Events by Quadrennium

Claim Inceptions

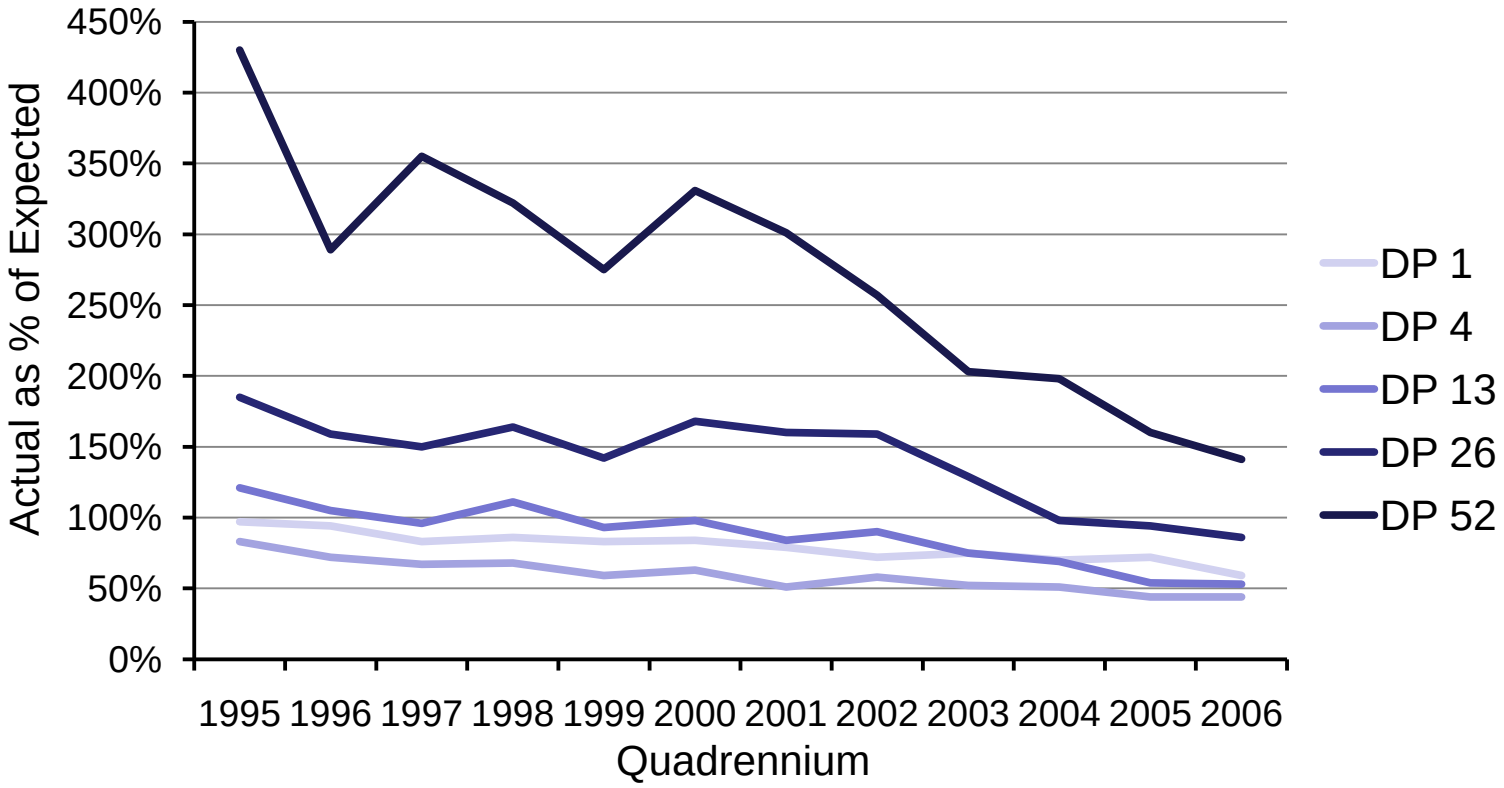


Claim Terminations



IP Experience Summary - Inceptions

Claims Inceptions; A÷E using SM1975-78; by Deferred Period
Males; Standard *; all Occ's and ages combined



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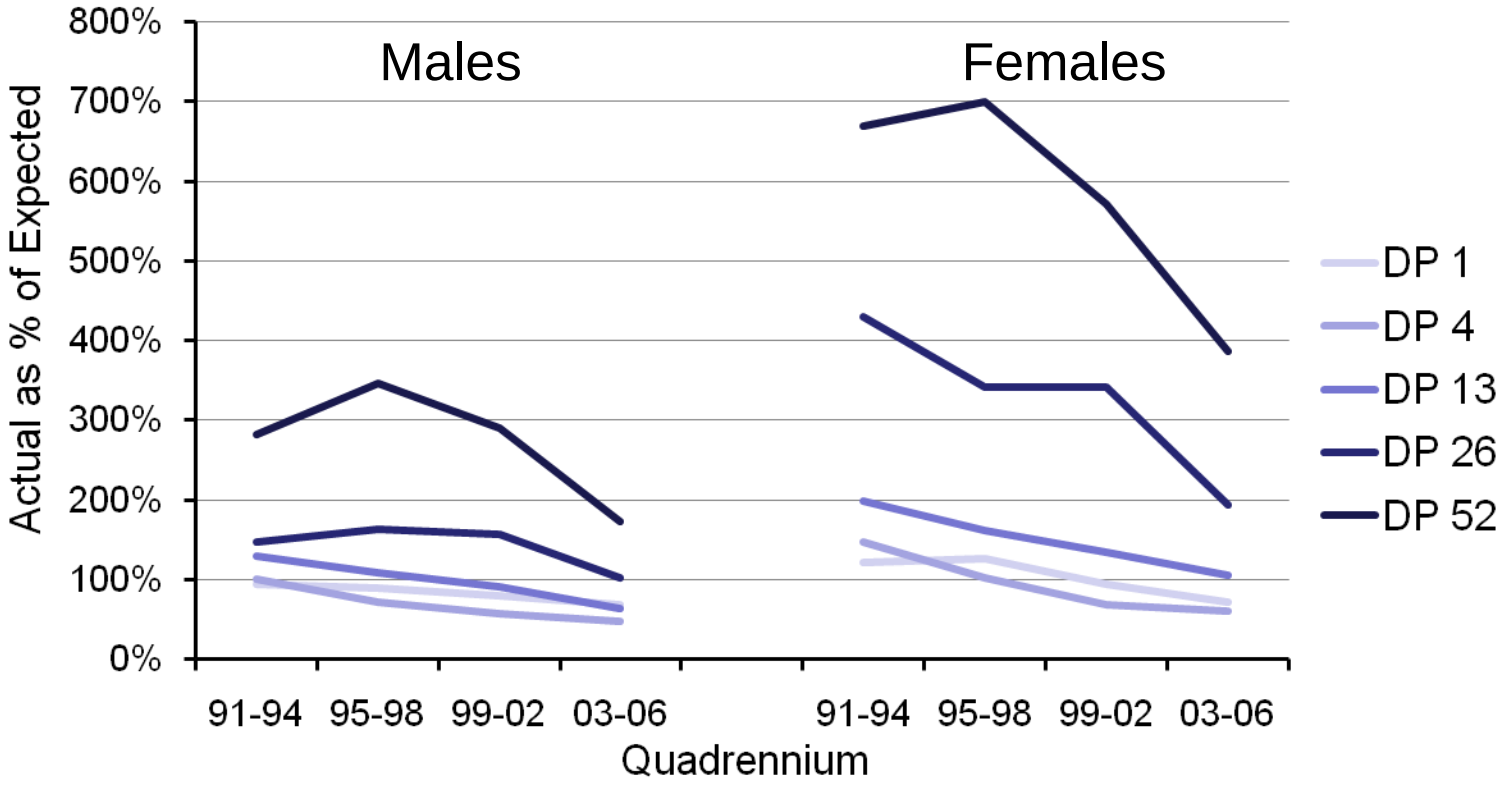
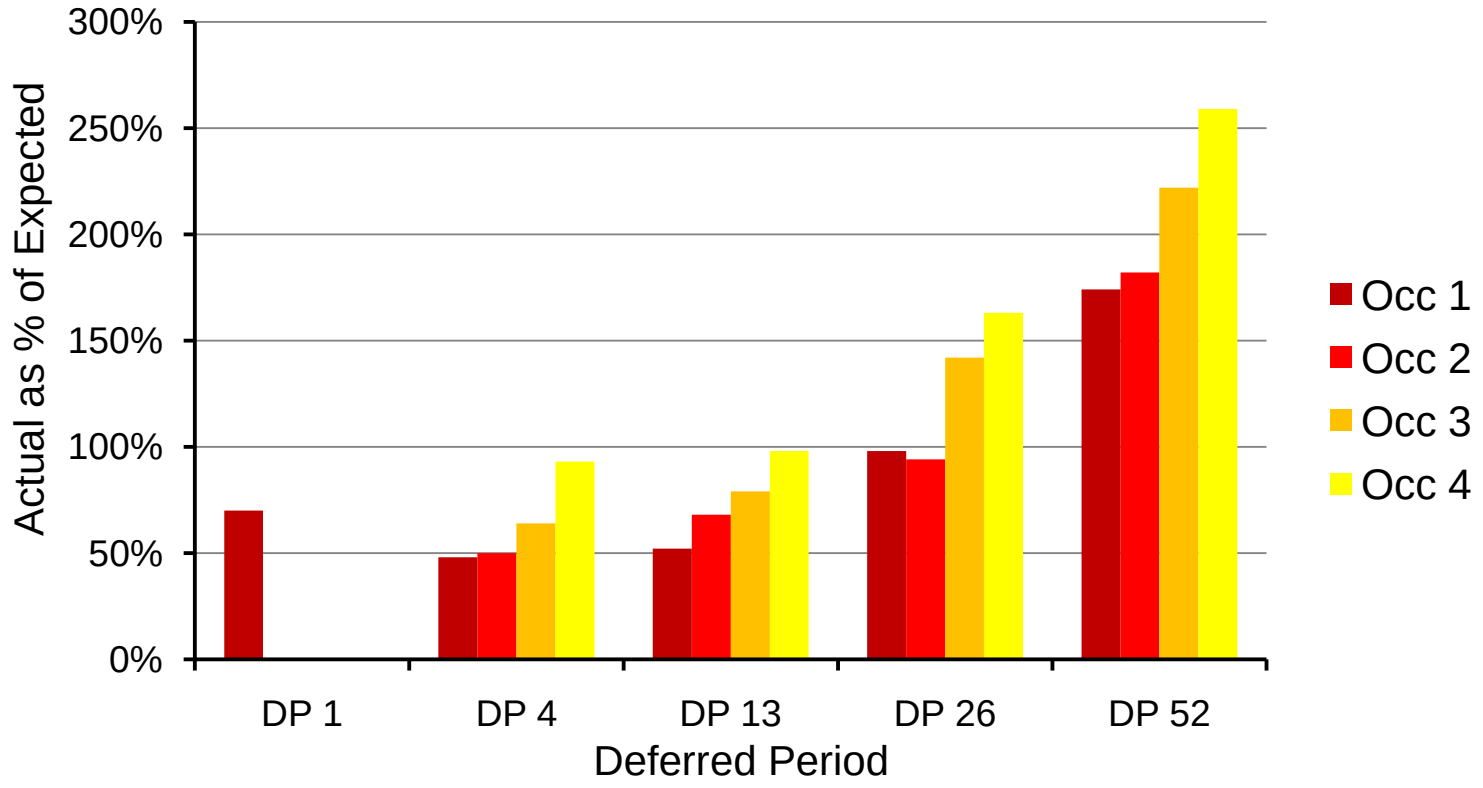


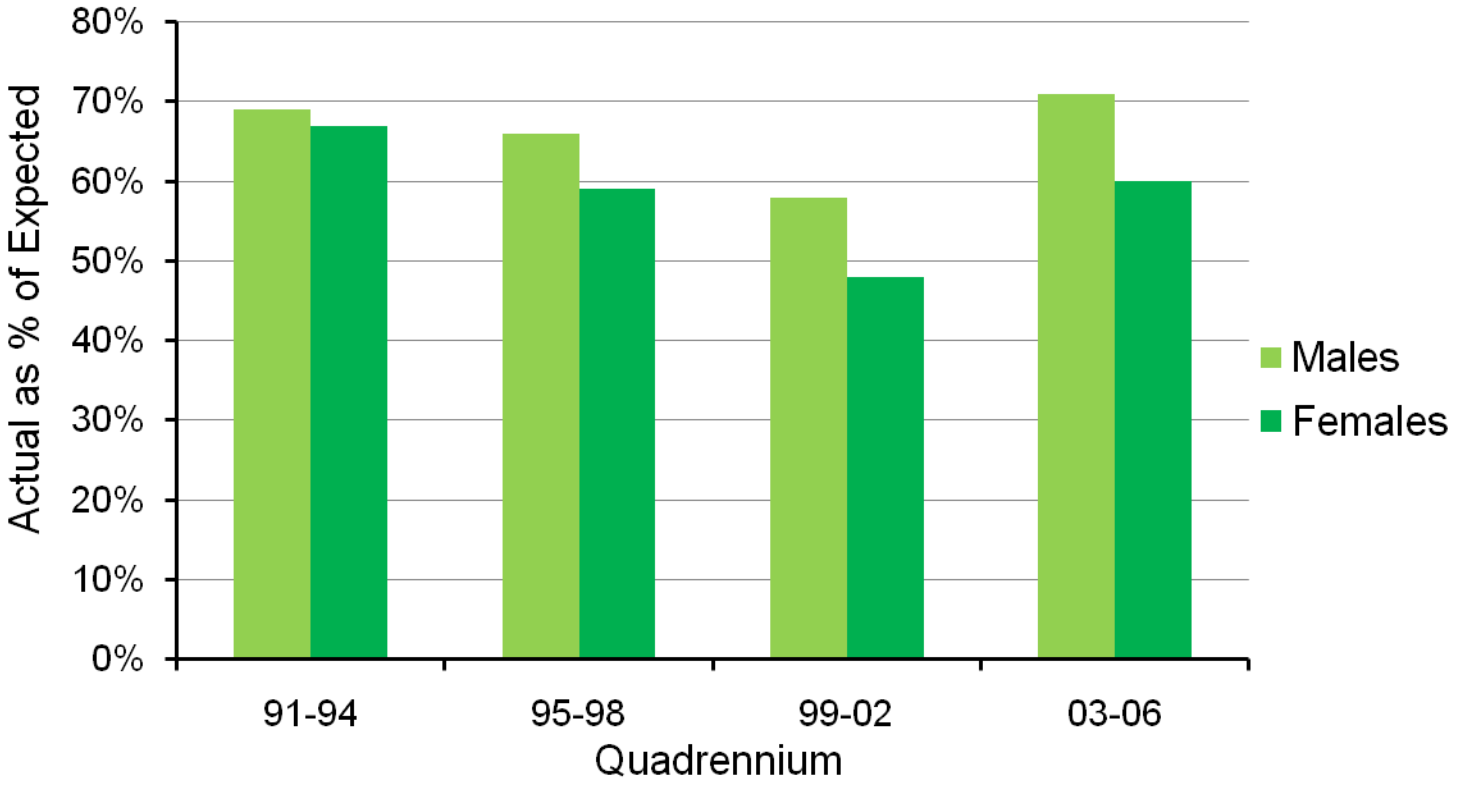
IP Experience Summary - Inceptions

Claims Inceptions; A÷E using SM1975-78; by Occupation Class
Males; Standard *; all ages combined; 2003-06



IP Experience Summary - Recoveries

Claims Terminated by Recovery; A÷E using SM1975-78 Standard *; all DP's, Occ's, ages and durations sick combined



IP Experience Summary - Recoveries

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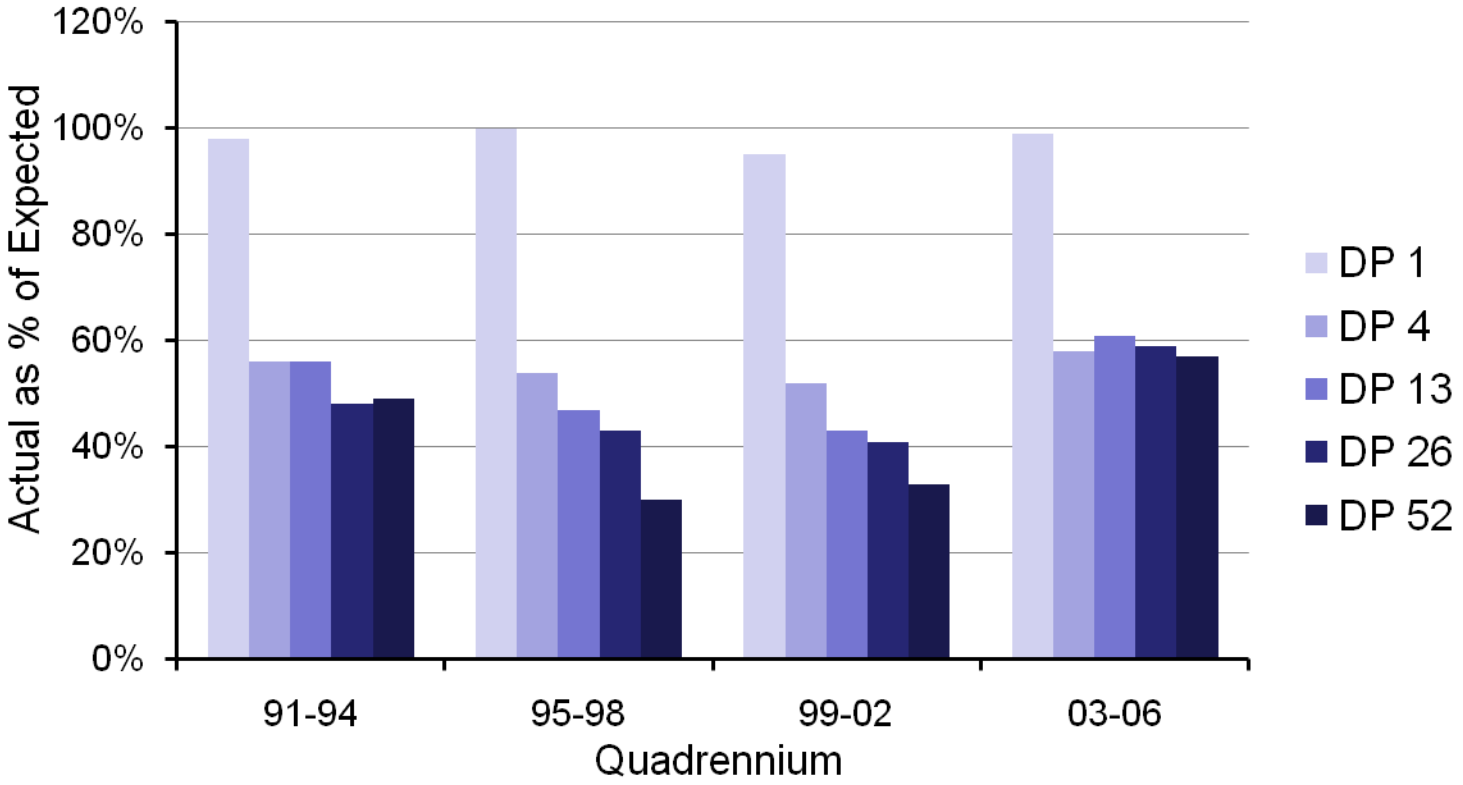
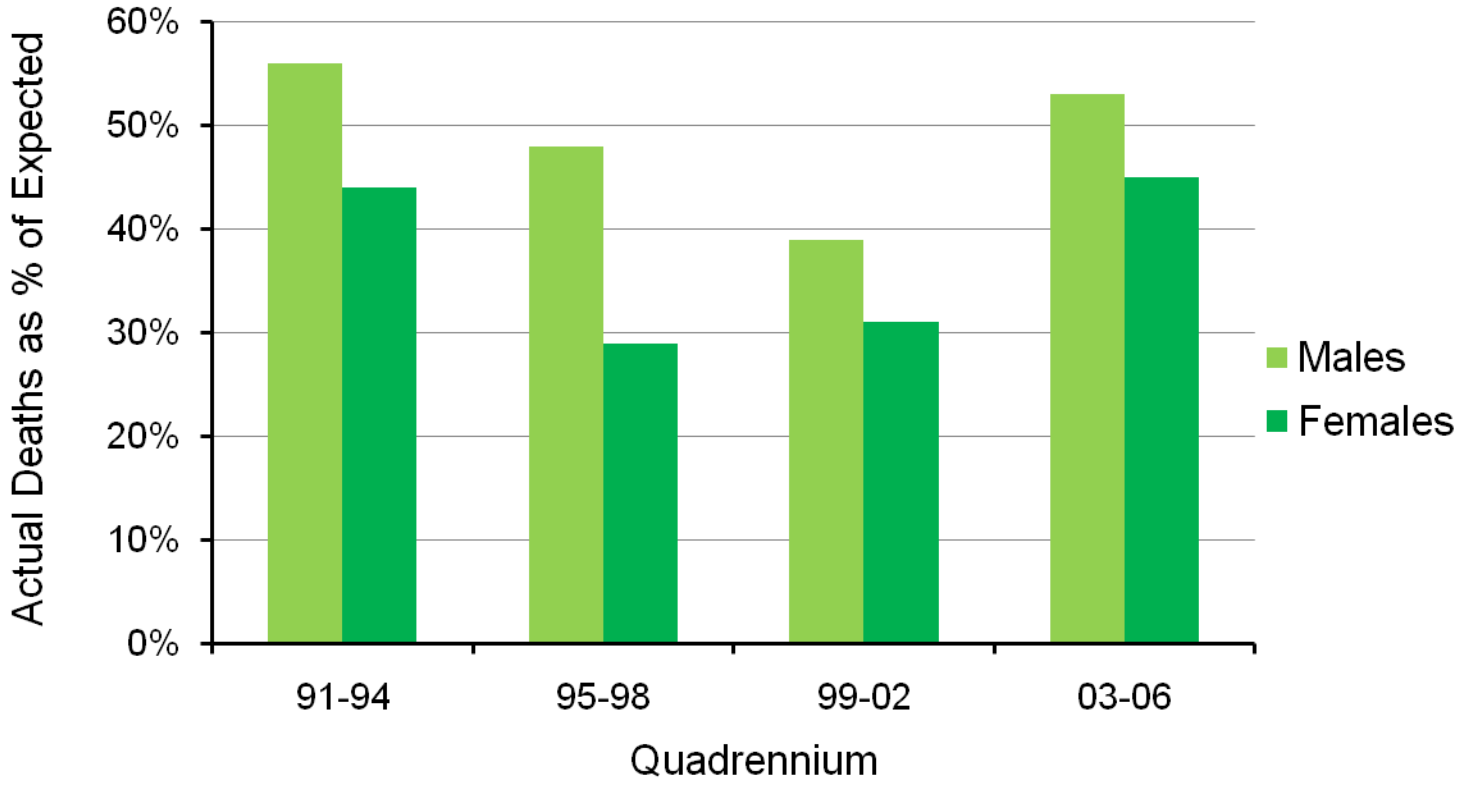


IP Experience Summary - Deaths

Claims Terminated by Death; A÷E using SM1975-78 Standard *; all DP's, Occ's, ages and durations sick combined

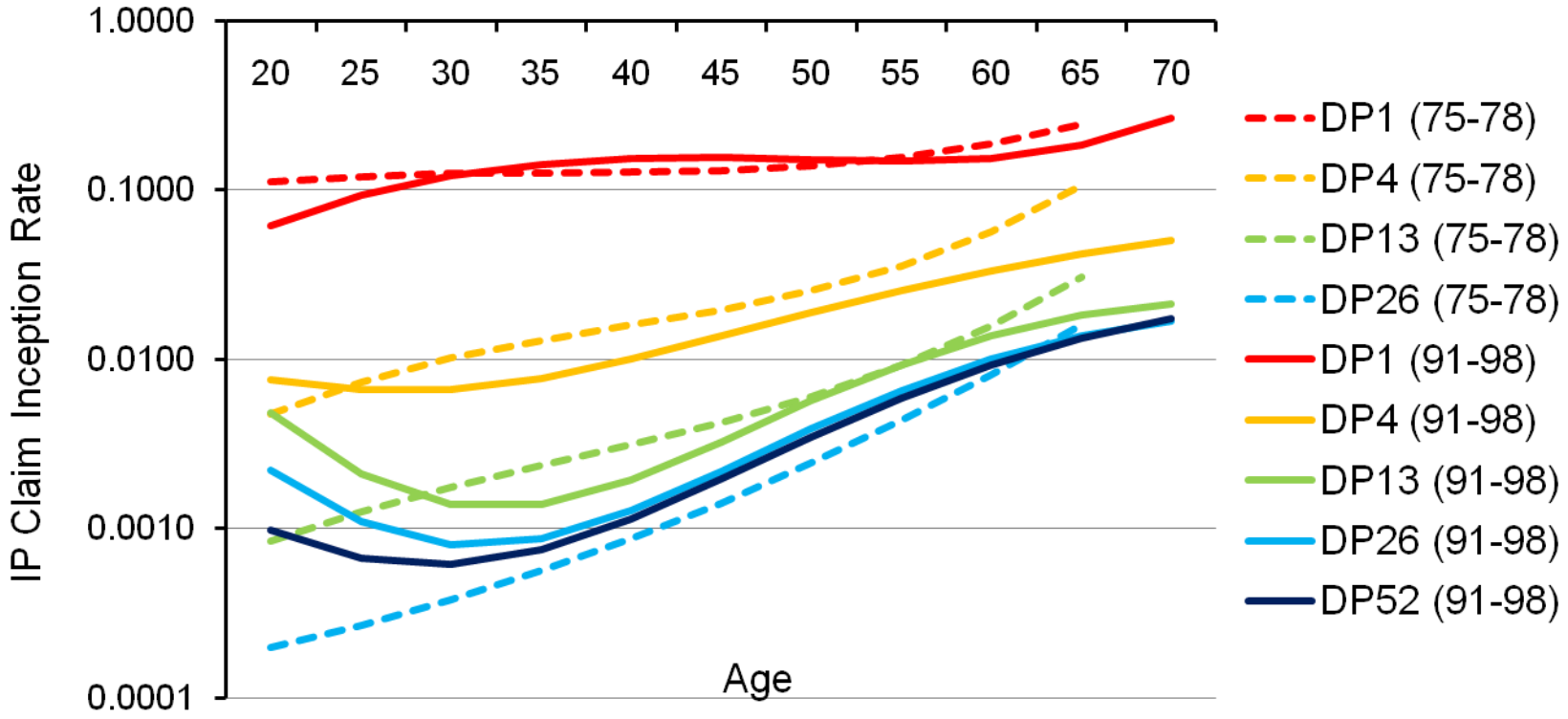


IP Experience - Draft Graduations

- Data for 1991-98; Males; Occ Class 1
- Graduation of termination rates - WP5, May 04
- Graduation of claim inception rates
  - Formal mathematical model
  - Model sickness rates and transition to claim inceptions
  - Separate application for each deferred period
  - Long process!
    - Complex model; Data issues, including ‘duplicates’
  - Compare graduated rates with other experiences:
    - Females; other Occupation Classes; 99-02

IP Experience - Draft Graduations

Individual IP Claim Inceptions Rates; Males; Occ Class 1
Draft Graduations for 1991-98; compared against SM1975-78



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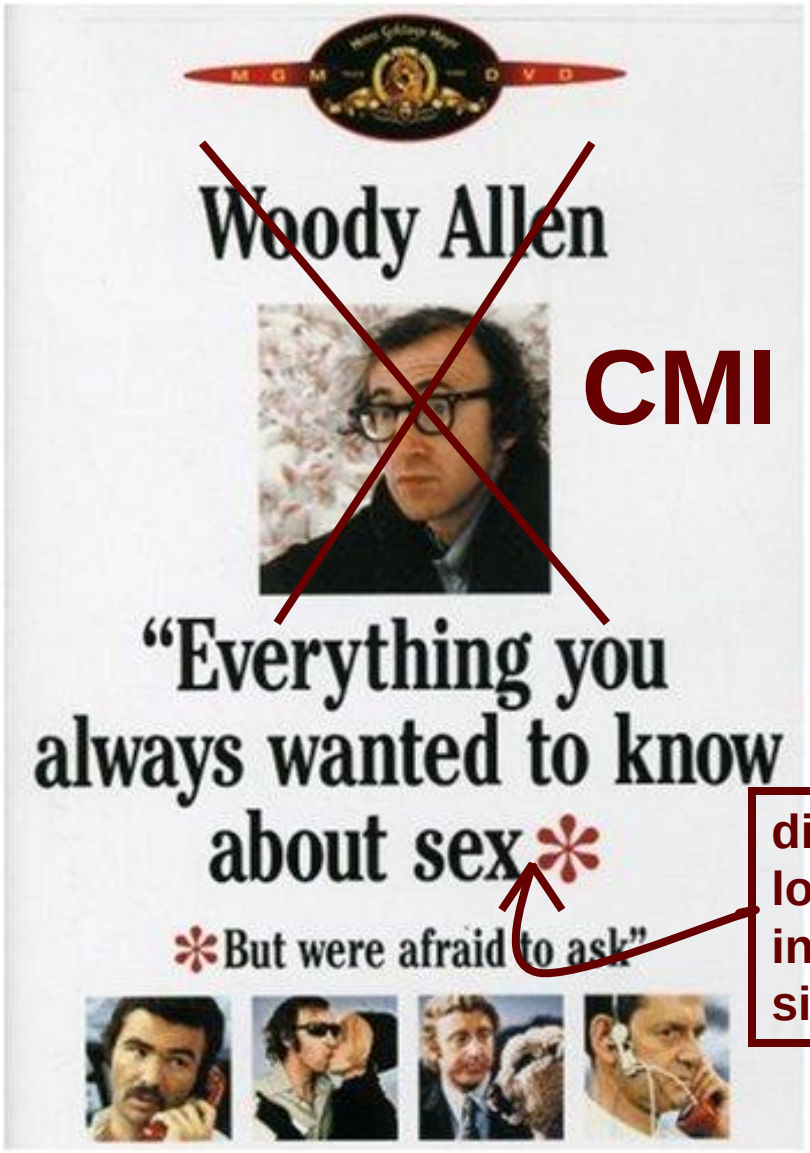


CMI

discrimination in UK long-term CI & IP insurance contracts since 5 April 2008

EU Equality Directive

- The use of gender as a factor in the calculation of premiums or benefits for insurance or related financial services products should not result in differences in the premiums or benefits of individuals.
- However, where gender is a determining factor in the assessment of risk based on **relevant and accurate actuarial and statistical data** then proportionate differences in individual premiums or benefits are allowed.
- This is subject to **accurate data relevant to the use of gender as a determining actuarial factor being compiled, published and regularly updated**.

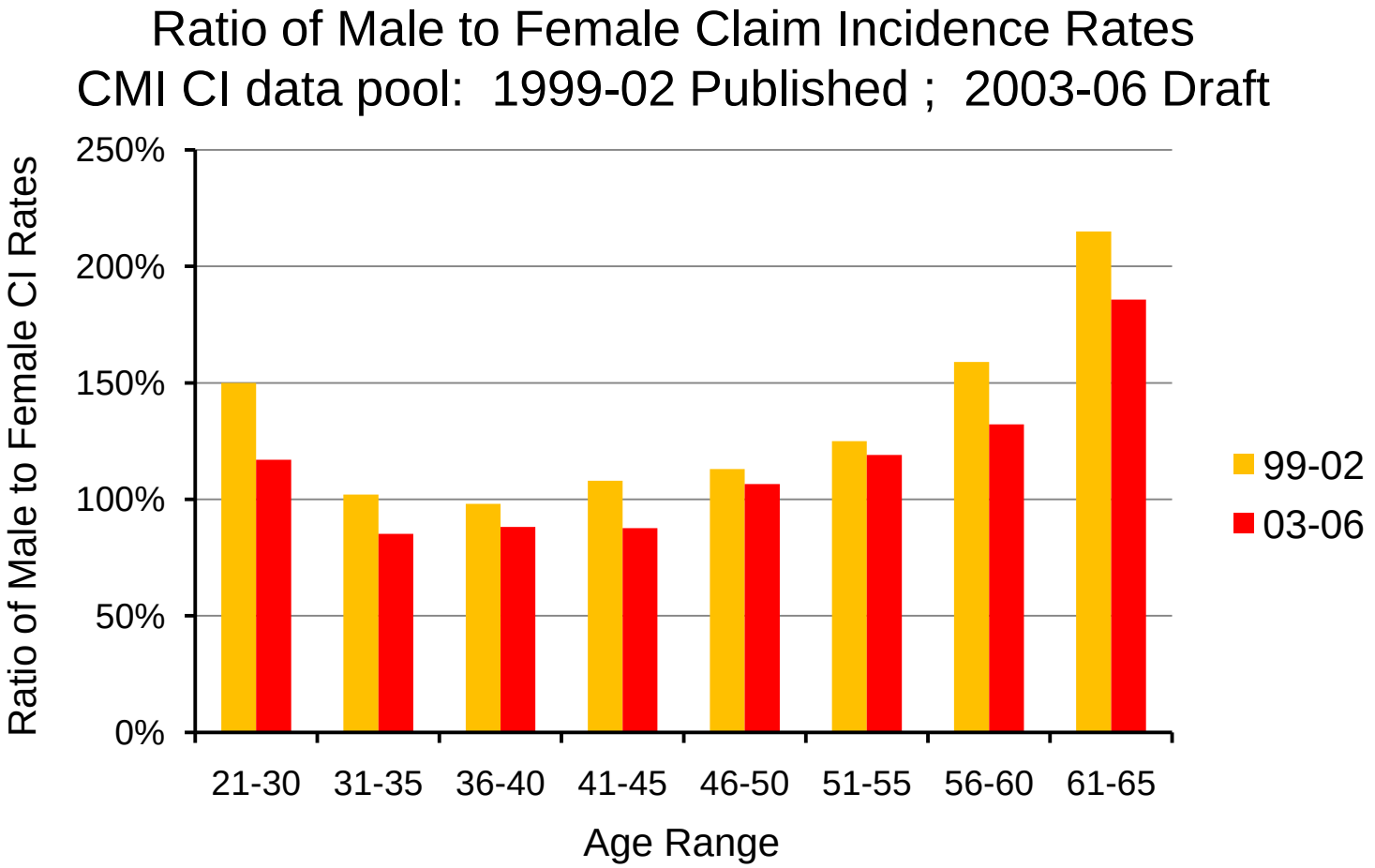
EU Equality Directive: Data Publication

- The UK has opted to regulate gender differentiation at a local level: the Treasury has set out guidance for the publication of data.
- Guidance describes minimum content, form and frequency of data to be published for each main policy type.
- General form of data:
  - Ratios of male to female rates for insured risks [in the UK / region]
  - Intelligible to someone who is not an insurance expert
  - Table(s) or chart(s) with appropriate explanations
  - Source of data and period to which it relates must be stated
  - Technical terms must be explained.
- Data may be published by insurers on an individual or joint basis or **collated by a third party;** source and accuracy must be attested to.

EU Equality Directive: Data Publication

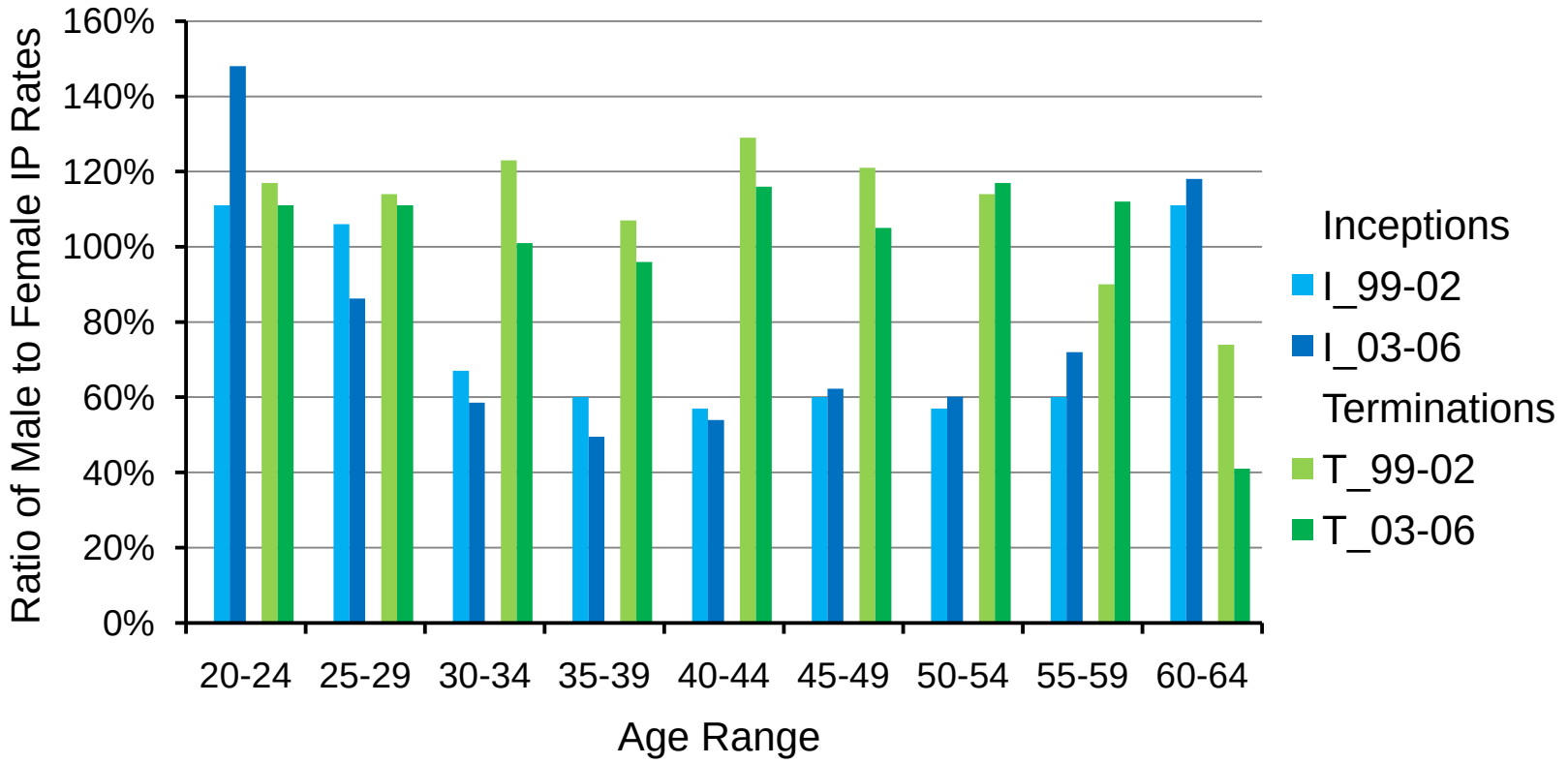
- The published data must illustrate **recent** differences in **the incidence and cost of** [**critical illness**] / [**long-term sickness**] by gender and by age.
- It may be based on graduated data using single-year age points or raw data by age ranges:
  - CI: range $\leq$ 10 years up to age 30, then $\leq$ 5 years up to age 80
  - IP: range $\leq$ 5 years up to age 75 and a single range thereafter.
- The published data may aggregate different forms of [**critical illness insurance**] / [**income protection insurance**].
- The published data should be reviewed and, if necessary, updated at intervals not exceeding four years.

Critical Illness Insurance



Income Protection Insurance

Ratio of Male to Female Claim Inception and Termination Rates
CMI IP data pool: 1999-02 Published ; 2003-06 Draft



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Critical Illness

- Covered in Per Policy Coding Guide v1.5, Jul 09
  - Data at policy / life insured level
  - Move from ‘census’ to exact exposure calculation
  - In time will support:
    - Improved analyses (including postcode)
    - Stronger data validation
    - Increased flexibility (inputs and outputs)
- Encourage contributors to move to new format
- New contributors warmly welcomed !

Income Protection

- Revised Coding Guide - v3.0, Jul 09
  - Consultation with contributors, Jun 08
  - Retain broadly current approach (policy records; census)
  - Some additional fields
    - Rating factors; Info on rated cases; Full dates
    - Postcode (and clarification data protection legislation)
  - Remove obsolete data fields
- Encourage contributors to move to new format
- New contributors warmly welcomed !

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Critical Illness - Planned Outputs

- Late 2009:
  - 2003-06 Quad Results (to member offices)
  - Gender Differentials (on 2003-06 data)
  - WP on deriving CI diagnosis rates (99-04 data)
- 2010:
  - 2007 Results (to member offices); 2008 ?
  - WP on 2003-06 Quad Results
  - WP with derived CI diagnosis rates for 2003-06

Income Protection - Planned Outputs

- Late 2009:
  - 2003-06 Quad Results (to member offices)
  - Gender Differentials (on 2003-06 data)
  - WP on Graduation of IIP Claim Inception Rates, 1991-98
- 2010:
  - 2007 Results (to member offices); 2008 ?
  - WP on 2003-06 Quad Results
  - WP with 99-02 and 03-06 restated against IPM91-98

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An Update from the CMI on IP and CI

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