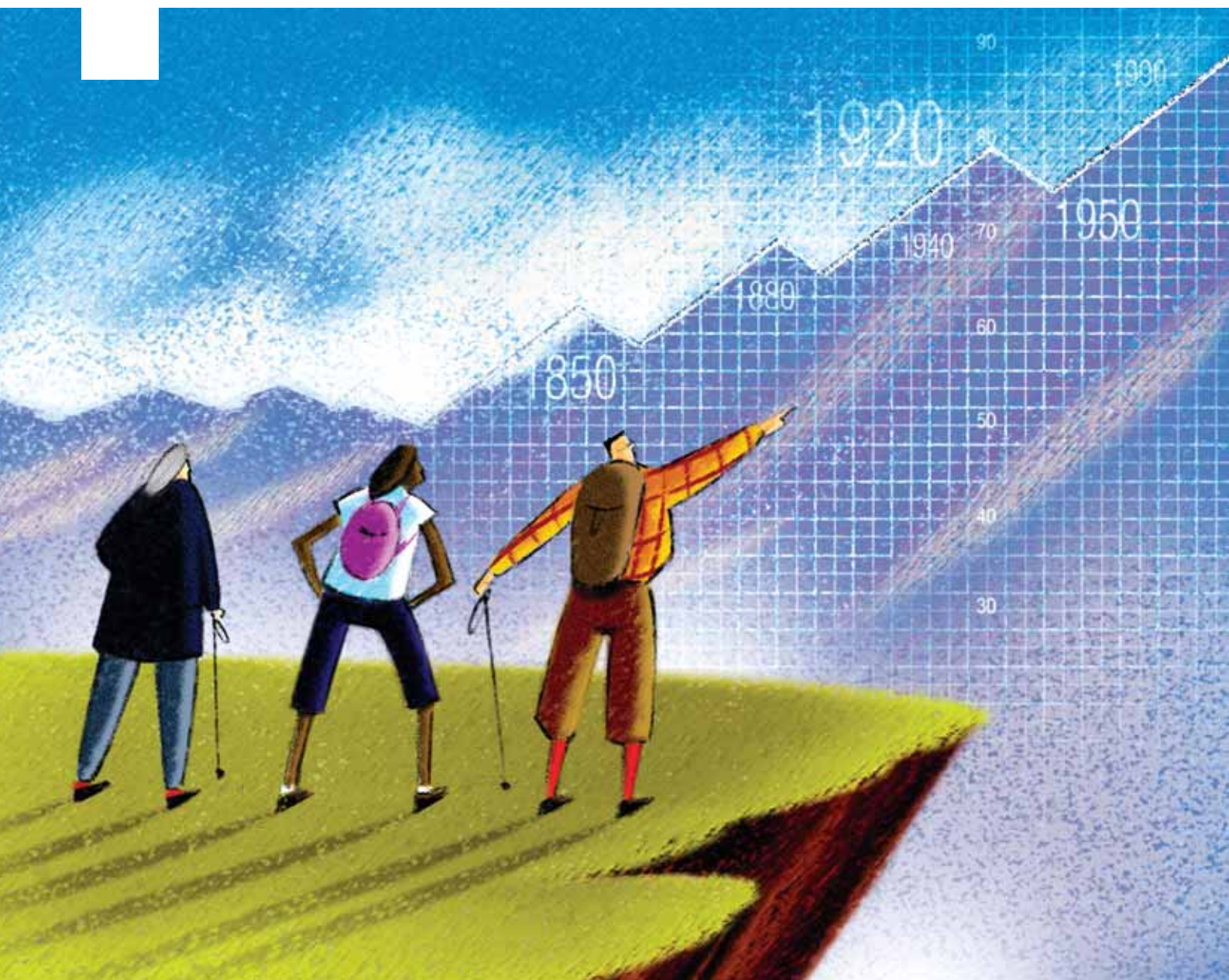


# The Actuarial Profession

making financial sense of the future

## Joining Forces on Mortality and Longevity A multidisciplinary conference

- 21-22 October 2009
- Royal College of Physicians, Edinburgh



# Committee Members

<b>Tushar Chatterjee</b>	Towers Perrin
<b>Adrian Gallop</b>	Government Actuary's Department
<b>Myer Glickman</b>	Office for National Statistics
<b>Sally Grover</b>	The Actuarial Profession
<b>David Guy</b>	Economic and Social Research Council
<b>Carol Jagger</b>	University of Leicester
<b>Tom Kirkwood</b>	Newcastle University
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**Mortality and longevity are of fundamental importance to the world of medicine, finance and social care. The pace of change is not merely evolving over time: new science and new analysis techniques are providing insights into developments at a previously inconceivable rate.**

This conference will be invaluable to those needing to understand and influence change, and to those who are driving or responding to developments in the many disciplines involved. It will bring together practitioners and researchers.

It is particularly important for:

- Policy makers and practitioners in business and financial services;
- Academic and medical researchers;
- Pensions and life assurance actuaries who make decisions on mortality bases;
- Early career researchers;
- Users of research, including potential funders such as research councils; and
- Other professionals wishing to keep pace with developments.



# Chairman's Introduction

For nearly two centuries, actuaries and health researchers have shared common interests but progressed down mostly separate paths towards understanding the patterns of human morbidity and mortality. Our conference on 'Joining Forces on Mortality and Longevity' is at once a celebration of two strands of vigorous and independent enquiry and recognition of the need to develop stronger connections.

The case to join forces has never been more compelling. Life expectancy continues to increase, confounding the forecasts of an earlier generation that longevity would bump into a ceiling imposed by the "fixed, ineluctable reality of ageing". Medical science now tells us that ageing is in fact much more malleable than we used to think. As we grapple with a world in which population ageing rises ever higher up the agenda, it is surely high time to put our heads together to try to understand what is responsible for these developments and where they may be taking us.

The conference to take place on 21-22 October 2009 at the Royal College of Physicians in Edinburgh, convened by the Mortality Research Steering Group, will be a landmark in our collective efforts to gain insight into past, present and future trends in mortality and longevity.

The conference programme is structured around three inter-related themes, in which leading international authorities in health research and actuarial science will examine the current state of play and the challenges yet to be met.

Theme one will seek to understand the drivers for change in mortality and longevity. For most of the last two centuries it was declines in early and mid-life mortality that dominated demographic change. Now it is the falling death rates in older people. But what actually causes death rates to continue to fall and what is the scope for the current trends to continue?

Theme two will ask how successive cohorts differ and why. Are those now reaching old age in some way different in terms of their intrinsic biology and exposure to risk than previous generations?

The third theme will explore the connections between populations and individuals. We are beginning to be able to study, as never before, how to drill down to individualised risk. How far can this approach take us?

Population ageing is likely to have at least as great an impact on how we live our lives and on how our societies will operate in the future as the better recognised effects of climate change, globalisation and terrorism. Yet population ageing is essentially a story of success. To continue this success will need effort and planning. If you want new, up-to-date research to understand current trends and the future prospects for mortality, this conference is for you.

## **Tom Kirkwood**

Conference Chairman

Joining Forces on Mortality and Longevity

“ The conference programme is structured around three inter-related themes, in which leading international authorities in health research and actuarial science will examine the current state of play and the challenges yet to be met. ”

# Programme

## Tuesday 20 October 2009

19.00 - 22.00 Traditional Scottish Ceilidh

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## Wednesday 21 October 2009

10.00 - 11.00 Registration

11.00 - 11.30 Opening by the Chairman  
Tom Kirkwood, University of Newcastle

11.30 - 12.00 Introduction to 'Drivers for change' work stream  
Stephen Richards, Richards Consulting

12.00 - 12.30 Introduction to 'Cohorts' work stream  
Carol Jagger, University of Leicester

12.30 - 13.00 Introduction to 'Individualised risk' work stream  
Diana Kuh, MRC National Survey for Health and Development

13.00 - 14.00 Lunch

14.00 - 15.30 **Plenary 1 - Drivers for change**  
Linkages between causes of death  
Maria Inés Reinert Azambuja, Universidade Federal do Rio Grande do Sul, Brazil  
Adjusting for bias in mortality forecasts  
Iain Currie, Heriot-Watt University

15.30 - 16.00 Afternoon coffee

16.00 - 17.00 **Plenary 2 - Cohorts**  
Are we ageing better at the highest ages?  
Kaare Christensen, University of Southern Denmark  
Future British mortality prospects  
Mike Murphy, London School of Economics

18.15 - 19.00 Pre-dinner drinks reception

19.00 - 19.45 Pre-dinner lecture

19.45 - 22.30 Gala dinner

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## Thursday 22 October 2009

09.00 - 10.30 **Plenary 3 - Individualised risk**  
Genetic predisposition for a healthy long life  
Rudi Westendorp, Leiden University Medical Center  
The role of lifetime behaviour, temperament and the psychosocial environment on mortality and longevity  
Matthew Hotopf and Barbara Maughan, King's College London

10.30 - 11.00 Morning tea

11.00 - 11.35 **Breakout session A**  
**A1 Drivers for change**  
Prospective longevity risk analysis  
Gordon Woo and Andrew Coburn, Risk Management Solutions

**A2 Cohorts**  
Modelling multi-population mortality with cohort effects  
Andrew Cairns, Heriot-Watt University

**A3 Individualised risk**  
Lifetime body size, physical function and mortality risk  
Rebecca Hardy, MRC Unit for Lifelong Health & Ageing

11.35 - 11.40 Move to next session

# Programme

- 11.40 - 12.15 Breakout session B**
- B1 Drivers for change**  
A new model of mortality and survival  
Eugene Milne, Newcastle University
- B2 Cohorts**  
Do cohort mortality trends emigrate?  
Alison O'Connell, Victoria University of Wellington
- B3 Individualised risk**  
The role of lifetime lifestyles on mortality and longevity  
Gita Mishra, MRC Unit for Lifelong Health & Ageing
- 12.15 - 12.20 Move to next session**
- 12.20 - 12.55 Breakout session C**
- C1 Drivers for change**  
Condition-based survival models of ill-health annuitants  
Andrew Dean, Partner Reinsurance
- C2 Cohorts**  
Forecasting of UK population mortality, allowing for the age, year and cohort effects  
David Forfar, Consulting Actuary and Heriot-Watt University
- C3 Individualised risk**  
Lifetime vascular, metabolic traits and mortality risk  
Debbie Lawlor, University of Bristol
- 12.55 - 13.55 Lunch**
- 13.55 - 14.30 Breakout session D**
- D1 Drivers for change**  
Uncovering pension scheme-specific longevity  
Gordon Fletcher, Mercer
- D2 Individualised risk**  
Do risk algorithms paint too simple a picture?  
Hande Love, Legal and General Assurance Society and Daniel Ryan, Watson Wyatt Worldwide
- D3 Individualised risk**  
Embryonic stem cells as models of ageing  
S Cedar, London South Bank University
- 14.30 - 14.35 Move to next session**
- 14.35 - 15.10 Breakout session E**
- E1 Drivers for change**  
Forecasting mortality, different approaches for different cause of deaths? The cases of lung cancer, influenza, pneumonia, and bronchitis and motor vehicle accidents  
Mariachiara Di Cesare and Michael Murphy, London School of Economics
- E2 Drivers for change**  
Which emerging treatments have the greatest potential to improve longevity?  
Daniel Ryan, Watson Wyatt Worldwide
- E3 Individualised risk**  
Changing course in ageing research: The healthy ageing phenotype  
Oscar Franco, University of Warwick
- 15.10 - 15.15 Move to next session**
- 15.15 - 15.50 Breakout session F**
- F1 Drivers for change**  
A 'simple' stochastic modelling of mortality  
Juliette Duchassaing and Fabrice Suter, Partner Reinsurance
- F2 Cohorts**  
Socio-economic status and the UK cohort effect  
Kenneth Howse, Oxford University and Steven Baxter, Club Vita LLP
- F3 Individualised risk**  
An important step closer to the Sicilian actuary: Individualising mortality and major disease  
Tushar Chatterjee and Christopher Johnson, Towers Perrin
- 15.50 - 16.20 Chairman's closing remarks**
- 16.20 Close of Conference**

# Plenary Speakers



## Maria Azambuja

**Universidade Federal do Rio Grande do Sul, Brazil**

Proponent, in 1994, of an association between the 1918 Influenza and the 20th Century CHD pandemics. Studying cohort effects of influenza priming upon longevity.

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## Kaare Christensen

**University of Southern Denmark**

Professor of Epidemiology, Institute of Public Health, University of Southern Denmark, and Senior Research Scientist at the Terry Sanford Institute, Duke University, North Carolina, USA. Professor Christensen is the Director of the Danish Twin Registry and the Danish Ageing Research Centre.

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## Iain Currie

**Herriot-Watt University**

Dr Iain Currie is Reader in Statistics in the Department of Actuarial Mathematics & Statistics of Heriot-Watt University. His main research interests are in multi-dimensional smoothing where he has developed Generalized Linear Array Models or GLAM for smoothing data arranged in an array. One important application of GLAM is to the modelling and forecasting of mortality data where he has written a number of papers with Stephen Richards for the Actuarial Profession.

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## Matthew Hotopf

**King's College London**

Matthew Hotopf is Professor of General Hospital Psychiatry at the Institute of Psychiatry, King's College London. He trained in psychiatry at the Maudsley and in epidemiology at the London School of Hygiene and Tropical Medicine, and is a researcher and clinician interested in the murky area between medicine and psychiatry. His research uses epidemiological methods to identify the impact of mental disorders on physical health and he has worked extensively with the national birth cohort studies, and on military cohorts. He has published over 200 academic papers and books, and is a National Institute of Health Research Senior Investigator

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## Carol Jagger

**University of Leicester**

Professor of Epidemiology, University of Leicester and Senior Research Fellow, Institute for Ageing and Health, Newcastle University

After completing her PhD on the analysis of survival times in twins, Carol began to work on a local Leicestershire study of older people and developed an interest in ageing. She is now the leading UK researcher in healthy life expectancy and is co-investigator on two large cohort studies: the MRC Newcastle 85+ Study and the MRC Cognitive Function and Ageing Study.

Carol is a Chartered Statistician and a Fellow of the Faculty of Public Health.



# Plenary Speakers



## Diana Kuh

**MRC National Survey for Health and Development: MRC Unit For Lifelong Health and Ageing**

Diana Kuh, Professor of Life Course Epidemiology at UCL, is the director of the MRC Unit for Lifelong Health and Ageing. The Unit is responsible for the MRC National Survey of Health and Development, the oldest of the British birth cohort studies, that has followed 5362 men and women since their birth in March 1946.

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## Michael Murphy

**London School of Economics**

Professor of Demography at the London School of Economics and Political Science

After 10 years in the Central Statistical Office, Mike has been at LSE since 1980. He is a Fellow of the British Academy, Research Secretary of the Population Investigation Committee and was President of the British Society for Population Studies until 2005. His main areas of research include: family, kinship and household demography; ageing; mathematical and statistical demography; and micro-simulation.

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## Stephen Richards

**Richards Consulting**

Stephen has been an independent consultant on longevity risk since 2005. Prior to this he was Head of Mortality Risk at Prudential, and before that he managed annuity pricing and bulk buy-outs at Standard Life. Stephen is also a director of Longevitas, a provider of advanced software for the analysis of mortality, longevity and persistency risks.

Stephen is a Fellow of the Faculty of Actuaries, and is active within the UK actuarial profession on mortality matters. He is currently the chairman of the Faculty of Actuaries Mortality Research Group, and has previously been a member of the mortality sub-committee of the Continuous Mortality Investigation (CMI). He was also a member of the CMI's working parties on mortality projections and technical standards.

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## Rudi Westendorp

**Leiden University Medical Center**

Prof. Dr. Rudi G.J. Westendorp qualified as a specialist in internal medicine and worked in intensive care before training as an epidemiologist. Since his appointment as Professor of Medicine, in particular research into ageing he combines both skills in trying to understand age related disorders and healthy longevity. He heads the department of Gerontology and Geriatrics of the Leiden University Medical Centre that especially takes care of elderly people with multiple comorbid conditions in a clinical and outpatient setting. He is founder and executive director of the Leyden Academy on Vitality and Ageing that trains pioneers in implementing excellence to advance the quality of life of older people.

# Workshop Sessions

## A1 DRIVERS FOR CHANGE

### Prospective longevity risk analysis

*Gordon Woo and Andrew Coburn, Risk Management Solutions*

This paper presents a prospective forward-looking approach to longevity risk analysis which is based on modelling the underlying causes of mortality improvement. As in modelling other types of extreme insurance risk, the objective is to construct a stochastic set of possible future events.

Intermediate

## A2 COHORTS

### Modelling multi-population mortality with cohort effects

*Andrew Cairns, Heriot-Watt University*

Individual analysis of different datasets reveals strikingly similar period and cohort effects providing pointers for jointly modelling two or more populations. As a starting point we assume that mortality changes in different populations do not move exactly in parallel, rather there is some form of stochastic linkage. We will discuss potential criteria that are required for stochastic mortality models that model jointly two or more populations. The talk will then focus on a two-population extension of a simple age-period-cohort model. We apply this model in a Bayesian framework in a setting with one large population and a second and relatively small sub-population.

Intermediate

## A3 INDIVIDUALISED RISK

### Lifetime body size and physical function and mortality risk

*Rebecca Hardy, MRC Unit for Lifelong Health & Ageing*

This session will;

- Highlight the importance of considering body size and physical function across the whole life course;
- Describe how body size from birth to old age is associated with mortality risk; and
- Present the evidence linking measures of physical function, such as grip strength and gait speed, with mortality risk.

Intermediate

## B1 DRIVERS FOR CHANGE

### A new model of mortality and survival

*Eugene Milne, Newcastle University*

A new mathematical model mimics patterns of mortality in species from nematodes to humans. Net risk, it suggests, arises from two components, an interactive element accounting for historical falls in human mortality, and redundant decay which shapes lifelong risk. This suggests "intrinsic ageing" is unrelated to the slope of the mortality curve, and is unlikely to have altered for humans in recent centuries.

Intermediate

## B2 COHORTS

### Do cohort mortality trends emigrate?

*Alison O'Connell, Victoria University of Wellington*

An exploration of the mortality of older, long-resident New Zealanders born in the UK, compared to the UK and New Zealand populations. This case example of the portability of mortality trends looks for signs of a 'golden cohort' among the emigrating British born and draws implications for future longevity projections.

Intermediate

## B3 INDIVIDUALISED RISK

### The role of lifetime lifestyles on mortality and longevity

*Gita Mishra, MRC Unit for Lifelong Health & Ageing*

This session will;

- Present the evidence linking lifestyle including diet, physical activity, alcohol intake, tobacco use, and social roles across the life course, with mortality and longevity;
- Highlight the role of initiation and maintenance of healthy lifestyle on mortality; and
- Propose a life course framework for the influence of lifestyle on longevity and mortality.

Intermediate

# Workshop Sessions

## C1 DRIVERS FOR CHANGE

### Condition-based survival models of ill-health annuitants

*Andrew Dean, Partner Reinsurance*

This session describes an approach to estimating survival for Impaired and Enhanced annuities. Accurate interpretation of the medical evidence and classification of risks will help to ensure the fair treatment of customers and to reduce the risk of anti-selection. The approach relies heavily on the alignment of medical knowledge with actuarial techniques.

Intermediate

## C2 COHORTS

### Forecasting of UK population mortality, allowing for the age, year and cohort effects

*David Forfar, Consulting Actuary and Heriot-Watt University*

The historical analysis will be based on the deaths and population size (males and females) for England and Wales over the years 1961 to 2007. The following questions will be addressed;

- Is there a statistically significant cohort effect present in the historical data?;
- How should one allow, in addition to the age effect, for the year effect and the cohort effect in forward projections?; and
- Do the forward projections allowing for the cohort effect look rather different from the forward projections not allowing for the cohort effect?

The analysis is based on MSc Dissertations for 2008 at Heriot-Watt University but the data has been updated, courtesy of ONS, to be the latest available.

Intermediate

## C3 INDIVIDUALISED RISK

### Lifetime vascular, metabolic traits and mortality risk

*Debbie Lawlor, University of Bristol*

This seminar will;

- Summarise changes with age in key vascular and metabolic traits (blood pressure, lipids, glucose and insulin);
- Summarise the evidence for effects of variation in vascular and metabolic traits across the whole life course on future mortality; and
- Describe how genetic variation can be used to assess causal effects of differences in mean lifetime levels of vascular and metabolic traits.

Intermediate

# Workshop Sessions

## D1 DRIVERS FOR CHANGE

### Uncovering pension scheme-specific longevity

*Gordon Fletcher, Mercer*

Pension schemes and annuitant portfolios are exposed to the risk that members live longer than budgeted for. Assessing and managing this risk is therefore a key component of any coherent risk management framework. Survival models enable sophisticated risk assessment for larger pension schemes and modest annuity portfolios.

Gordon will present an overview of the method and then will illustrate how this can be used in a real-life example. The talk will focus on the practical aspects of measuring the risk and how this can be used in practice.

*Intermediate*

## D2 INDIVIDUALISED RISK

### Do risk algorithms paint too simple a picture?

*Hande Love, Legal and General Assurance Society and Daniel Ryan, Watson Wyatt Worldwide*

Authors will:

- Investigate classic risk factors for circulatory disease;
- Quantify actual mortality experience from such risk factors;
- Examine and apply risk algorithms to the population to support future mortality improvement assumptions; and
- Understand better an individual's risk to help with making more knowledgeable predictions for future longevity.

*Intermediate*

## D3 INDIVIDUALISED RISK

### Embryonic stem cells as models of ageing

*S Cedar, London South Bank University*

Embryonic Stem Cells are among the earliest cells in human development.

- Can understanding their behaviour and characteristics illuminate processes in ageing mechanisms?; and
- Can ESC or their products be exploited in regenerative medicine to reverse some of the degenerative effects of ageing?

*Basic*

## E1 DRIVERS FOR CHANGE

### Forecasting mortality, different approaches for different causes of deaths? The cases of lung cancer, influenza, pneumonia, bronchitis and motor vehicle accidents

*Mariachiara di Cesare and Michael Murphy, London School of Economics*

This study analyzes trends and forecasts mortality rates for three major causes of death - lung cancer, influenza, and motor vehicle accidents - that have different underlying trends and drivers using Lee-Carter, Age-Period-Cohort, and Bayesian statistical models.

*Intermediate*

## E2 DRIVERS FOR CHANGE

### Which emerging treatments have the greatest potential to improve longevity?

*Daniel Ryan, Watson Wyatt Worldwide*

The paper identifies three emerging treatments which could follow in the footsteps of statins in driving longevity still higher:

- Monoclonal antibodies;
- Vaccines for non-infectious diseases; and
- CETP (cholesterol ester transfer protein).

For each treatment the author will address the likely population that could benefit, the obstacles that remain for those still progressing through clinical trials and the potential costs. The potential improvement in longevity represented by each treatment will be assessed and comparisons will be drawn with those drugs that have fuelled improvements over the past decades.

*Intermediate*

## E3 INDIVIDUALISED RISK

### Changing course in ageing research: The healthy ageing phenotype

*Oscar Franco, University of Warwick*

This session will explore:

- The healthy ageing phenotype concept;
- Report from a meeting convened by Unilever and MRC UK;
- Mechanisms, factors and trajectories leading to the healthy ageing phenotype; and
- Effects of obesity and weight gain on the healthy ageing phenotype: the Nurses Health Study.

*Intermediate*

# Workshop Sessions

## F1 DRIVERS FOR CHANGE

### A 'simple' stochastic modelling of mortality

*Juliette Duchassaing and Fabrice Suter,  
Partner Reinsurance*

We define a simple stochastic model to facilitate stress tests (ICA, Solvency II) around any estimate of future mortality. We calibrate it on England and Wales data. Using sample annuity portfolios we determine the NPV distribution of cash flows and examine the implied percentiles of stressed scenarios. We analyse the impact of full and limited reinsurance on capital.

Intermediate

## F2 COHORTS

### Socio-economic status and the UK cohort effect

*Kenneth Howse, Oxford University and Steven Baxter, Club Vita LLP*

We know that longevity differs by socio-economic background - but how have mortality rates been changing amongst those of similar socio-economic backgrounds? In this session Kenneth and Steven will explore the socio-economic 'trickle-down' of health behaviours, and how this is leading to different cohort effects depending on socio-economic background.

Intermediate

## F3 INDIVIDUALISED RISK

### An important step closer to the Sicilian actuary: Individualising mortality and major disease

*Tushar Chatterjee and Christopher Johnson,  
Towers Perrin*

Most mortality projections extrapolate from historic death rates, with division by age, sex and smoker status. We describe a modelling approach which uses a wider range of risk factors to examine past death rates and develop estimates of future mortality and morbidity rates. A number of illustrative examples are provided.

Intermediate

# Information

## Edinburgh Information

Welcome to Edinburgh, where the buzz of Scotland's capital city sits in perfect contrast to the peaceful tranquility of the surrounding Lothians region.

Edinburgh has one of the most beautiful cityscapes in the world, making it the ideal city break destination and, should you wish to extend your stay you can discover the world-class museums and galleries, take a tour on an open-top bus or even visit the city's own zoo. From the world famous Festivals to top-class restaurants and bars, not to mention great shopping, you'll be spoilt for choice.



Wherever you're coming from, and, however you choose to travel, getting to Edinburgh is easier than you might think. Whether you choose to take a train, plane, car, coach or boat to the city, Scotland's capital is within your reach.

## Getting to Edinburgh By Air:

### Edinburgh International Airport Flights

Edinburgh is one of the UK's fastest growing airports, offering direct and connecting flights from many UK, European and International airlines.

The flight from London takes around an hour and there are over 40 flights from London airports every day. Regular services arrive in Edinburgh from other major UK cities and there are frequent scheduled flights from 40 European airports, including Amsterdam, Paris, Munich, Frankfurt and Zurich. Continental Airlines offers a daily direct service from New York's Newark airport, while Delta Airlines offer a daily direct flight between Atlanta's Hartsfield-Jackson Atlanta International Airport and Edinburgh. Further transatlantic flights arrive at Glasgow International Airport, one hour's drive away.

Edinburgh International Airport is eight miles (12km) west of the city centre.

The Airlink 100 operates a frequent bus service (every 10 minutes at peak times) between Edinburgh Airport and the city centre, with designated stops en route. Journey time is about 25 minutes and tickets cost £3.00 single and £5.00 return. [www.flybybus.com](http://www.flybybus.com)

The Edinburgh Shuttle operates a frequent, on-demand mini-coach service between Edinburgh Airport and the city centre. Departs every 10 - 20 minutes to any address within the city centre zone. [www.edinburghshuttle.com](http://www.edinburghshuttle.com)

Taxis are also widely available at the airport and cost around £15 to the city centre.

## By Bus:

If you're on a budget then buses are a great travel option. And because Edinburgh is well placed on the Scottish motorway network, getting here by bus or coach could be quicker than you might think. There are regular coach services to Edinburgh from all major UK cities.

The following companies can provide more information:

- **Linking Edinburgh to England:**  
National Express contact number: +44 (0) 8705 80 80 80.
- **Linking Edinburgh to England and to cities across Scotland:**  
Mega Bus contact number: +44 (0) 900 160 0900
- **Linking Edinburgh to towns and cities across Scotland:**  
Scottish Citylink contact number: +44 (0) 8705 50 50 50  
Or Stagecoach contact number: +44 (0) 870 608 2 608.

# Information

## By Car:

Because Edinburgh is located at the heart of the Scottish motorway network, it can be surprisingly quick and easy to get here by car. If you're travelling from the north of Scotland, for example, Edinburgh is only three hours from Inverness and just over two hours from Aberdeen. Journey times from England are just as good; you can get here from Birmingham in about five and a half hours, from Manchester and York in about four hours, and the city is just two and a half hours from Newcastle.

## By Train:

Edinburgh is easy to reach by train, the National Express line is the fastest intercity railway in the UK, with a journey time of just under five hours between Edinburgh (Waverley) and London (King's Cross).

ScotRail operate an overnight service, the Caledonian Sleeper, between London (Euston) and Edinburgh six nights a week.

Edinburgh train station has great rail links to other major cities too. York, Newcastle, Inverness and Aberdeen are all about two hours away by train, and Glasgow is just 50 minutes away on the First ScotRail shuttle service which leaves Waverley train station every 15 minutes.

The following companies can provide more information.

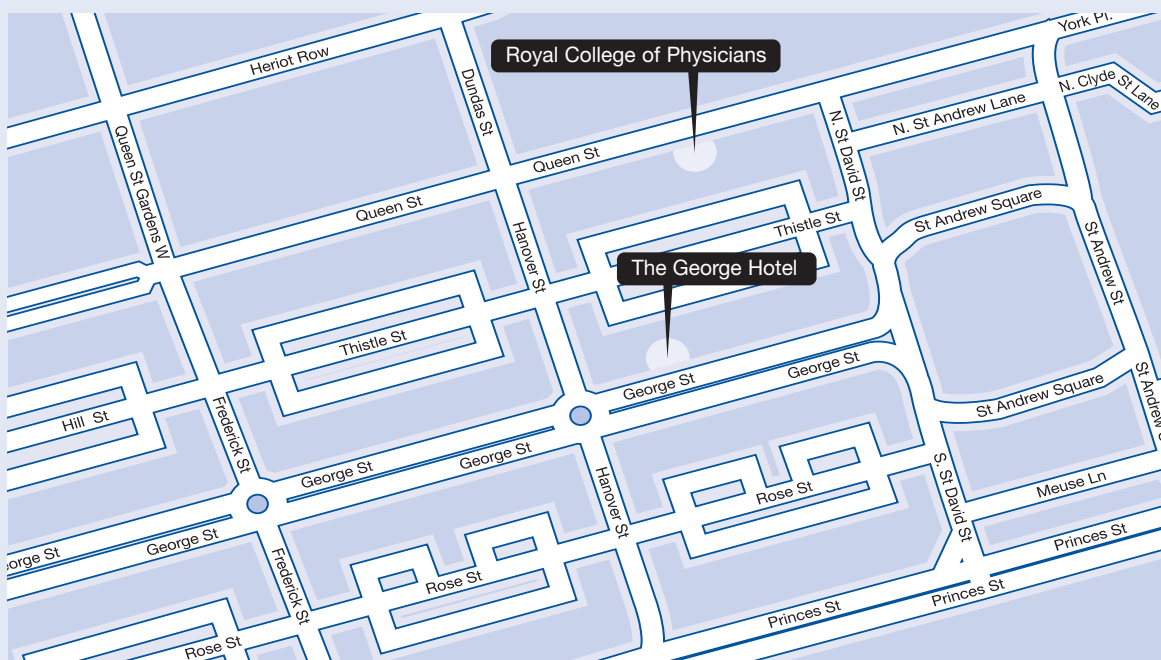
- Linking Edinburgh train station and London via the east coast main line:  
National Express contact number: +44 (0) 8457 48 49 50
- Linking Edinburgh to towns and cities in England:  
Virgin contact number: +44 (0) 8457 222 333
- Linking Edinburgh to Manchester and Manchester Airport via the Lake District, Carlisle and Lockerbie  
First TransPennine Express: +44 (0) 845 600 1671
- Travelling to and from Edinburgh to all around Scotland:  
First Scotrail contact number: +44 (0) 8457 48 49 50
- For all your timetables and fares UK wide:  
National Rail Enquiries contact number:  
+44 (0) 8457 48 49 50
- For all your rail travel requirements:  
Traveline contact number: +44 (0) 871 200 22 33
- For all methods of travel visit: [www.transportdirect.info](http://www.transportdirect.info)

## The Conference Venue

Royal College of Physicians of Edinburgh, 9 Queen Street, Edinburgh EH2 1JQ, UK

**Telephone:** +44 (0)131 225 7324     **E-mail:** [events@rcpe.ac.uk](mailto:events@rcpe.ac.uk)

The Royal College of Physicians of Edinburgh provides a unique blend of historic and modern facilities located in the heart of the city. The College, based in the heart of the City of Edinburgh, is just a few minutes walk from bus and train stations; the main shopping area and hotels.



# Information

## Hotel Information

To take advantage of the reduced hotel booking rates offered below please visit our dedicated webpage, which is in association with the Edinburgh Convention Bureau at: [https://cabs.conventionedinburgh.com/ei/getdemo.ei?id=150146&s=\\_7V40MRXTW](https://cabs.conventionedinburgh.com/ei/getdemo.ei?id=150146&s=_7V40MRXTW)

### Headquarters' Hotel

★ The George Hotel  
 19 - 21 George Street, Edinburgh EH2 2PB, Scotland  
 Telephone: +44 (0)131 225 1251

Boasting one of the most prestigious locations of Scotland's capital, the George Hotel is situated in the heart of the city, taking prime position on George

Street. Although retaining many of the original architectural details, most of the hotel's 199 bedrooms, many with views of Edinburgh Castle or the Firth of Forth, have been transformed and given a contemporary new look. Wireless or broadband access is available throughout the hotel.

The hotel now also boasts one of George Street's most attractive bar and restaurant adventures, Tempus, offering sophisticated contemporary surroundings and the best of local produce and international wines and cocktails.

Management wish to inform guests that there is a minimum three day cancellation policy on all reservations.

## Alternative Hotels

Hotel	Star Rating	Approximate distance to Royal College of Physicians	Single Occupancy	Double/Twin Occupancy
IBIS Edinburgh	2	0.8 miles	£75	£80
Jurys Edinburgh Inn	3	1 mile	£80	£90
Ramada Mount Royal	3	0.9 miles	£85	£85
★ George Hotel	4	0.1 miles	£125	£135
Roxburghe Hotel	4	0.8 miles	£125	£135



# Information

## Social Events

### Tuesday 20 October

Kick start the conference by dusting off your dancing shoes at our traditional Scottish Ceilidh. There will be a live band, a selection of dances and refreshments throughout the evening. Whether you want to try your hand (or feet) at some of the traditional Scottish moves, or simply come along to mingle with colleagues and delegates. A Ceilidh is a great way to enjoy traditional Scottish culture and enjoying yourself is pretty much guaranteed. This evening is not included in the conference fee.

### Wednesday 21 October

Conference drinks reception and gala dinner with a prestigious pre-dinner speaker to be held at the Royal College of Physicians. This evening is included in the conference fee.

## Papers

Session presentation slides and papers, where provided by speakers, will be placed on the Actuarial Profession's website. Delegates will be given a password in their joining instructions to enable them to access these in advance of the Conference.

## Continuing Professional Development

Members of the Actuarial Profession may find the conference a useful contribution to their CPD needs. The total hours of CPD that can be claimed for this conference is 11 hours 25 minutes. It is up to the discretion of the individual to update personal CPD records according to sessions attended.

## Presenting a Poster

### Abstract submission deadline: Friday 11 September 2009

Poster submissions are welcomed in areas related to the three themes of the conference. Posters will be on display for the duration of the conference in the main catering area. Presenters will be expected to be available during refreshment and lunch breaks on both days to explain their work and answer any questions. Presenters will be provided with a poster board but will need to provide their own materials in a form suitable for mounting and related handouts.

## Conference Fee

### By 21 August 2009

Actuarial Profession Member	£775
Non Member	£875
Academic	£350
Student (Limited number of places available)	£250

### After 21 August 2009

Actuarial Profession Member	£875
Non Member	£975
Academic	£400

The Conference fee includes all administration, access to speakers' presentations, refreshments, lunches and the gala dinner as detailed in the programme from Wednesday 21 October to Thursday 22 October 2009. The fee DOES NOT include the Ceilidh on Tuesday 20 October or accommodation. Delegates are responsible for booking their accommodation directly with the hotel of their choice.

Closing date for receipt of all applications and payments is Friday 21 August 2009.

### You can register online at:

[www.actuaries.org.uk/members/transactions/conference\\_booking](http://www.actuaries.org.uk/members/transactions/conference_booking)

Please refer to the accommodation section on pages 16 and visit [www4.eventsinteractive.com/ecb/getdemo.ei?id=150146&s=\\_7V40MRXTW](http://www4.eventsinteractive.com/ecb/getdemo.ei?id=150146&s=_7V40MRXTW) for further information.

### Bursary places for PhD & Masters students

The Economic and Social Research Council (ESRC) are funding a limited number of bursary places for PhD students studying social science subject(s) to attend the conference. If you will be studying for your PhD/Masters in October 2009 and are participating in the conference by presenting a paper or poster you could be eligible.

To apply please contact [claire.marsh@actuaries.org.uk](mailto:claire.marsh@actuaries.org.uk) by Friday 24 July 2009.

Posters will be considered for publication in the British Actuarial Journal. Prizes to the value of £500 and £250 will be available for the best poster presentations.

A limited number of bursaries are available to assist PhD and Masters students to attend.

**Contact: Claire Marsh, Event Organiser**

**Email: [claire.marsh@actuaries.org.uk](mailto:claire.marsh@actuaries.org.uk)**

**Tel: +44 (0) 207 632 2147**

## Booking Your Place

If you wish to attend the Conference, please complete both sides of the application form and return it with your remittance, or indicate your method of payment. Cheques should be made payable to the 'Institute of Actuaries', and sent to The Event Management Division, The Actuarial Profession, Staple Inn Hall, High Holborn, London, WC1V 7QJ, UK, tel: +44 (0)20 7632 1498, fax: +44 (0)20 7632 2141, by the closing date of Friday 21 August 2009. All successful applications will be confirmed by email after the closing date, so please ensure your email address is clearly written on the Conference Application Form.

PLEASE NOTE: All delegate payments must be received prior to registering onsite. If you have an outstanding balance when you arrive onsite, you will be asked to settle the amount by credit card before you collect your conference materials (we do not accept Amex).

Booking forms received after the closing date as indicated on this form, are required to settle the delegate fee by credit card (a member of the Event Management Division will telephone you for your details), unless the form is accompanied by a BACs remittance advice.

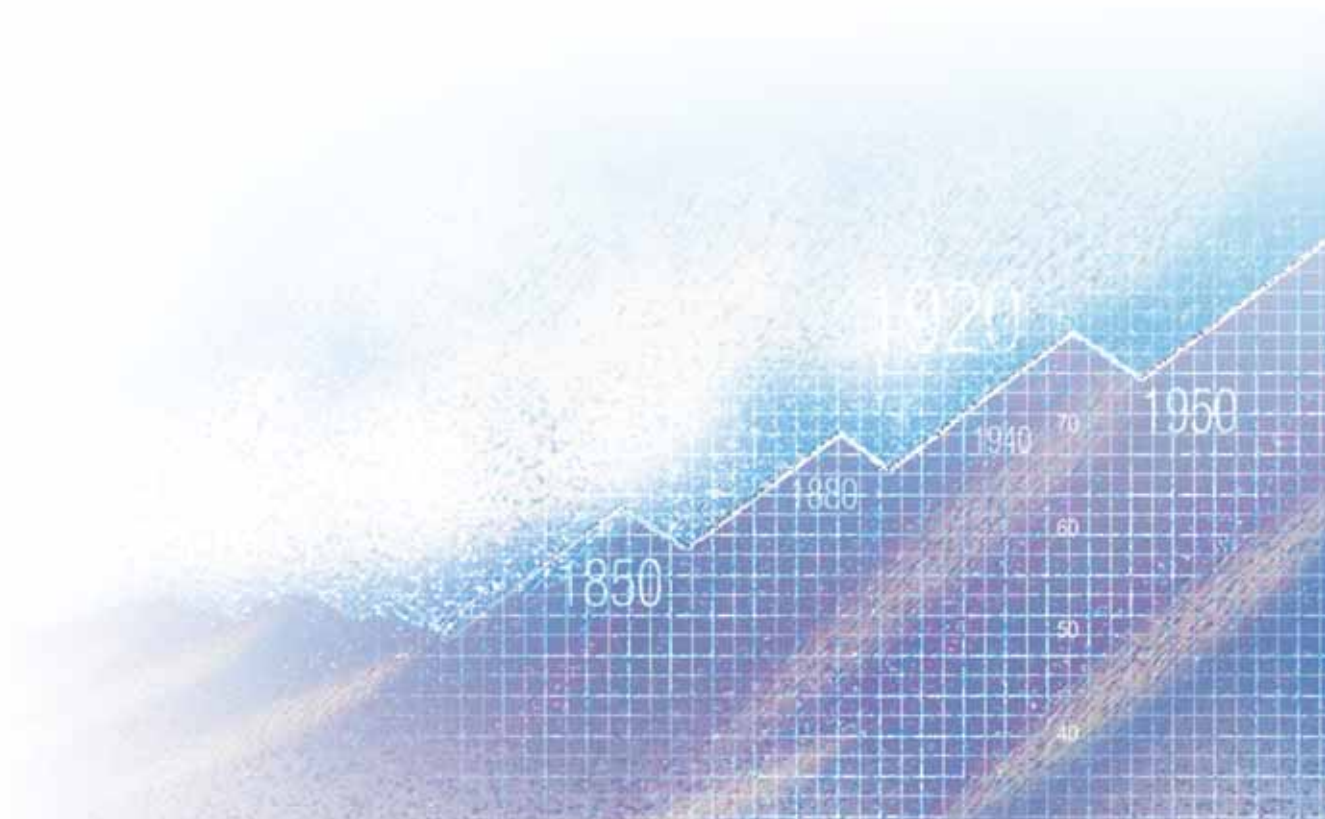
PURCHASE ORDER NUMBERS: If your accounts payable department require a Purchase Order Number on the delegate payment invoice, please ensure that they provide the number on the booking form before submitting to the Event Management Division. This will avoid any unnecessary delays.

## Cancellations

All cancellations must be made in writing. Cancellation of a confirmed place will be subject to an administrative charge of £155. There will be no refund for cancellations after Friday 21 August 2009.

Substitutions are acceptable, but please inform Claire Marsh the Conference Organiser of any changes.

Cancellation of accommodation must be made directly with the hotel.



# Sponsorship & Exhibition

## BOOK YOUR SPACE!

### Joining Forces on Mortality and Longevity

21 - 22 October 2009 • Royal College of Physicians • Edinburgh

### 3m x 2m Table Top Stand or Display will cost £695 +VAT\*

The aim of the Joining Forces on Mortality and Longevity Conference is to advance research and awareness of research in mortality involving a variety of disciplines. During the conference all breaks will take place within the exhibition area so exhibitors will be assured dedicated time with all attendees. We are expecting approximately 150 delegates to attend.

*\*Exhibitors who include a "fun" element to their stands will receive a 25% discount off their stand fee*

### Sponsorships

Companies have the opportunity to sponsor various aspects of the conference. The following is a partial list of what is available for sponsorship:

PhD Bursary Sponsorship (3 sponsors possible)	£5,000+VAT
Conference Umbrellas	£2,250+VAT
Conference Dinner Late Bar	£1,750+VAT
Conference Bag (2 sponsors possible)	£1,750+VAT
Refreshment Breaks (4 opportunities available)	£1,500+VAT
Conference Notepads	£750+VAT
Conference Pens	£ 750+VAT
Conference Lanyards	£ 750+VAT

If you are interested in booking or sponsoring a stand please complete and return this flyer. All stands will be assigned on a first come first served basis.

Contact Name/Position	
Exhibiting Organisation	
Address	
	Postcode
Tel	Fax
Email	Website

\*Display package includes: company description in on-site programme, coffee, lunch and tea for two representatives on 21-22 October, draped two-meter table and two chairs. All of the elements of your stand and fun element must fit into the space purchased.

**Fax to Claire Marsh, Conference Organiser, The Actuarial Profession**

**Tel: +44 (0)20 7632 2147**

**Fax: +44 (0)20 7632 2141**

**Email: [claire.marsh@actuaries.org.uk](mailto:claire.marsh@actuaries.org.uk)**

“ If you want new, up-to-date research to understand current trends and the future prospects for mortality, this conference is for you. ”

# Application Form

## Joining Forces on Mortality and Longevity

21 - 22 October 2009 • Royal College of Physicians • Edinburgh

### PLEASE COMPLETE IN BLOCK CAPITALS AND TICK WHERE APPROPRIATE

Surname	Initials	ARN
Title	Forename(s)	
First name for badge		
Dietary requirements		
Company		
Address for correspondence		
Telephone number	Fax number	
Mobile	Email	
Do you require facilities for the disabled?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Fees

Before 21 August 2009

After 21 August 2009

#### Member's discount of £100

I am a member of the Actuarial Profession

£775

£875

#### Conference Fee

£875

£975

#### Academic

£350

£450

#### PhD/Master Bursary

I have submitted my bursary application form

I would like to attend:

**Scottish Ceilidh** (Additional fee of £25)

£25

**The Gala Dinner** (Included in the conference fee)

### Payment

**Cheque** (please make cheques payable to the 'Institute of Actuaries')

**I will be paying by credit card** (in order to pay by Credit Card you will need to book online at: [www.actuaries.org.uk/members/transactions/conference\\_booking](http://www.actuaries.org.uk/members/transactions/conference_booking))

**I will be paying by BACs.** Details: Bank sort code 56-00-20 / Account number 08671990.

Please quote your invoice number and ARN on your remittance. Please mail or fax remittance to: Event Management Division, Staple Inn Hall, High Holborn, London WC1V 7QJ UK. Fax: +44 (0)20 7632 2141.

Please return both sides of this booking form to The Event Management Division, The Actuarial Profession, Staple Inn Hall, High Holborn, London WC1V 7QJ, UK, tel: +44 (0)207 632 1498, fax: +44 (0)20 7632 2141, by the closing date of **Friday 21 August 2009**. All successful applications will be confirmed by email after the closing date. Please ensure your email address is clearly written on the application form.

For information on group discounts when booking six or more delegates from the same company please call The Event Management Division, tel: +44 (0)207 632 1498.

*Cancellation of a confirmed place will be subject to an administrative charge of £155. There will be no refund for cancellations after Friday 21 August 2009.*

**Please tick this box if you do not wish your details to be included on the delegate list.**

PLEASE NOTE: All delegate payments must be received **prior** to registering onsite. If you still have an outstanding balance when you arrive onsite, you will be asked to settle the amount by credit card before you collect your delegate pack (we do not accept Amex).

Booking forms received after the closing date as indicated on this form, are required to settle the delegate fee by credit card (a member of the Event Management Division will telephone you for your details), unless the form is accompanied by a BACs remittance advice.

**PURCHASE ORDER NUMBERS:** If your accounts payable department require a Purchase Order Number on the delegate payment invoice, please ensure that they provide the number on the booking form **before** submitting to the Event Management Division. This will avoid any unnecessary delays.

**PLEASE TURN OVER TO SELECT YOUR CONCURRENT WORKSHOP SESSION CHOICES**

For office use only: Conference JEVCP091000 • Ceilidh JEVCP091020

# Workshop Booking Form

Name

ARN (if applicable)

Company

PLEASE INDICATE YOUR 1ST AND 2ND CHOICES FOR EACH OF THE SIX CONCURRENT WORKSHOP SESSIONS, BY PLACING THE NUMBERS 1 & 2 IN THE RELEVANT BOXES.

## Session A

- Prospective longevity risk analysis
- Modelling multi-population mortality with cohort effects
- Lifetime body size, physical function and mortality risk

## Session B

- A new model of mortality and survival
- Do cohort mortality trends emigrate?
- The role of lifetime lifestyles on mortality and longevity

## Session C

- Condition-based survival models of ill-health annuitants
- Forecasting of UK population mortality, allowing for the age, year and cohort effects
- Lifetime vascular, metabolic traits and mortality risk

## Session D

- Uncovering pension scheme-specific longevity
- Do risk algorithms paint too simple a picture?
- Embryonic stem cells as models of ageing

## Session E

- Forecasting mortality – different approaches for different causes of deaths?
- Which emerging treatments have the greatest potential to improve longevity?
- Changing course in ageing research: The healthy ageing phenotype

## Session F

- A 'simple' stochastic modelling of mortality
- Socio-economic status and the UK cohort effect
- An important step closer to the Sicilian actuary: Individualising mortality and major disease

# Forthcoming Events

## **How to Become a Confident and Effective Networker**

23 June 2009, Staple Inn, London

## **Career Support for Actuaries**

23 June 2009, Staple Inn, London

## **Dependency Modelling Course**

25 June 2009, Staple Inn, London

1 July 2009, Staple Inn, London

2 July 2009, Staple Inn, London

18 November 2009, Staple Inn, London

19 November 2009, Staple Inn, London

20 November 2009, Staple Inn, London

## **Lessons from the Disciplinary Scheme**

26 June 2009, Shepherd and Wedderburn LLP, Edinburgh

10 July 2009, Shepherd and Wedderburn LLP, London

## **Strategic Concepts**

3 July 2009, Staple Inn, London

## **Cocktail Masterclass**

7 July 2009, Voodoo Rooms, Edinburgh

## **Advanced Professionalism**

18 September 2009, Hilton Paddington, London

## **CILA II**

5 October, Staple Inn, London

## **Current Issues in ERM for the Life Industry**

18 September 2009, Staple Inn, London

## **Strategic Concepts**

24 September 2009, Staple Inn, London

## **Financial Reporting**

8 October 2009, Staple Inn, London

## **Market Consistent Valuation Workshop**

15 October 2009, Staple Inn, London

## **Life Conference & Exhibition**

25 - 27 November 2009, EICC, Edinburgh

## **Current Issues in Health & Care**


28 October 2009, Staple Inn, London

## **Advanced Professionalism**

4 December 2009, Hilton Paddington, London

## **Momentum Conference**

7 - 9 December 2009, Hilton, Glasgow



# The Actuarial Profession

making financial sense of the future

The Actuarial Profession  
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