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Insights into recent Income Protection experience by cause of sickness

Duncan Heald and Hannah Cook
CMI Income Protection Committee

Workshop E04
Health and Care Conference 2013
Celtic Manor, Newport

16 May 2013



E04: CMI Income Protection Investigation

Agenda

- An update on the committee's recent activity
- Experience results database and methodology
- Individual IP claim inceptions experience
 - A summary of trends in experience over 1991 to 2009
 - Features of claim inceptions experience by cause of sickness
- Individual IP claim terminations experience
 - A summary of trends in experience over 1991 to 2009
 - Features of claim terminations experience by cause of sickness
- Insights into claim values by cause of sickness
- Plans for future work and request for feedback.



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Recent activity and outputs

CMI Income Protection Committee Members

- **Joan Coverson** (Chair) Gen Re
- **Hannah Cook** L&G
- **Duncan Heald** SCOR Global Life
- **Andrew Keeling** Unum
- **Gerry Kennedy** Southampton University
- **James Needham** Wesleyan
- **David Wilkie** InQA
- **Neil Robjohns** (Secretariat) Barnett Waddingham
- **Mark Paulson** (Secretariat) Barnett Waddingham



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CMI IP Committee

Recent activity and outputs

- Graduations of the 1991-98 IIP, Male, Class 1 experience
 - CMI Working Papers 5, 6, 7 (Terminations) and 46, 47 (Inceptions)
 - Overview of IPM 1991-98: CMI Working Paper 48
- Reporting experience for 1991 – 2006 using IPM 1991-98
 - CMI Working Papers 59 (reference paper) and 60 (experience report)
 - Improved reporting format using MS Office Excel spreadsheets
- Data Collection
 - 2007, 2008 and 2009 results issued to CMI member offices
 - Collecting data for 2010 – 2012
- Current research and developments
 - Experience by cause of sickness (WP and database)
 - Calculation tools for practitioners.





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Experience results database and methodology

Experience results database and methodology

Databases of IP experience by cause, 1991-2009

- Aiming to make the experience analysis more accessible for practitioners by releasing a database of low-level results
- Claim inceptions experience database
 - Presented as a table in an Excel spreadsheet
 - Data row for each combination of attributes,
 - Year (19), sex (2), occupation class (5), deferred period (5), age group (10)
 - Data items provide summary totals of experience for each row
 - Exposure, actual (A) (split into 15 cause groups), and expected (E) claims
- Claim terminations experience database
 - Attributes extended to include duration sick (14) and cause group (15)
 - Row totals for A and E are split by type: recovery or death.

[Figures in brackets are the number of categories for each attribute.]



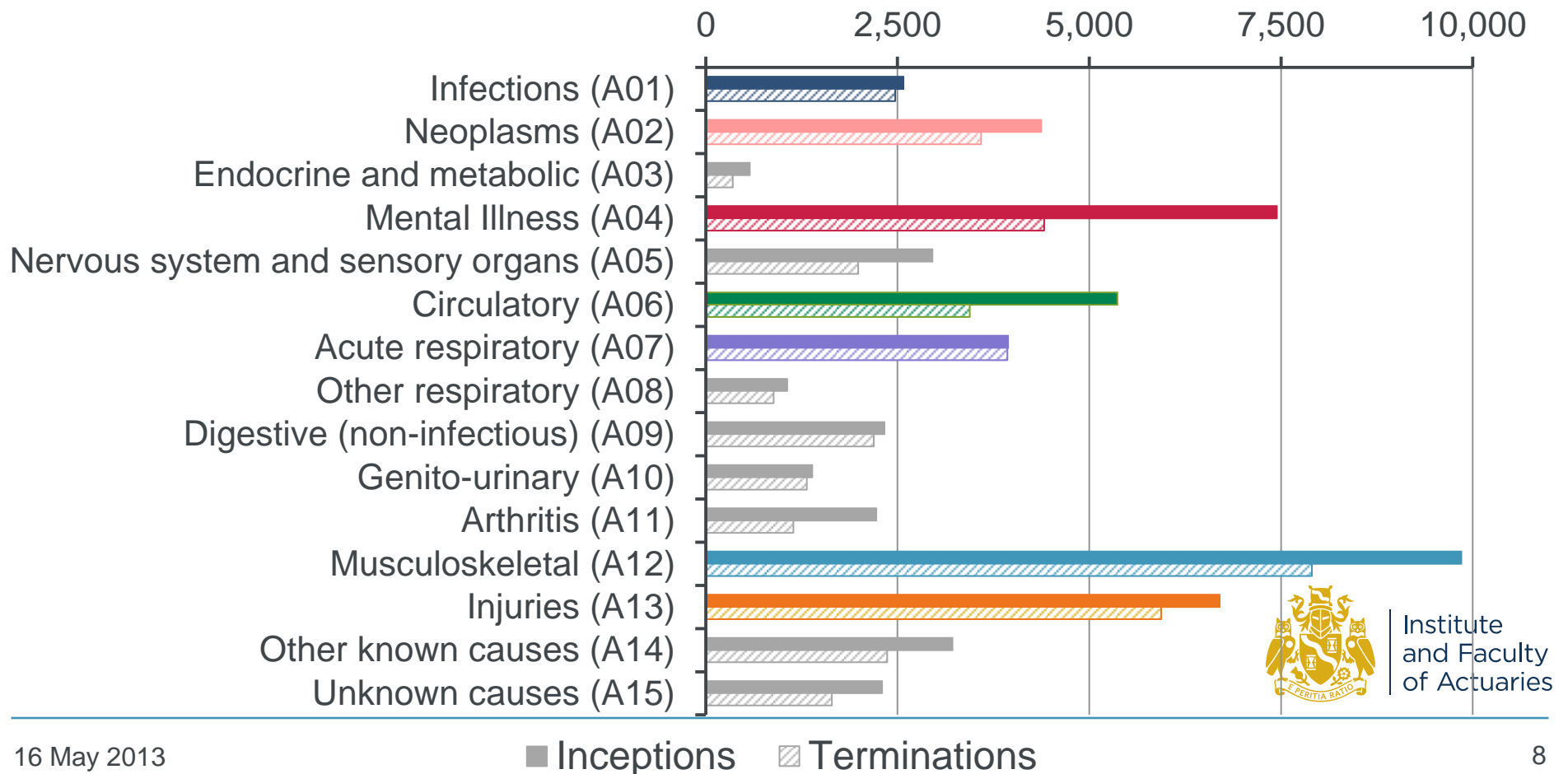
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Experience results database and methodology

Grouping of causes of sickness

Total numbers of claim events by cause-of-sickness category, 1991-2009

7 largest categories are represented throughout this presentation by colours shown



Experience results database and methodology

Features of IPM 1991-98

- IPM 1991-98 has been used as the comparison basis (for E)
- Underlying dataset:
 - CMI Individual IP, Standard* data, Males, CMI Occ Class 1, 1991-98
 - No adjustments made for females or other occupation classes so differences in A/E directly represent differences in observed claim rates
 - Aggregate causes / all-cause rates
- Claims Inceptions – rates vary with age and DP
 - Separate basis for each DP
- Claimant Recoveries – rates vary with duration sick, age and DP
 - Single ‘shape’ but different levels / multipliers for each DP
- Claimant Deaths – vary with duration sick, age, DP
 - Single ‘shape’ but different level / multiplier for DP1.



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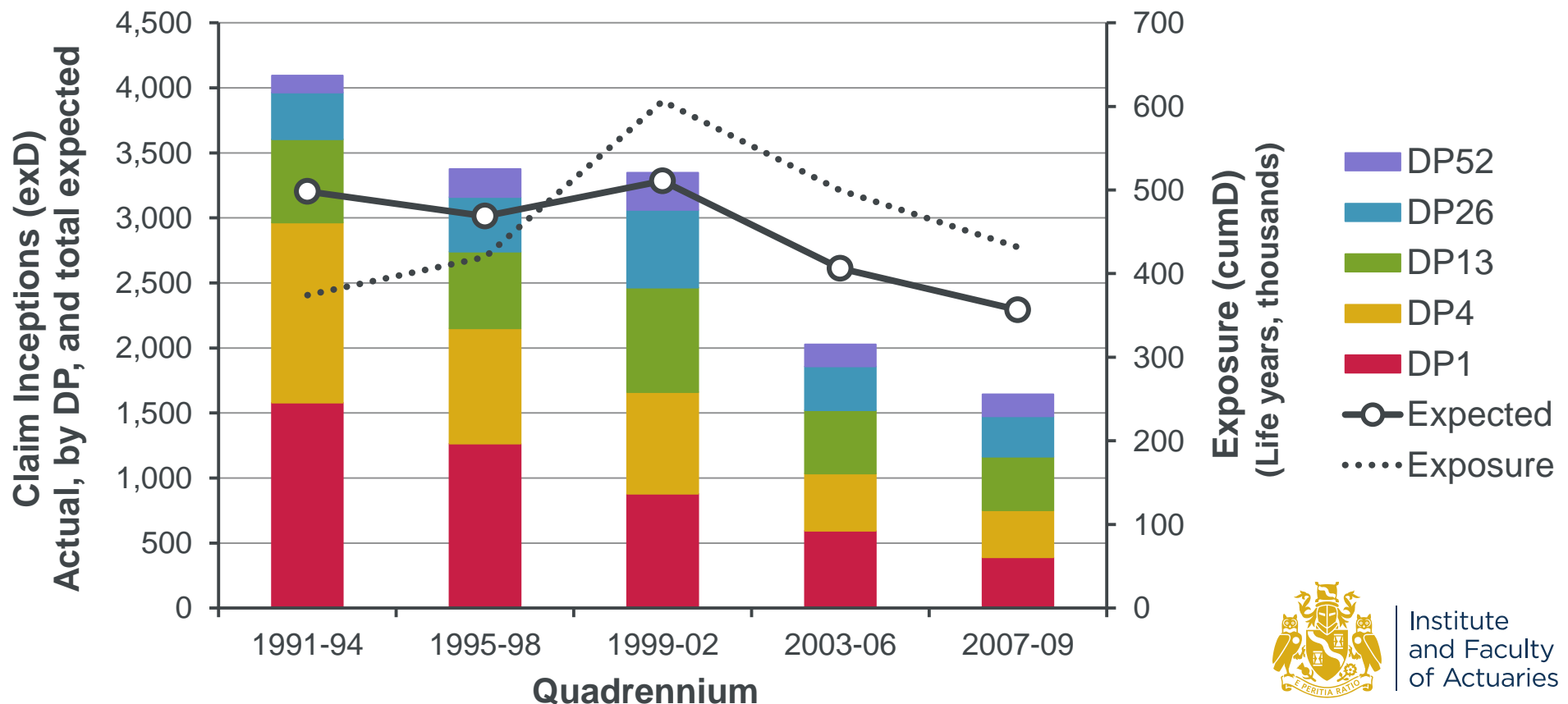
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Individual IP experience 1991-2009: Claim Inceptions

Claim inceptions experience, 1991 – 2009

Data volumes for claim inceptions analysis

Average annual Individual IP claim inception counts, by quadrennium
Actual (by DP) and expected (total) claim inceptions (exD); exposure (cumD)



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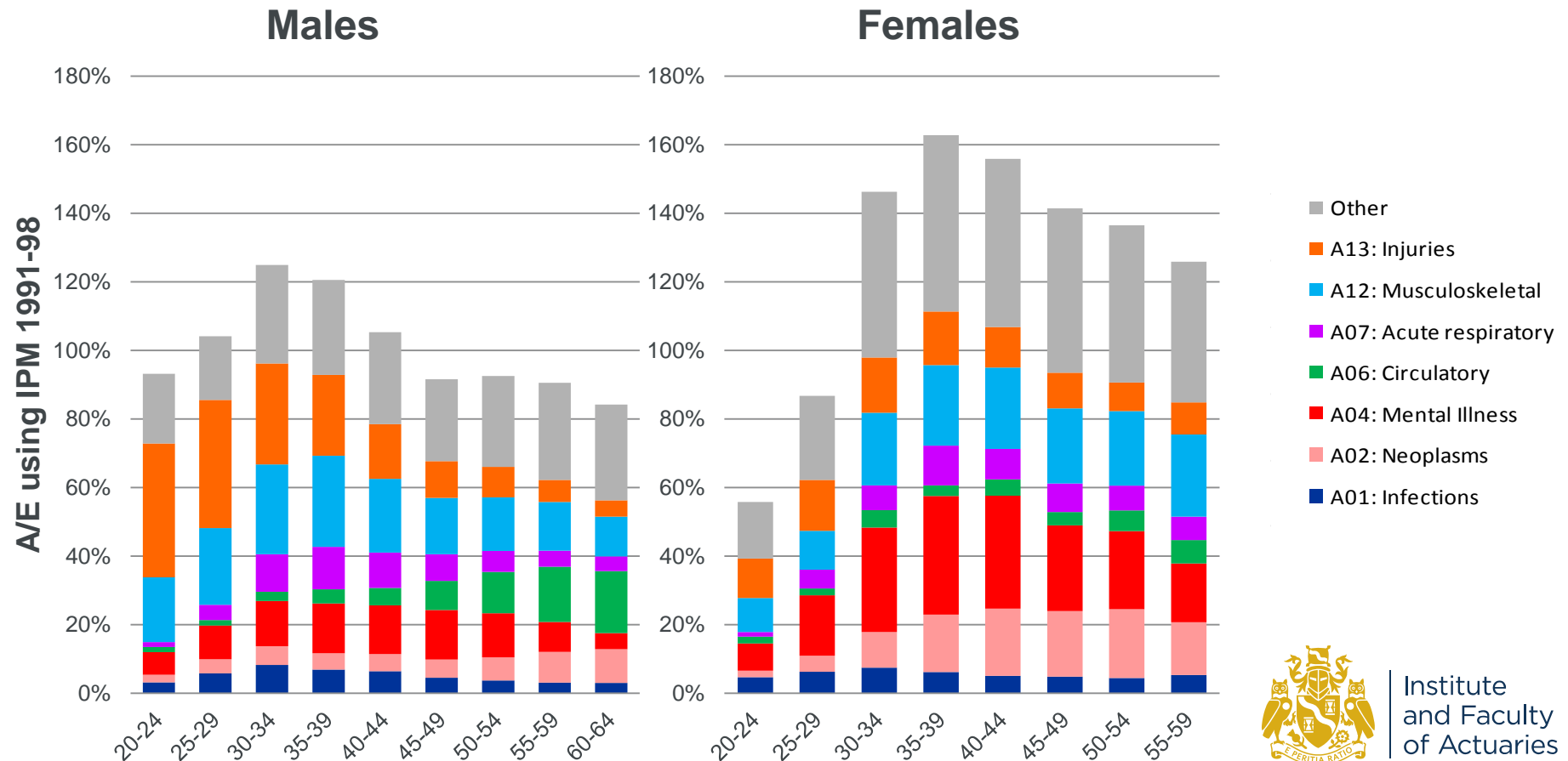
Claim inception experience, 1991 – 2009

Experience by sex, age and cause of sickness

Comparison of actual claim inceptions with those expected using IPM 1991-98

Individual IP *Standard** experience by sex, age band and cause group

All years (1991-2009), Occupation Classes and DPs combined

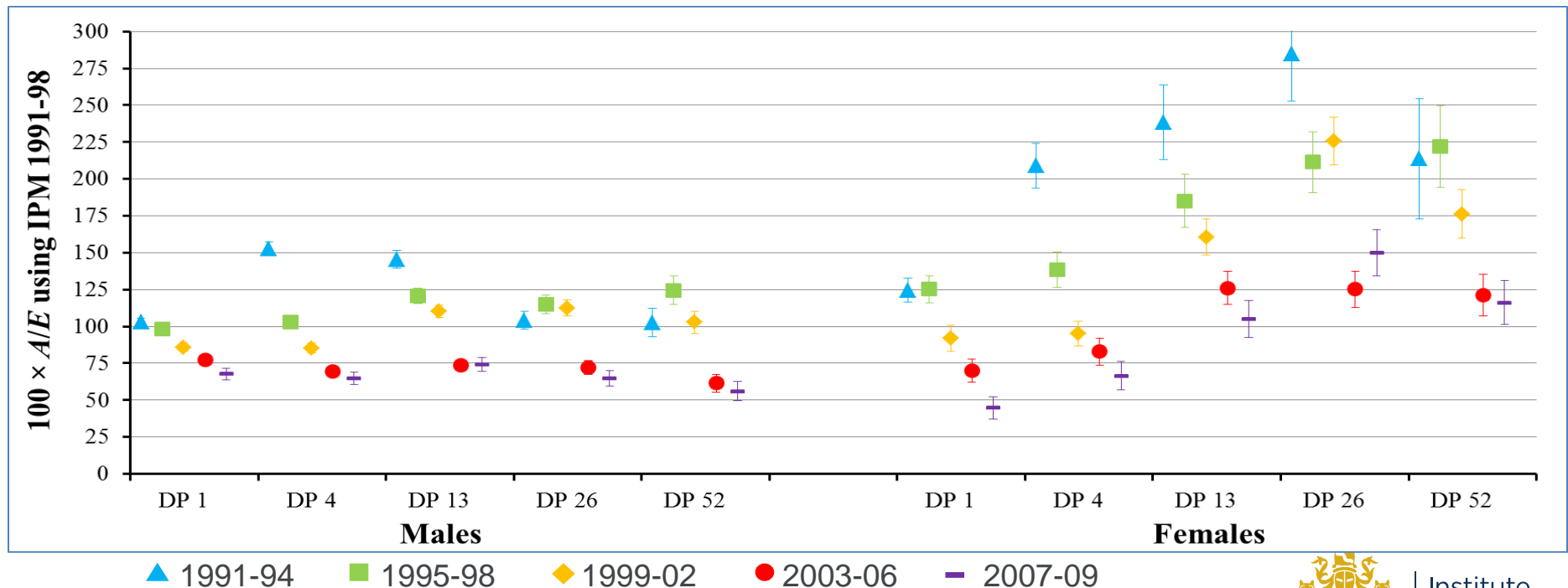


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Individual IP experience: Trends over 1991 – 2009

Claim Inceptions by sex and DP

Comparison of actual claim inceptions with those expected using IPM 1991-98
 Individual IP *Standard** experience by quadrennium, sex and DP
 1991-2009; all CMI Occupation Classes and ages combined



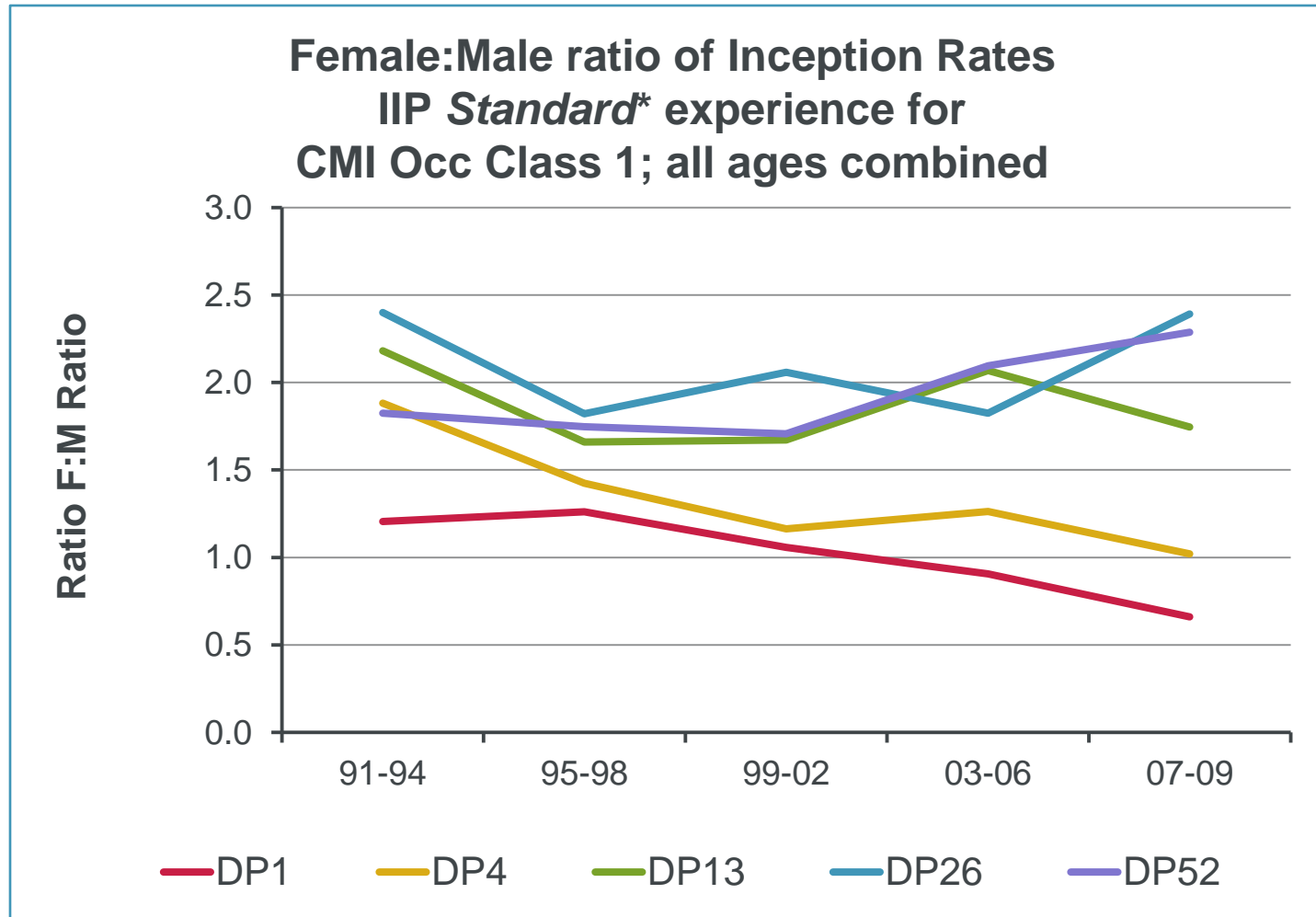
The error bars show approximate 95% confidence intervals, $100 \times A/E \pm 1.96\sigma$, where $\sigma = 100 \times \sqrt{A/E}$.
 Data points based on fewer than 10 actual claim inceptions are omitted from the above chart.



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Features of claim inception experience, 1991 – 2009

Ratios of claim inception rates by sex and Occ Class

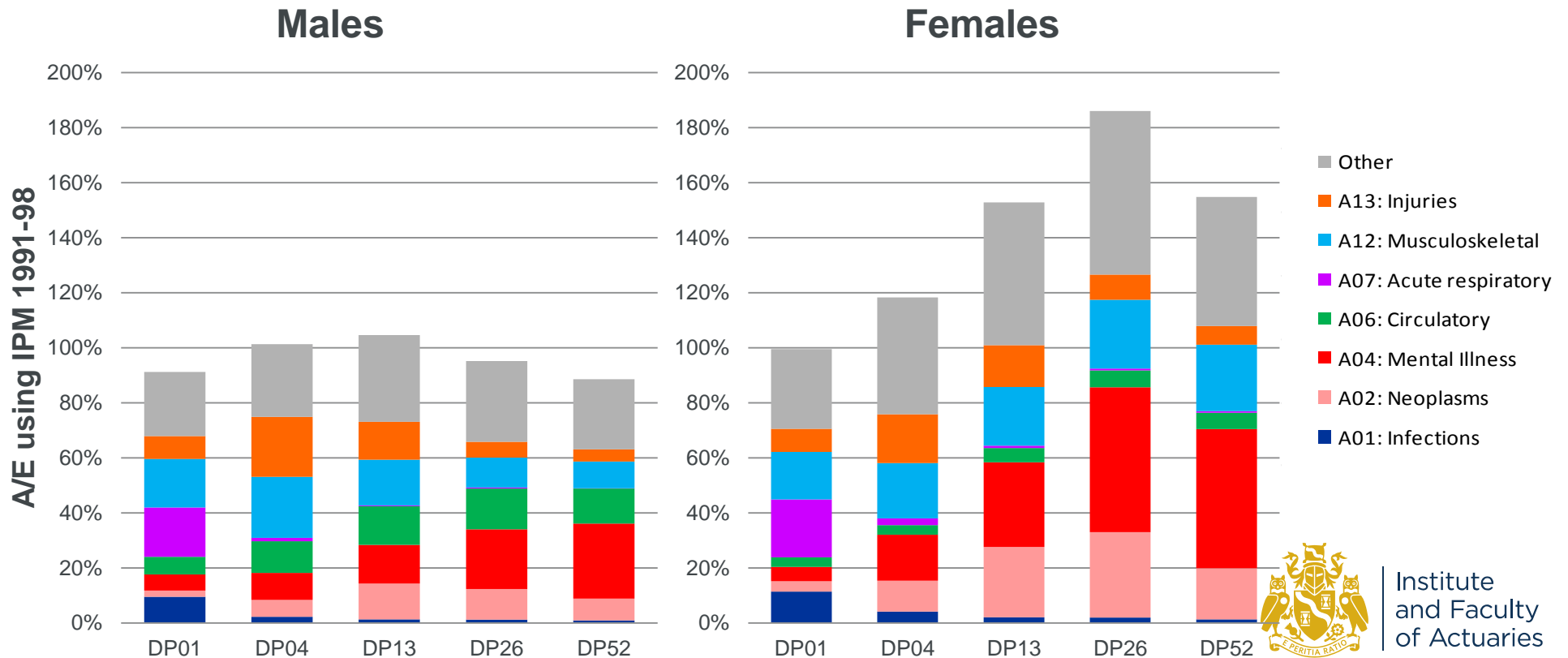


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Claim inception experience, 1991 – 2009

Experience by sex, DP and cause of sickness

Comparison of actual claim inceptions with those expected using IPM 1991-98
 Individual IP *Standard** experience by sex, DP and cause group
 All years (1991-2009), ages and Occupation Classes combined

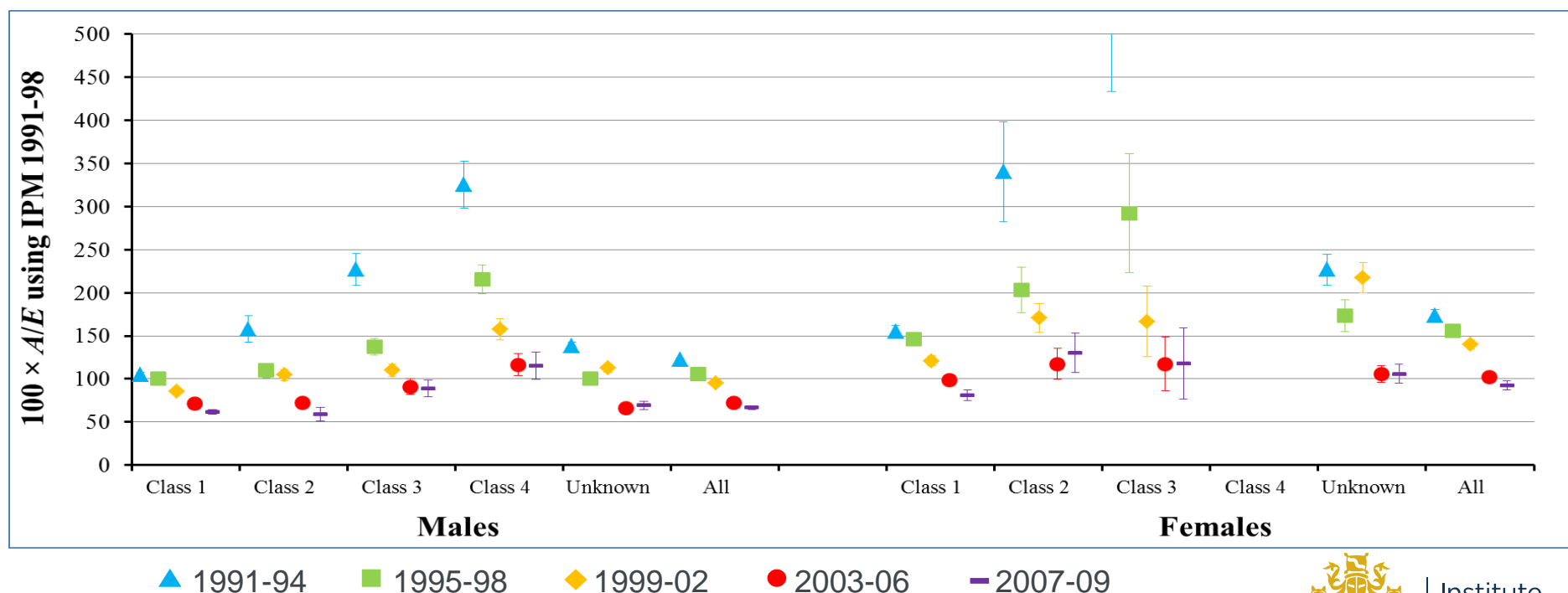


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Individual IP experience: Trends over 1991 – 2009

Claim Inceptions by sex and Occupation Class

Comparison of actual claim inceptions with those expected using IPM 1991-98
 Individual IP *Standard** experience by quadrennium, sex and CMI Occupation Class
 1991-2009; all DPs and ages combined



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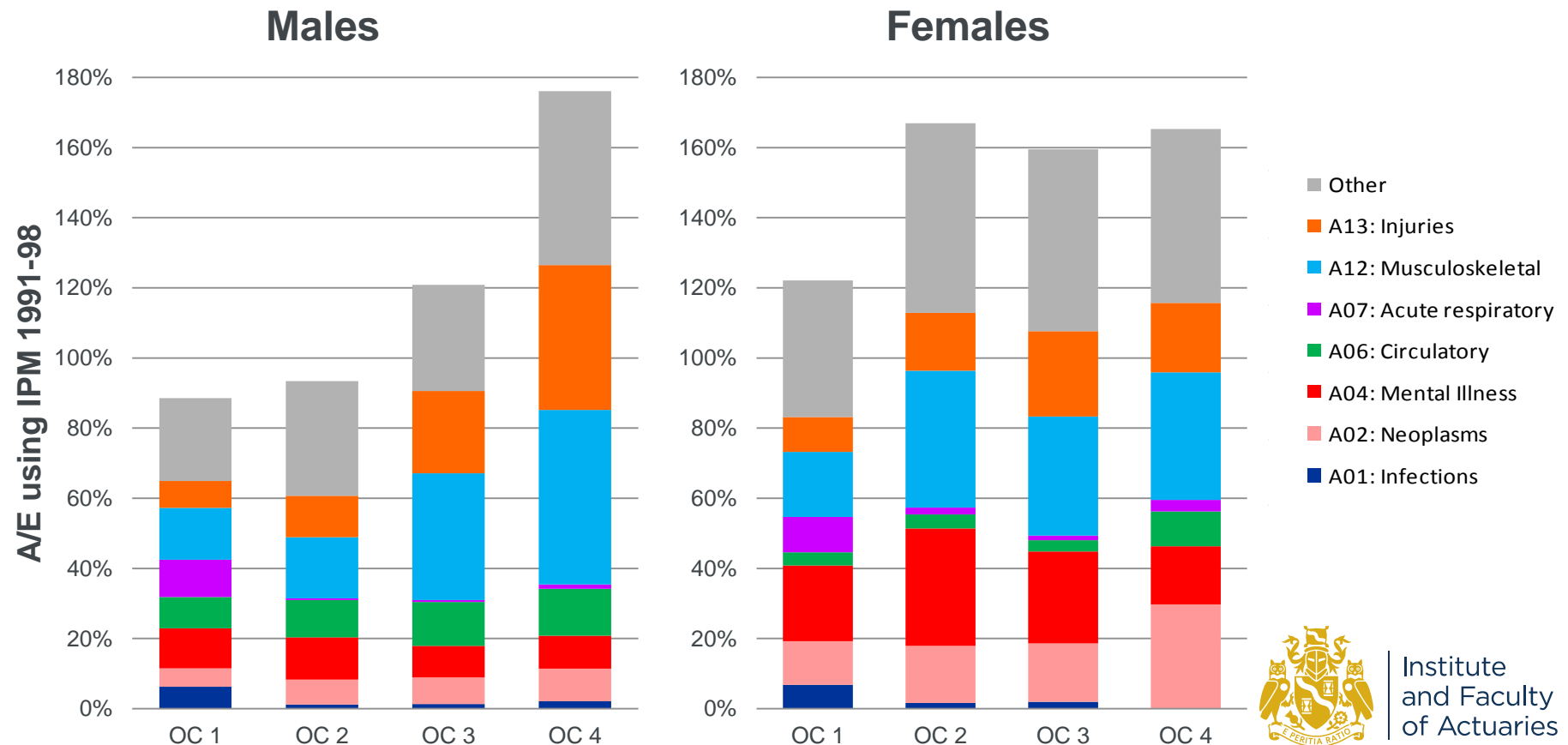


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Claim inceptions experience, 1991 – 2009

Experience by sex, Occ Class and cause of sickness

Comparison of actual claim inceptions with those expected using IPM 1991-98
 Individual IP *Standard** experience by sex, Occupation Class and cause group
 All years (1991-2009), ages and DPs combined; Occ Class unknown excluded

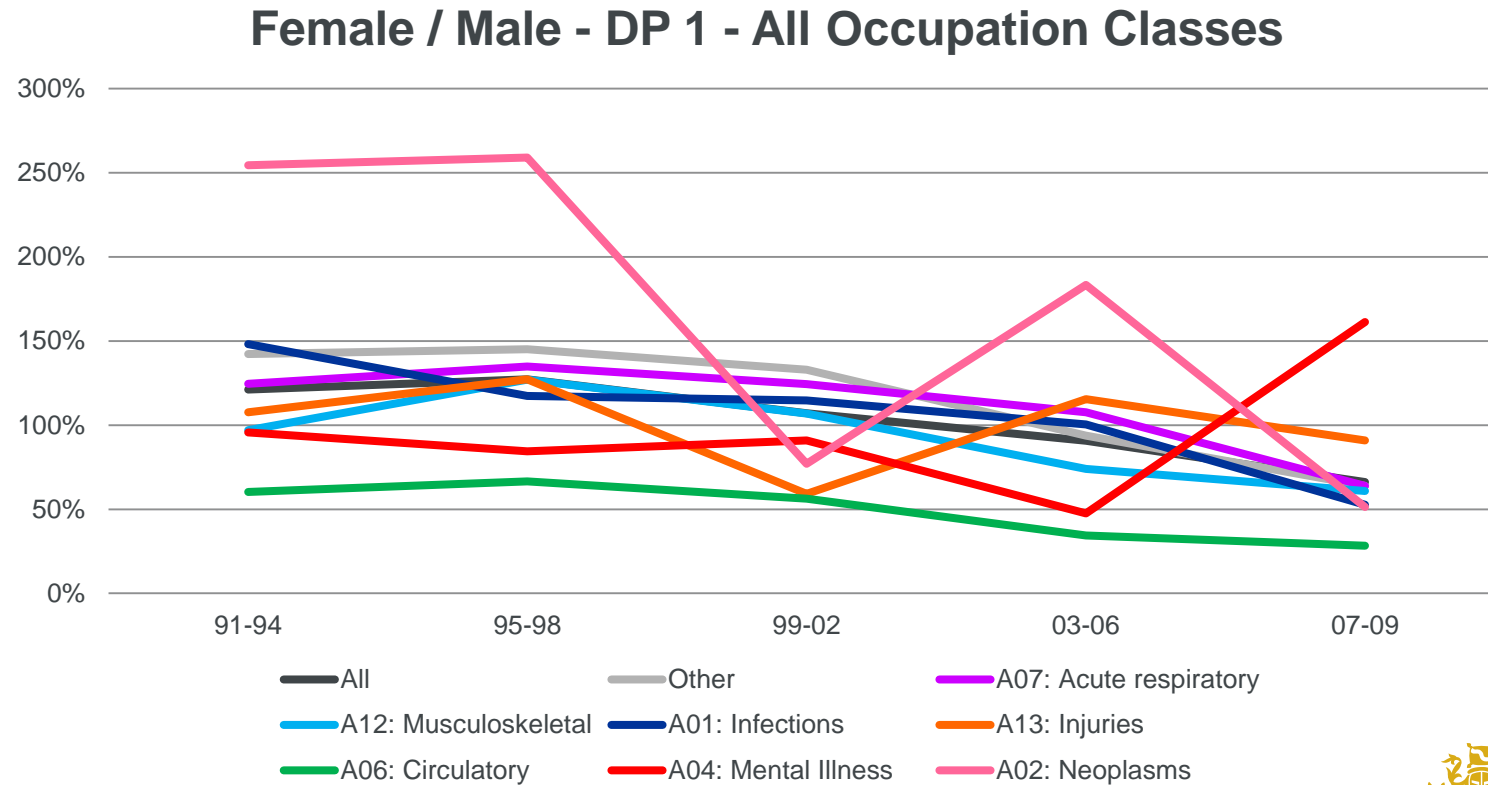


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Features of claim inceptions experience, 1991-2009

Narrowing of the gender differential

Female:Male ratio of Inception Rates for IIP *Standard** experience for DP 1
1991-2009 by quadrennium and cause; all ages and Occupation Classes combined



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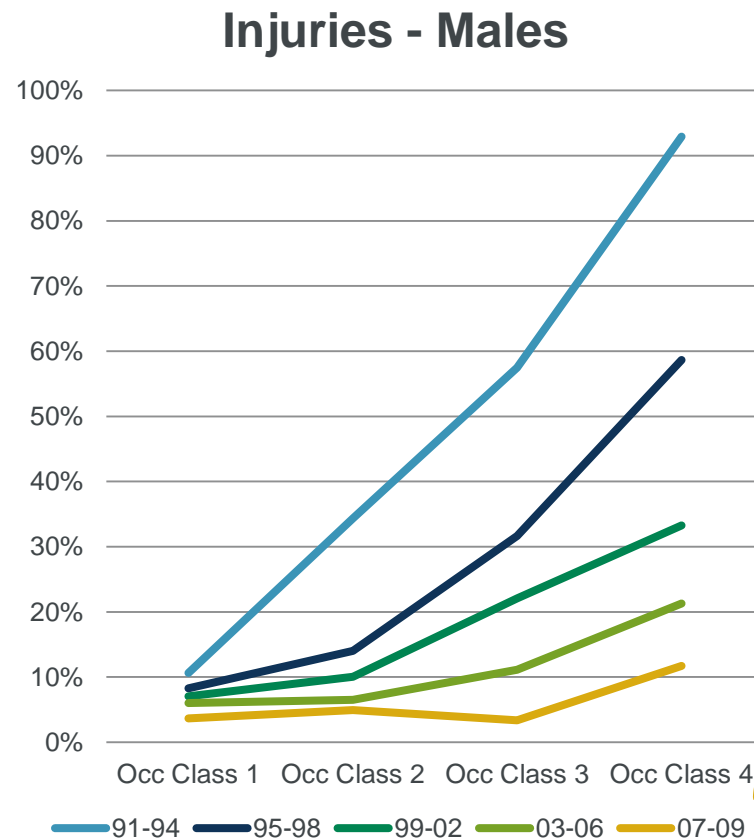
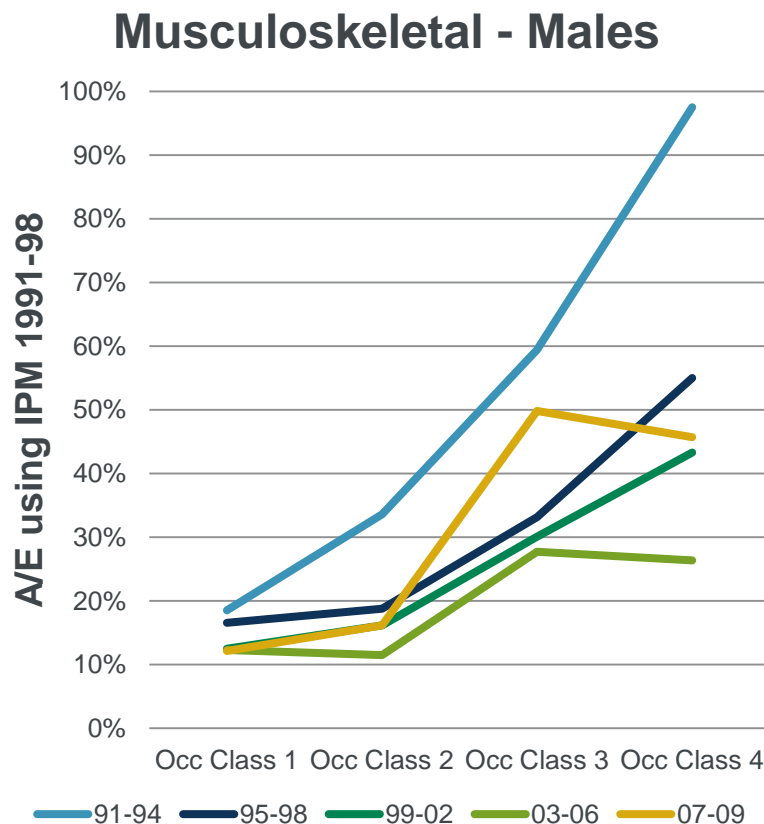
Features of claim inceptions experience, 1991-2009

Reduced differentials between Occupation Classes

Comparison of actual claim inceptions with those expected using IPM 1991-98

Individual IP *Standard** experience by Occupation Class for males

Selected cause groups only; 1991-2009 by quadrennium; all ages and DPs combined



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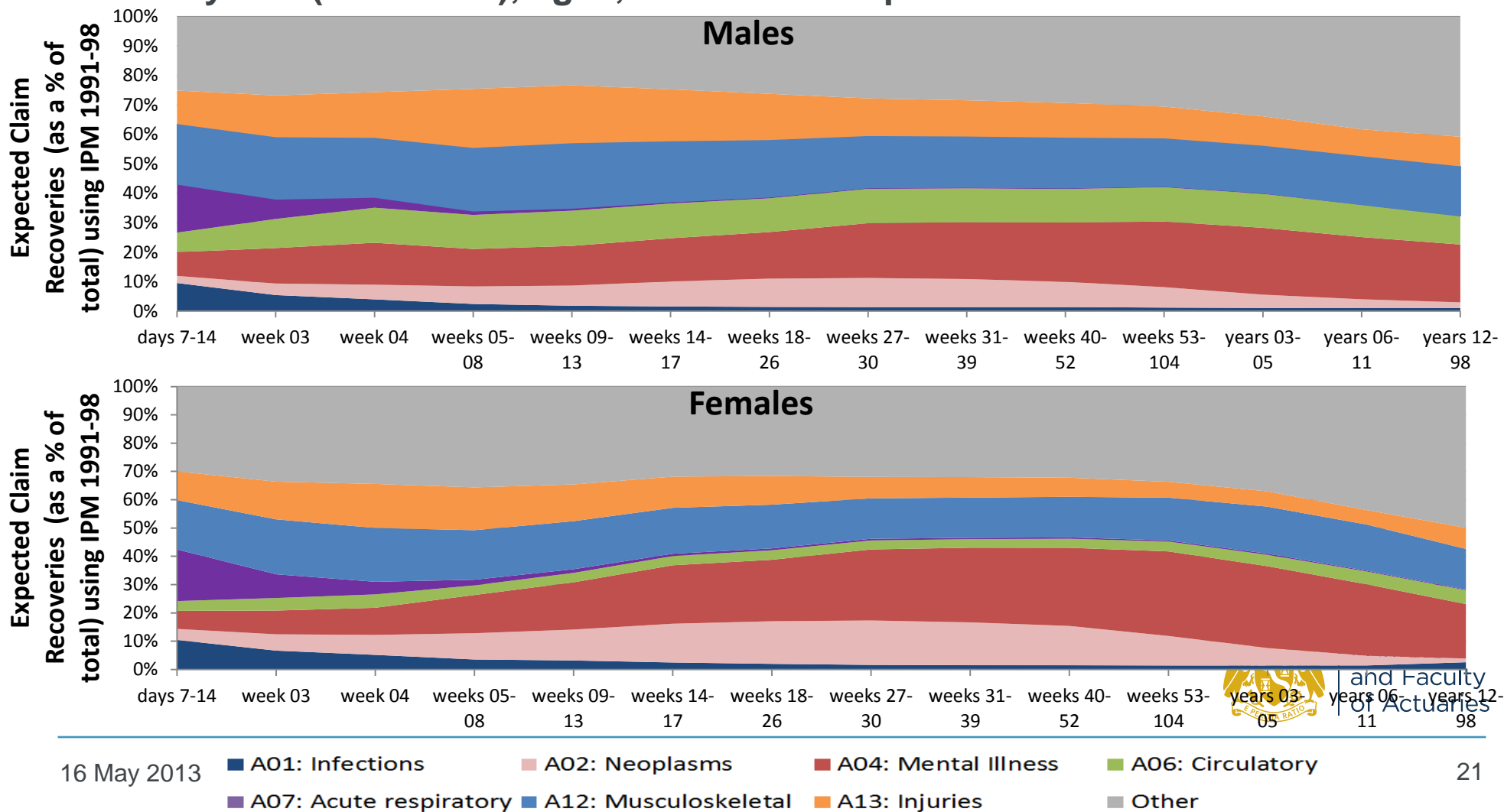
Individual IP experience 1991-2009: Claim Terminations

Claimant recoveries experience, 1991 – 2009

Expected recoveries by cause and duration sick

Percentage of expected claimant recoveries using actual claims in payment and all-cause recovery rates from IPM 1991-98, by duration sick, cause of sickness and sex

All years (1991-2009), ages, DPs and Occupation Classes combined



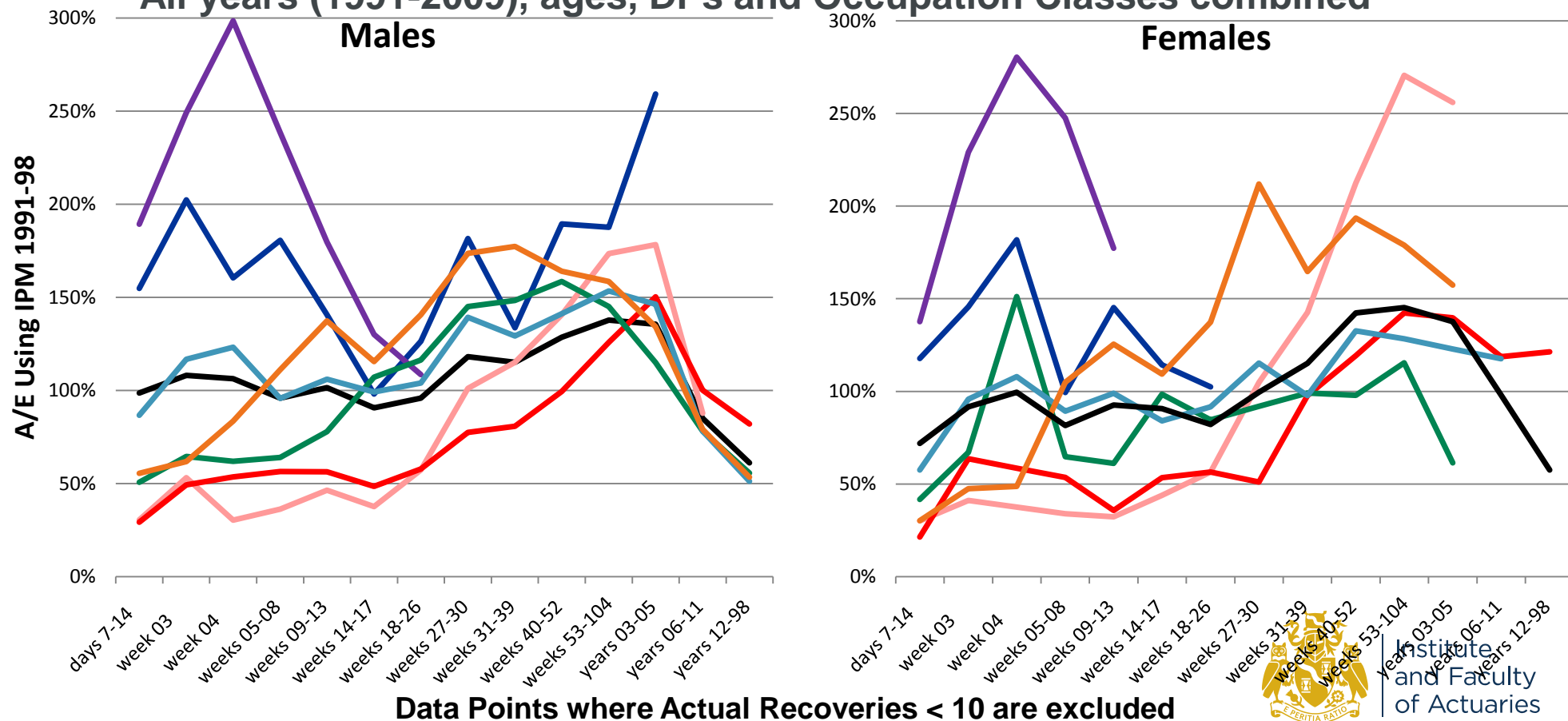
Claimant recoveries experience, 1991 – 2009

Experience by sex, duration and cause of sickness

Comparison of actual claimant recoveries with those expected using IPM 1991-98

Individual IP *Standard** experience by sex, duration sick and cause group

All years (1991-2009), ages, DPs and Occupation Classes combined

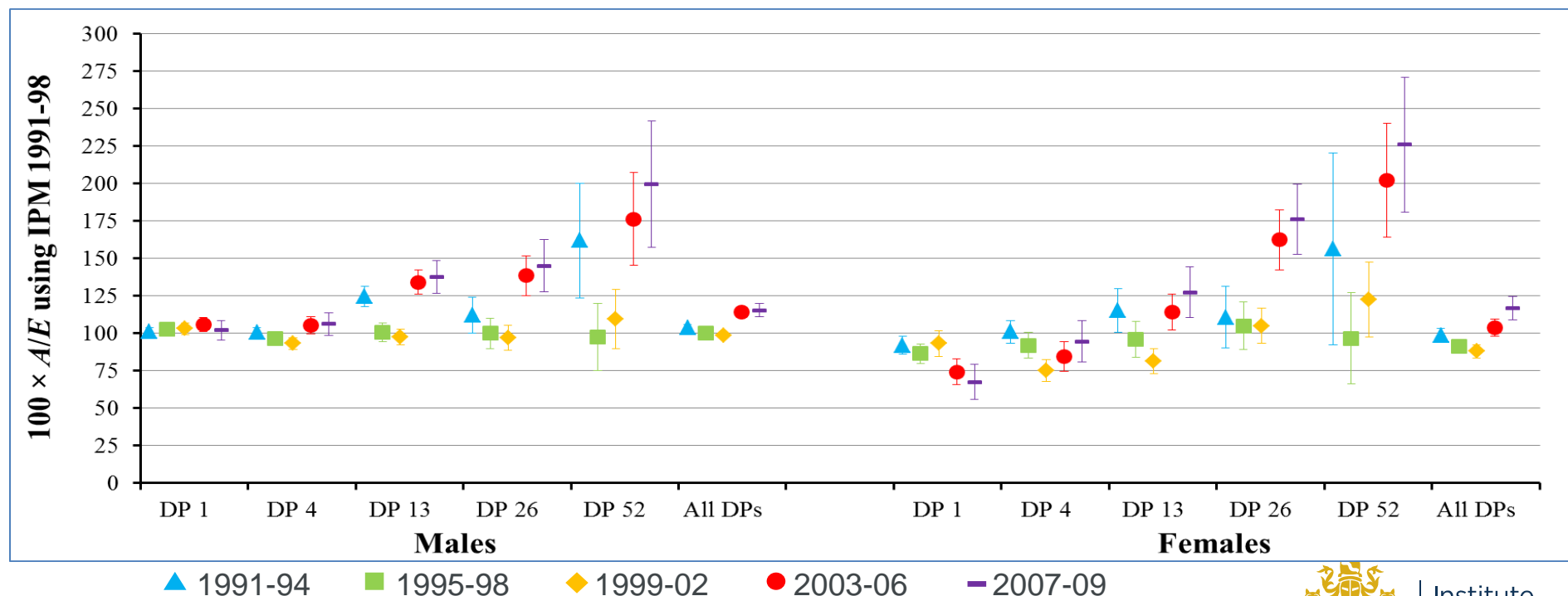


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Claimant recoveries experience, 1991 – 2009

Trends over 1991 – 2009 by sex and DP

Comparison of claimant recoveries with those expected using IPM 1991-98
 Individual IP *Standard** experience by quadrennium, sex and DP
 1991-2009; all CMI Occupation Classes, ages and durations sick combined



The error bars show approximate 95% confidence intervals, $100 \times A/E \pm 1.96\sigma$, where $\sigma = 100 \times \sqrt{A/E}$.
 Data points based on fewer than 10 actual claimant recoveries are omitted from the above chart.

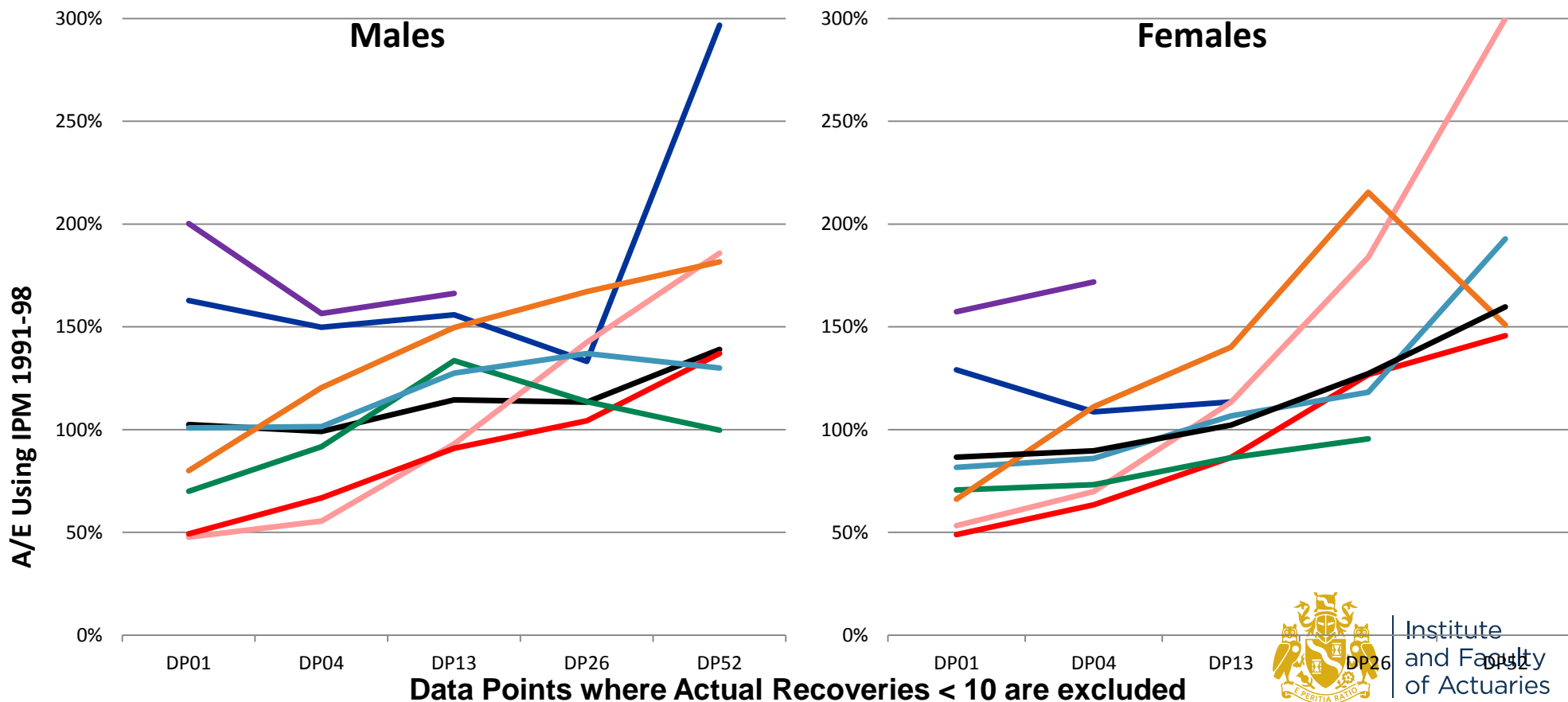


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Claimant recoveries experience, 1991 – 2009

Experience by sex, DP and cause of sickness

Comparison of actual claimant recoveries with those expected using IPM 1991-98
 Individual IP *Standard** experience by sex, DP and cause group
 All years (1991-2009), ages, Occupation Classes and durations sick combined

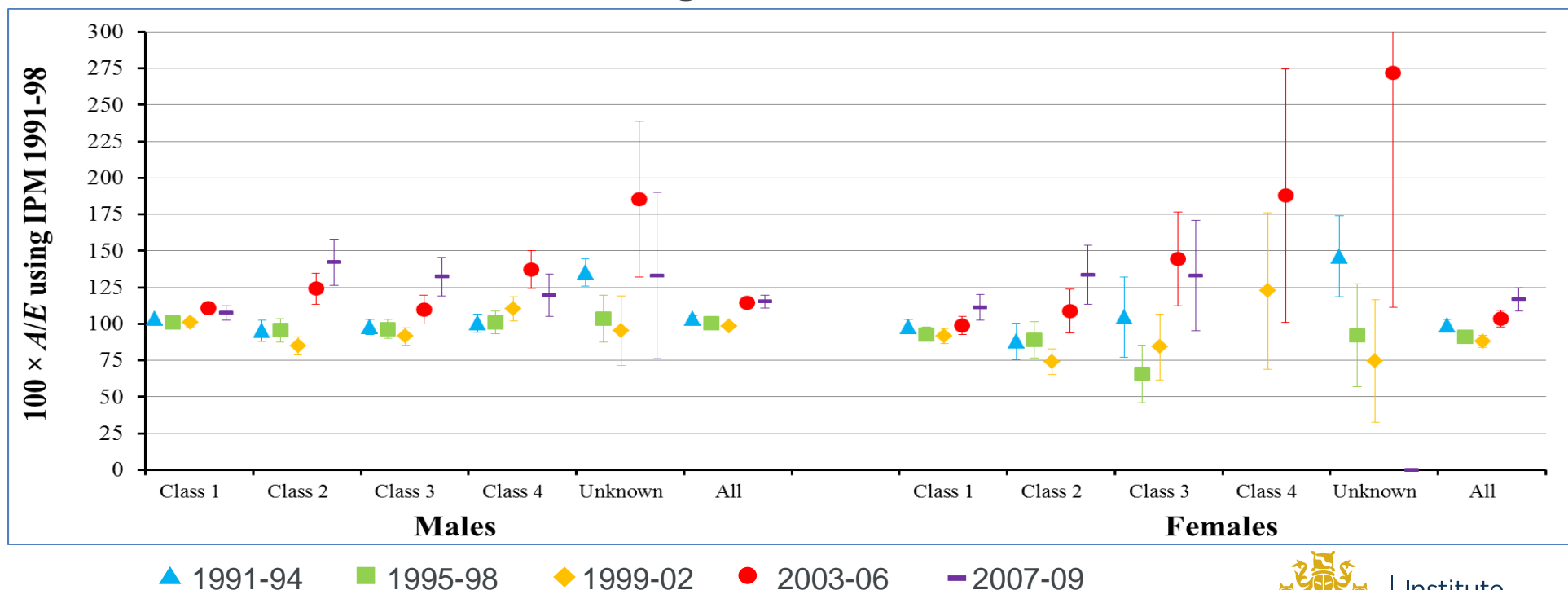


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Claimant recoveries experience, 1991 – 2009

Trends over 1991 – 2009 by sex and Occupation Class

Comparison of claimant recoveries with those expected using IPM 1991-98
 Individual IP *Standard** experience by quadrennium, sex and CMI Occupation Class
 1991-2009; all DPs, ages and durations sick combined



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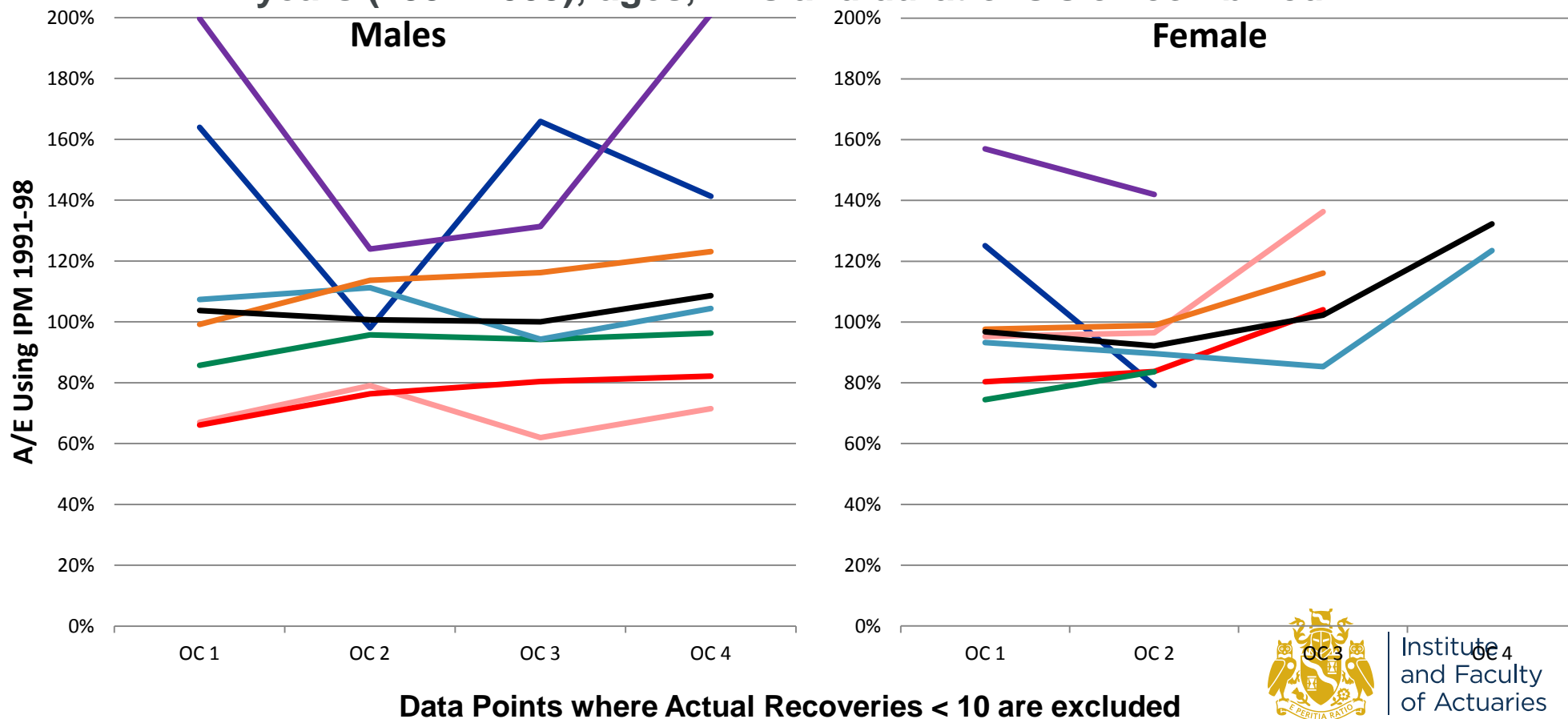
Claimant recoveries experience, 1991 – 2009

Experience by sex, Occ Class and cause of sickness

Comparison of actual claimant recoveries with those expected using IPM 1991-98

Individual IP *Standard** experience by sex, Occ Class and cause group

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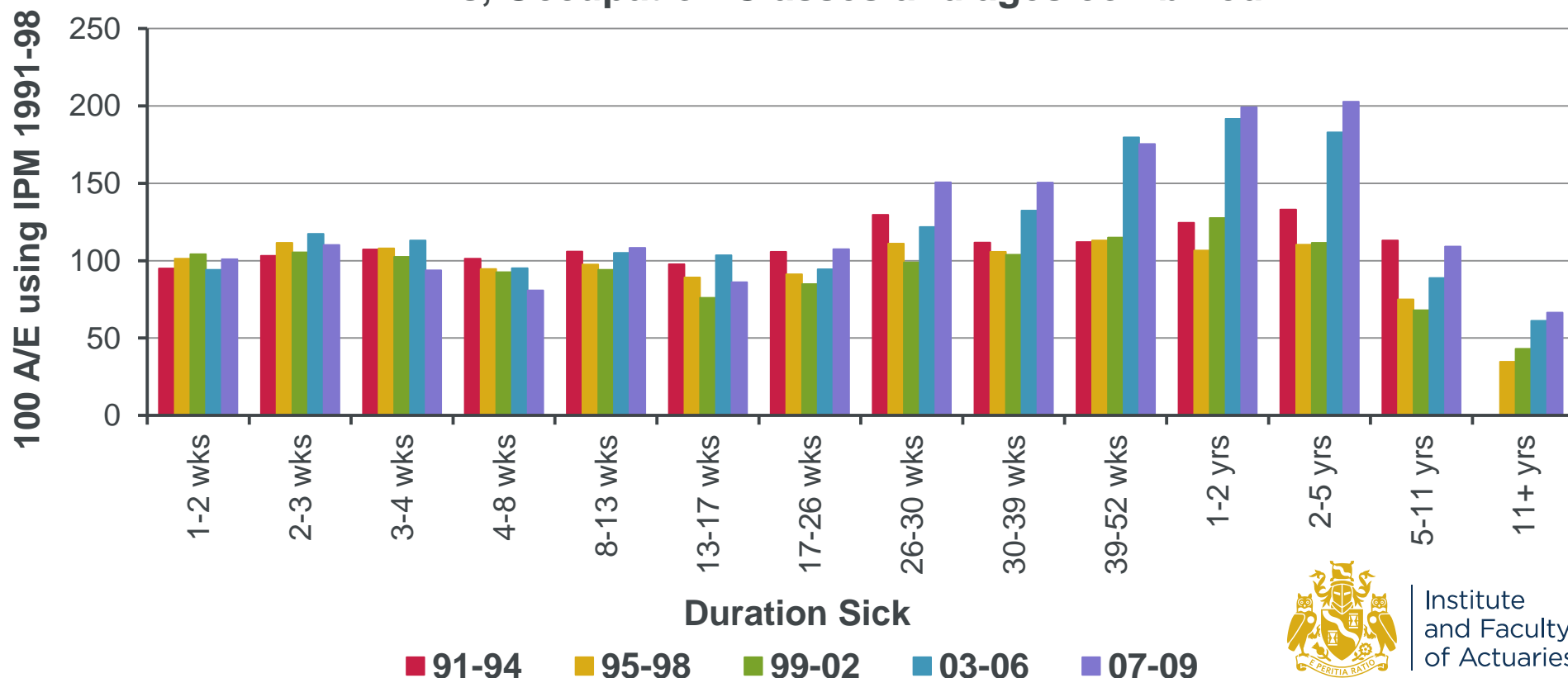


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Claimant recoveries experience, 1991 – 2009

Experience for males, by duration sick

Comparison of claimant recoveries with those expected using IPM 1991-98 Individual IP *Standard** experience for 1991-2009 for males by duration sick and quadrennium
All DPs, Occupation Classes and ages combined

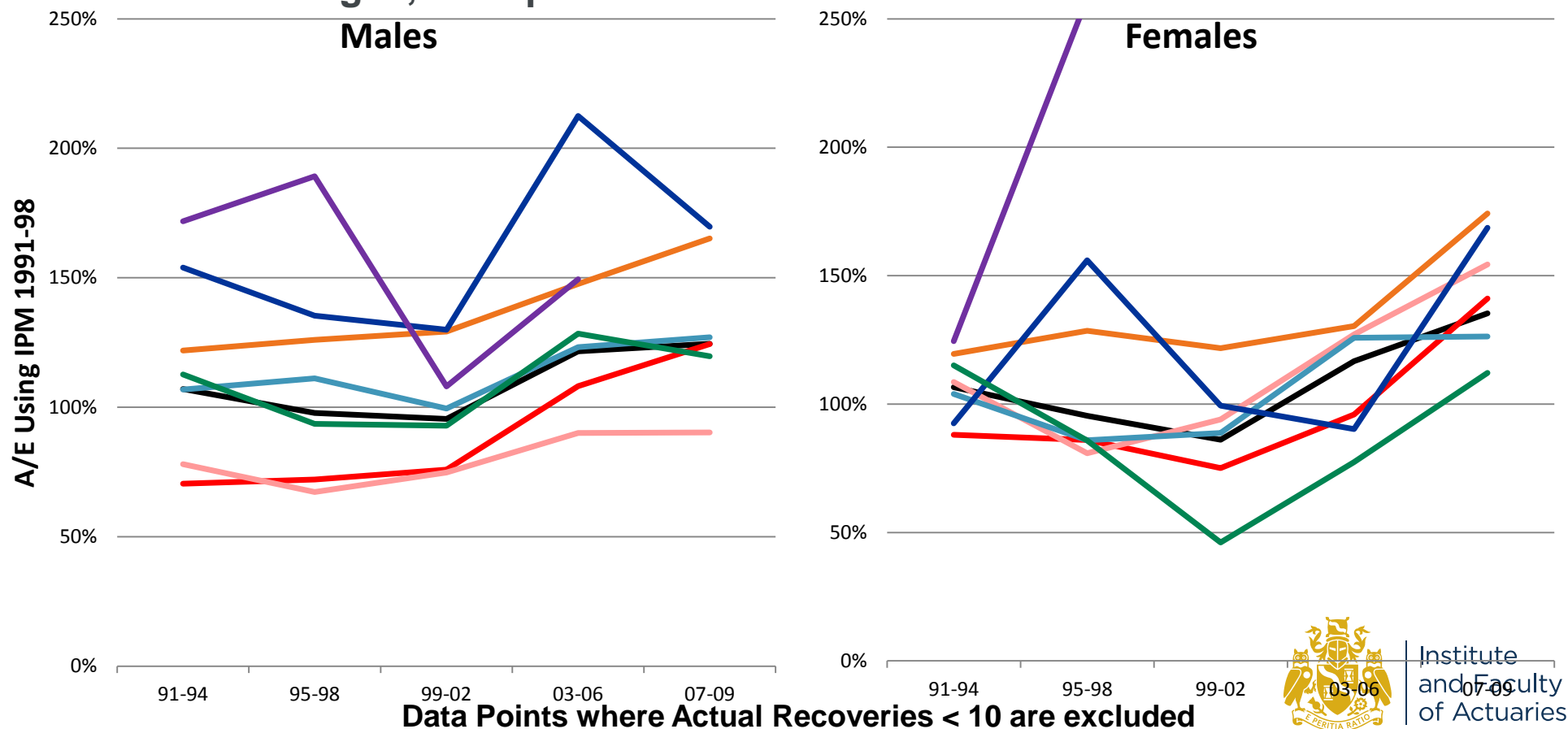


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Claimant recoveries experience, 1991 – 2009

Experience for DPs 4 – 52 by sex, quad and cause

Comparison of actual claimant recoveries with those expected using IPM 1991-98
 Individual IP *Standard** experience for DPs 4 – 52 by sex, quadrennium and cause group
 All ages, Occupation Classes and durations sick combined

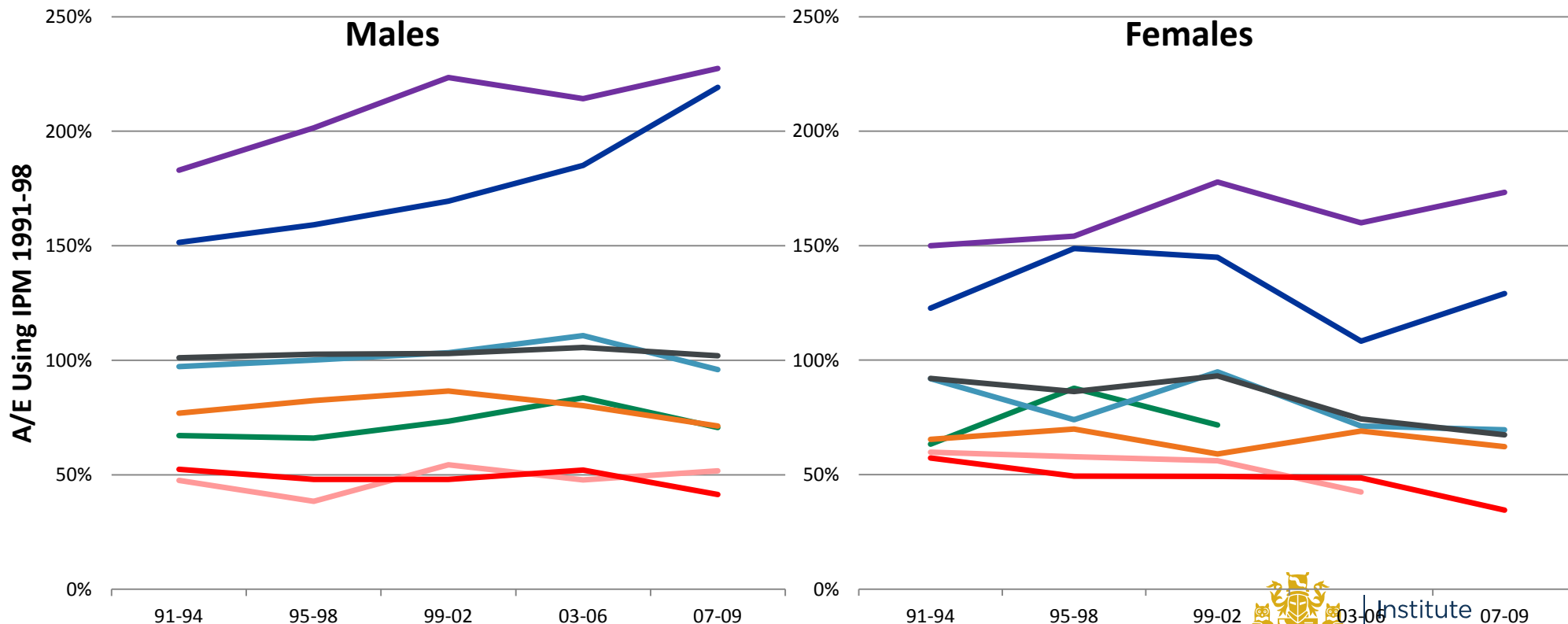


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Claimant recoveries experience, 1991 – 2009

Experience for DP 1 by sex, quad and cause

Comparison of actual claimant recoveries with those expected using IPM 1991-98
 Individual IP *Standard** experience for DP 1 by sex, quadrennium and cause group
 All ages, Occupation Classes and durations sick combined



Data Points where Actual Recoveries < 10 are excluded

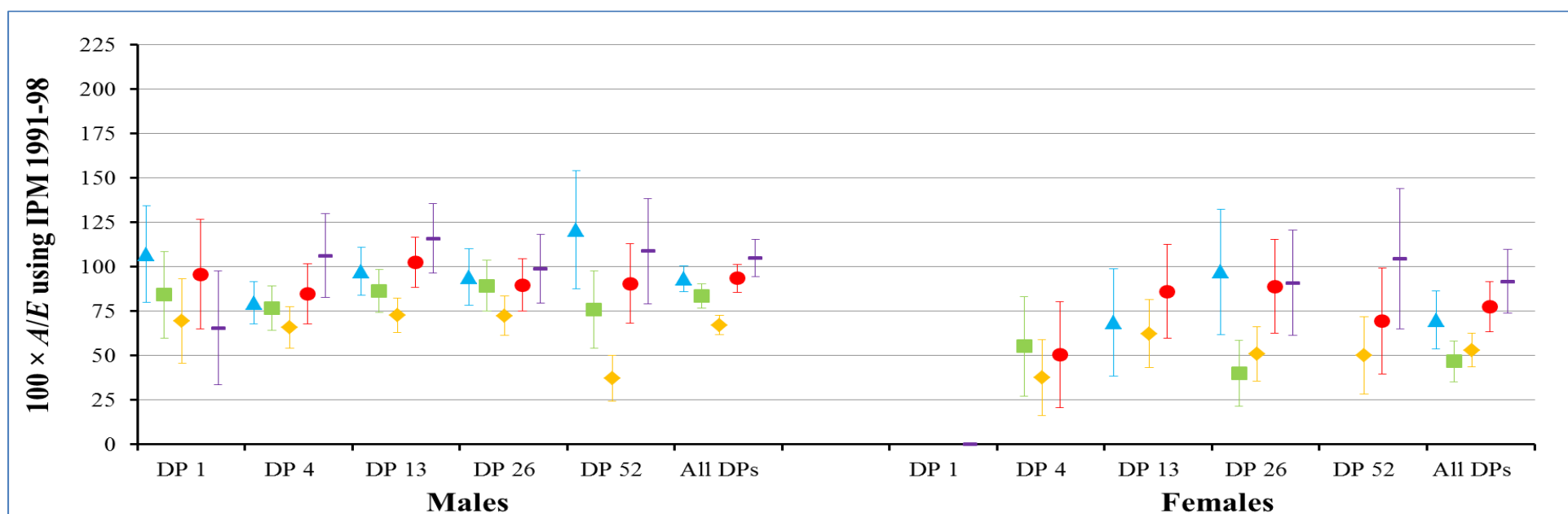


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Claimant deaths experience, 1991 – 2009

Trends over 1991 – 2009 by sex and DP

Comparison of actual claimant deaths with those expected using IPM 1991-98
 Individual IP *Standard** experience by quadrennium, sex and DP
 1991-2009; all CMI Occupation Classes, ages and durations sick combined



▲ 1991-94 ■ 1995-98 ◆ 1999-02 ● 2003-06 — 2007-09

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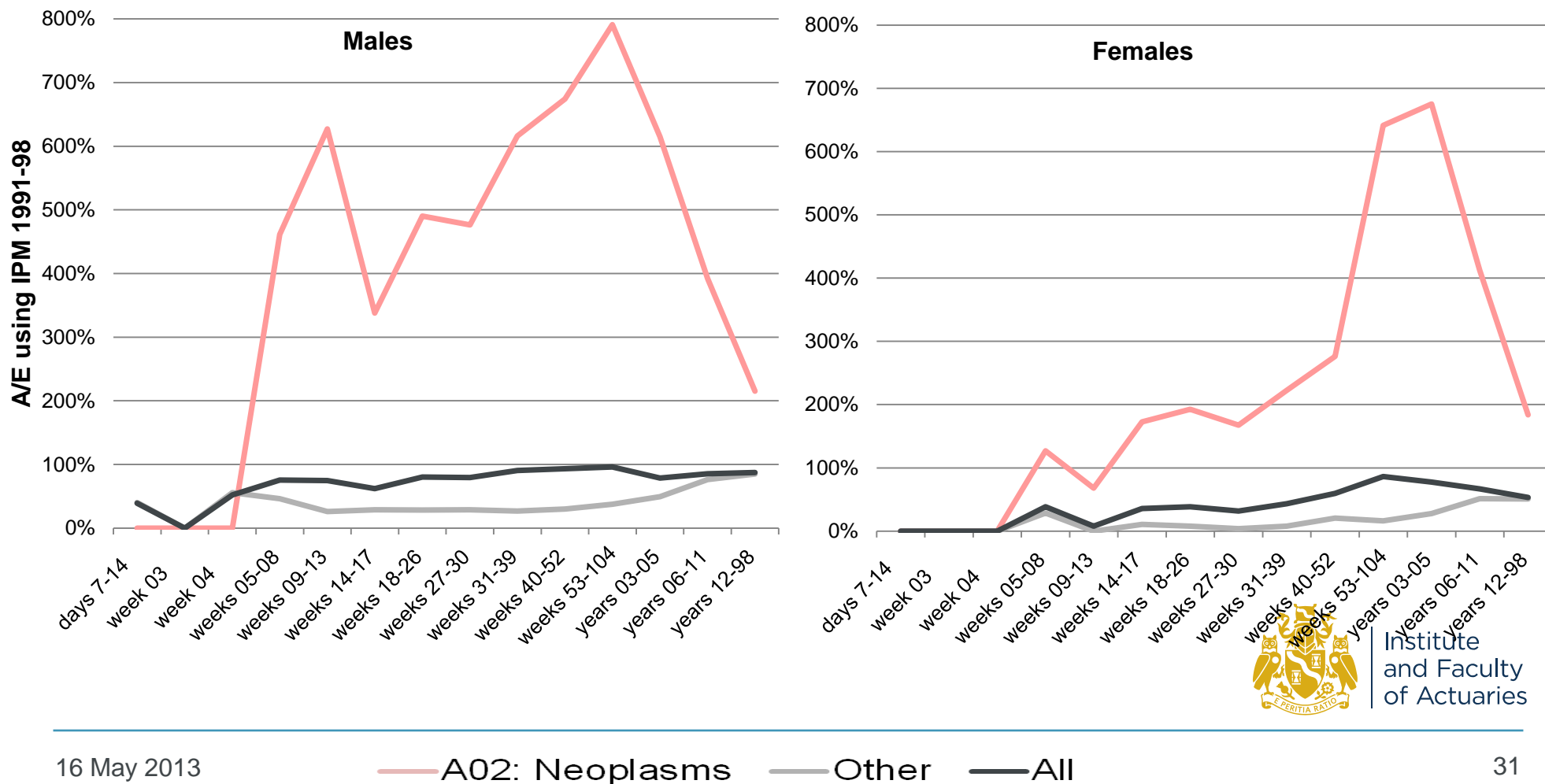


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Claimant deaths experience, 1991 – 2009

Experience by sex, duration and cause of sickness

Comparison of actual claimant deaths with those expected using IPM 1991-98
 Individual IP *Standard** experience by sex, duration sick and cause group
 All years (1991-2009), ages, DPs and Occupation Classes combined





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Insights into claim values by cause of sickness

Insights into claim values by cause of sickness

Rationale and methodology

- Examining the distribution of claims and experience by cause of sickness only gives parts of the picture
- It is helpful also to consider:
 - Claim annuity values by cause of sickness
 - The contribution of each cause group to total claim costs
- Graduations of claim terminations experience by cause of sickness were published by SY Ling et al
 - Modelling IP Claim Termination Rates by Cause of Sickness – Ling, Waters, Wilkie – AAS 4 (II) 2009
- The following sample table combines:
 - CMI IIP claim inceptions expce by cause, 1991-2009, Occ Class 1
 - Sample annuity values by cause presented in SY Ling et al
 - Modelled on CMI IIP data for 1975-2002, Occ Class 1 (or equiv)
 - Time trend modelled; values calculated using rates as at 2002



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Insights into claim values by cause of sickness

Sample components of claim values by cause group

Cause of Sickness	Male, Age 40, DP 1		Female, Age 40, DP26	
	% by incidence	% by value	% by incidence	% by value
A01: Infections	12.6%	2.8%	1.4%	1.8%
A02: Neoplasms	1.1%	2.1%	19.5%	9.3%
A04: Mental Illness	6.8%	30.8%	38.9%	42.3%
A06: Circulatory	3.7%	8.8%	2.7%	3.4%
A07: Acute Respiratory	24.3%	0.9%	0.5%	0.3%
A12: Musculo-skeletal	19.7%	20.7%	13.6%	15.2%
A13: Injuries	10.6%	6.5%	4.8%	3.7%
All other causes	21.3%	27.4%	18.7%	24.0%
Total	100%	100%	100%	100%



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**Future plans
and request for feedback**

CMI IP Committee

IP experience by cause of sickness, 1991-2009

- Complete and release current research
- CMI Working Paper
 - Summary of data and methodology
 - High-level analysis of experience by cause of sickness
 - Overview of previous work on experience by cause of sickness
 - Sample breakdown of typical claim annuity values by cause of sickness
- Databases of IP experience by cause of sickness, 1991-2009
 - Low-level results in database format
 - Separate tables for Inceptions and Terminations, in Excel spreadsheets
 - Enable practitioners to pursue analysis in areas of interest to them
 - Enable multi-dimensional analysis / modelling of experience



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Future plans and request for feedback

- Complete and release current research and developments
 - Experience by cause of sickness (Working Paper and database)
 - Rate calculation tools for practitioners
- Data collection for 2010 to 2012
 - Hope to complete All Office results for 2010 and 2011 this year ...
 - ...and to analyse experience of the 2007-10 quadrennium next year
- Improving data quality and volumes
- Considering further graduations work in 2014+
 - Incorporate variation by sex and Occupation Class?
 - 2003 – 2010 dataset?



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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.

Thank you for your attention

CMI Income Protection Committee

<http://www.actuaries.org.uk/research-and-resources/pages/income-protection-investigation>



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E04: CMI Income Protection Investigation Outline

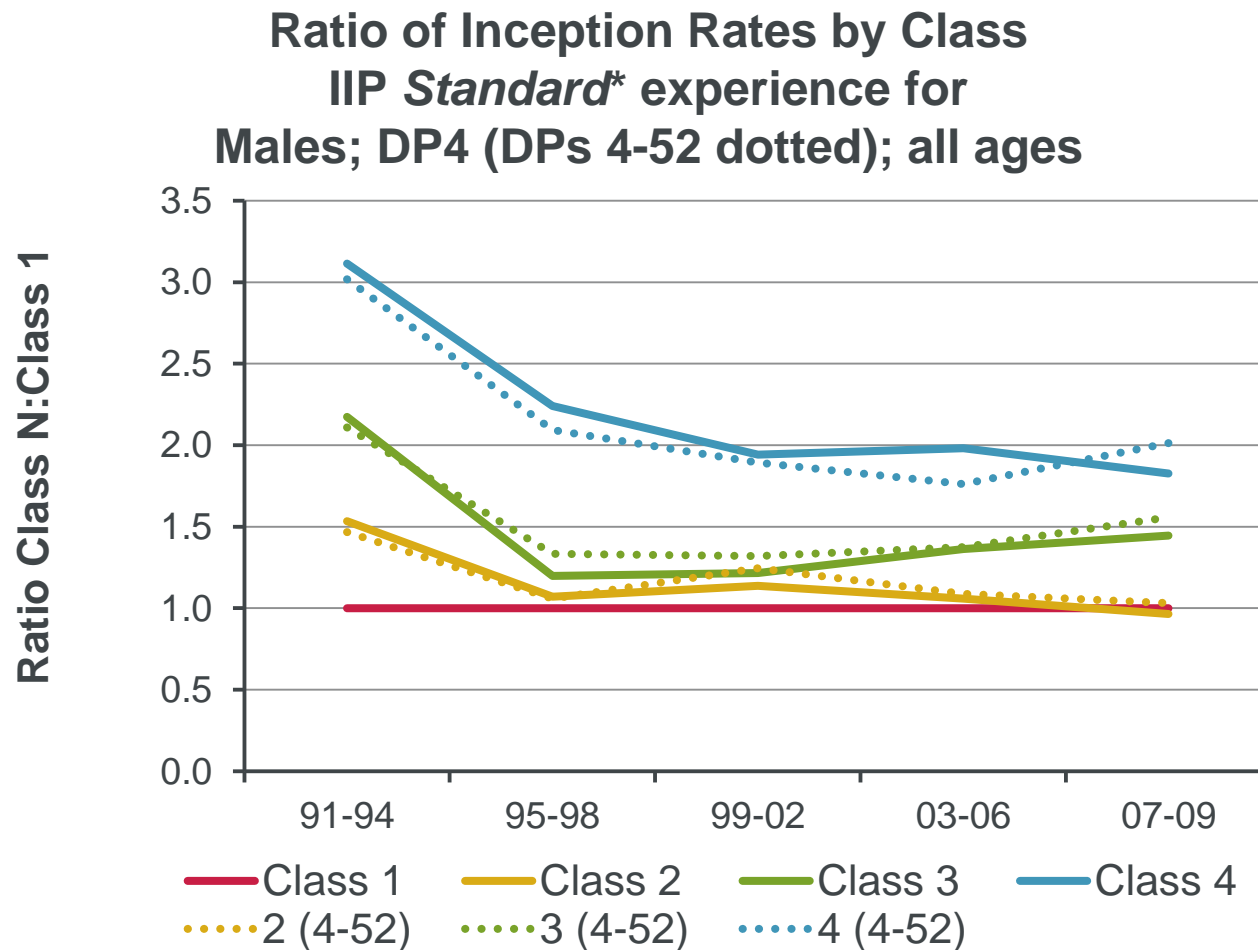
- An update on the committee's recent activity and future plans
- A summary of individual IP experience features and trends over 1991 to 2009
- Making the experience analysis more accessible: creation of a database, by cause of sickness, for practitioners to use
- Features of claim inceptions by cause of sickness
- Features of claim terminations by cause of sickness
- Insights into claim values by cause of sickness and implications for pricing and reserving.



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Features of claim inceptions experience, 1991 – 2009

Ratios of claim inception rates by sex and Occ Class

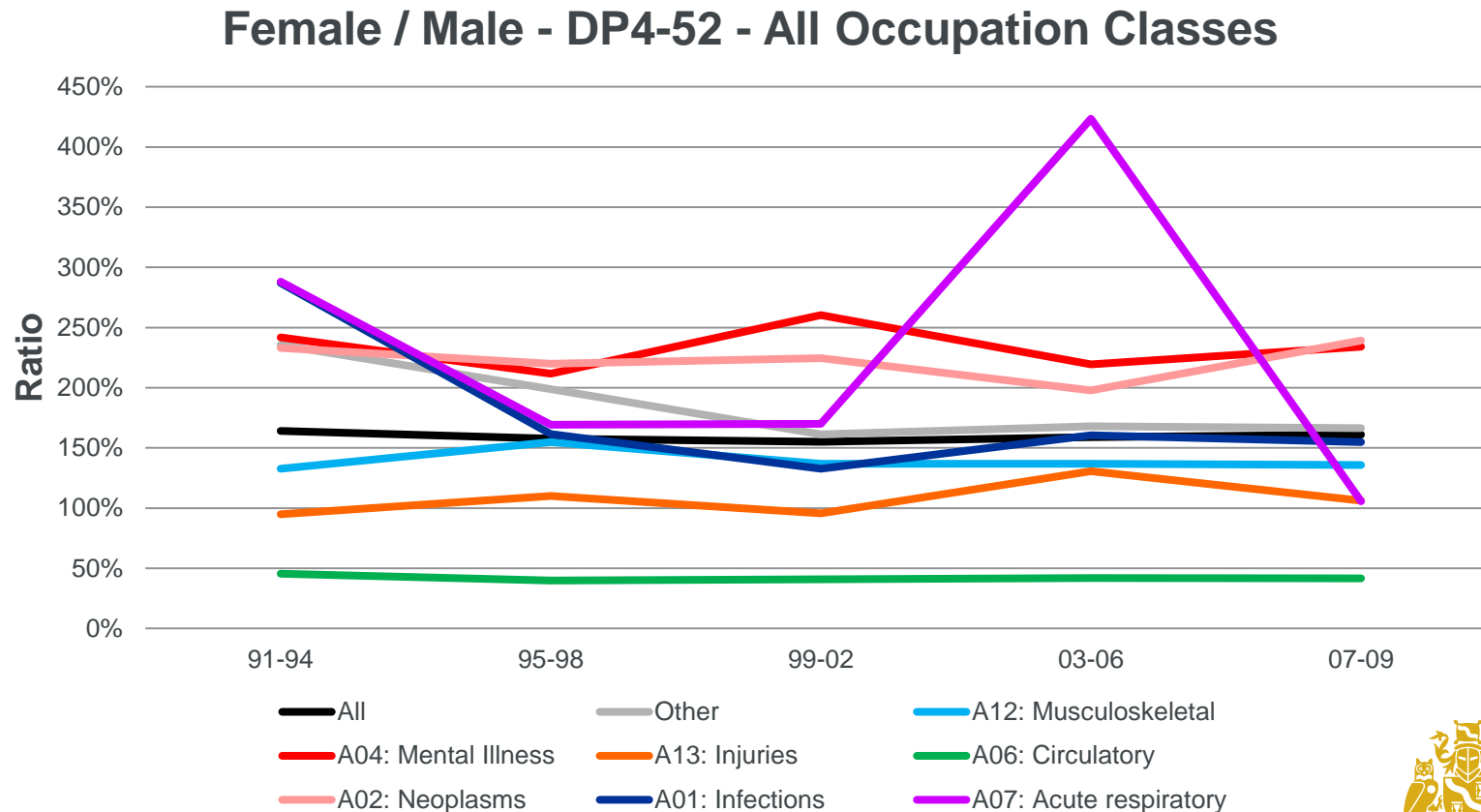


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Features of claim inceptions experience, 1991-2009

Narrowing of the gender differential

Female:Male ratio of Inception Rates for IIP *Standard** experience for DP 4 – 52
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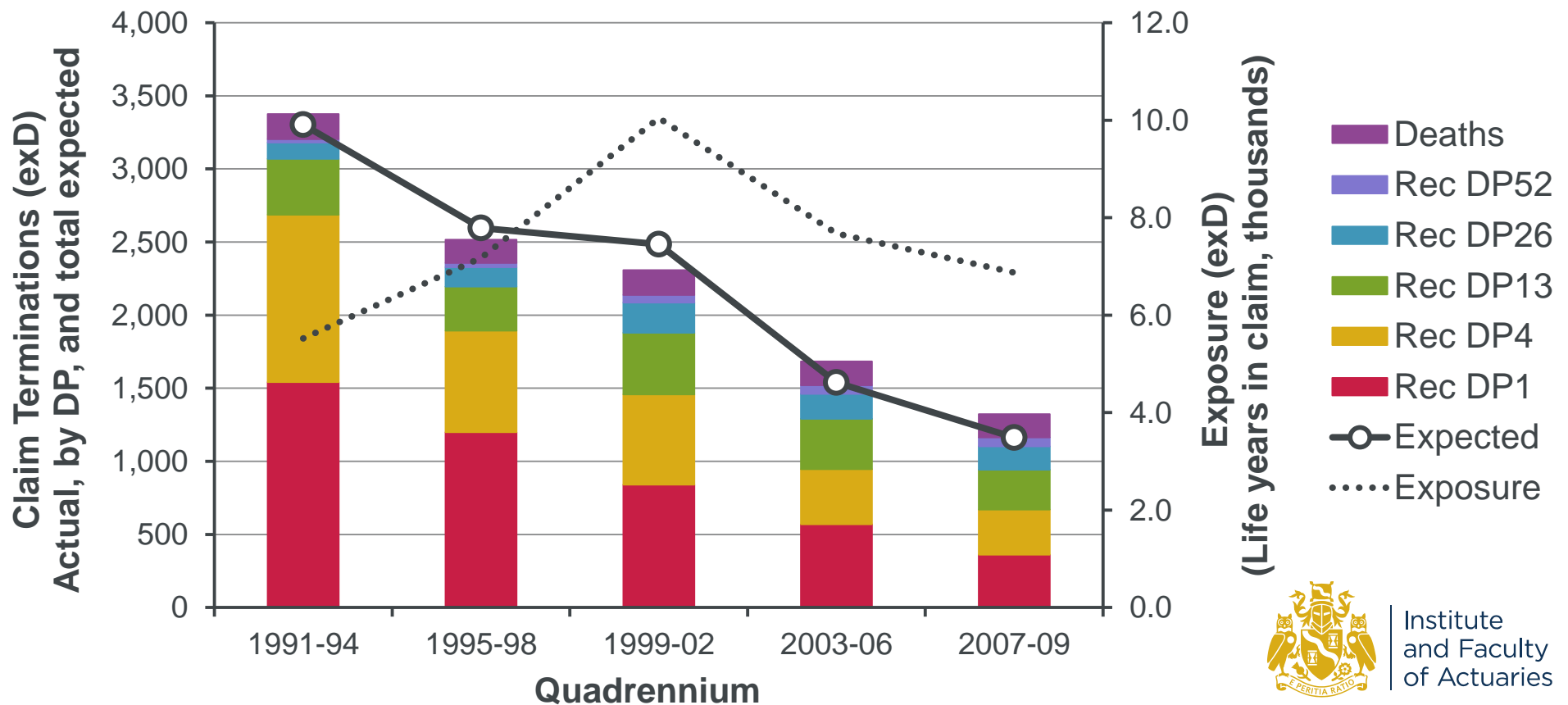


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Claim terminations experience, 1991 – 2009

Data volumes for claim terminations analysis

Average annual Individual IP claim termination counts, by quadrennium
Actual (by DP) and expected (total) claim terminations (exD); exposure (exD)

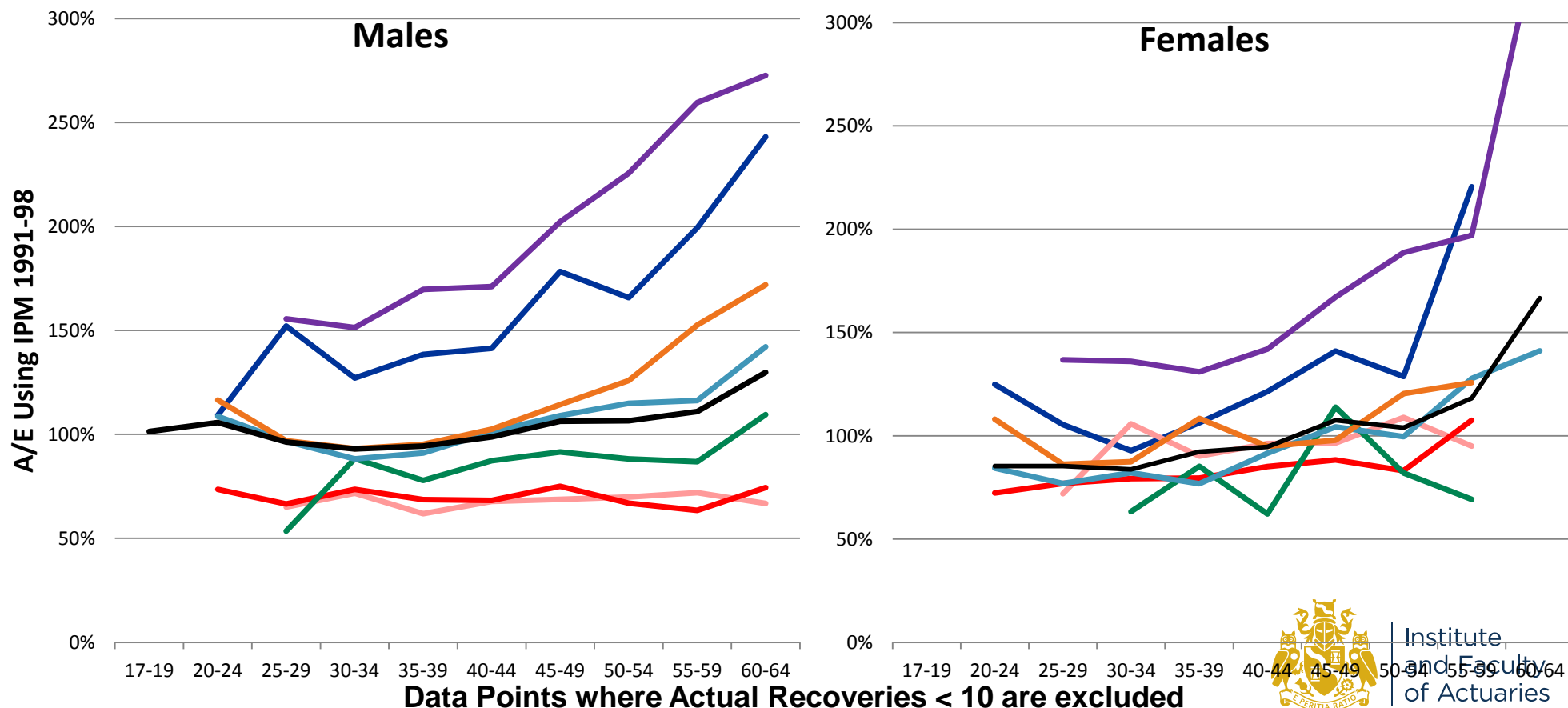


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16 May 2013

A01: Infections A02: Neoplasms A04: Mental Illness A06: Circulatory
 A07: Acute respiratory A12: Musculoskeletal A13: Injuries All Categories

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