

## EAA Seminar

# Predictive Modeling for Life & Health Insurance

15/16 November 2018 | Barcelona, Spain



Organised by the EAA - European Actuarial Academy GmbH in cooperation with the Col·legi d'Actuaris de Catalunya.

SPONSOR of this seminar:



### Introduction

In recent years, predictive modelling has changed important aspects of actuarial practice. Predictive modelling enhances traditional actuarial models with modern statistical tools and analysis. It uses emerging volumes of data to provide important insights into life and health insurance business, including how to identify appropriate risks, manage the risks insurance companies face, and improve the accuracy of actuarial projection models.

Predictive modelling impacts many areas of life and health insurance – from underwriting, to risk identification, to assumption setting and financial modelling. In underwriting, predictive modelling can be used to select the policyholders that meet desired risk profiles and to improve the accuracy of risk classification schemes. For existing blocks of business, predictive modelling allows actuaries to identify key risk factors impacting financial performance, creating opportunities to proactively manage those risk. As a projection tool, actuaries use predictive modelling to identify the key factors impacting actuarial assumptions, and to appropriately fit the assumptions used in financial projection models to historical data, potentially improving the accuracy of actuarial projections.

As actuaries enhance their focus on and knowledge of predictive analytic tools, it is likely that predictive modelling will play an increasingly important role in actuarial practice in the future. This seminar is designed to provide actuaries with the technical tools needed to be prepared for the ways in which actuarial practice may evolve in the coming years.

## Participants

The seminar is intended as a technical introduction for actuaries wishing to develop fundamental skills in predictive modelling techniques. It is designed for those who will be directly involved in the construction and analysis of predictive models. The seminar presumes no prior knowledge of predictive modelling or multivariate regression. However, attendees should have a working knowledge of basic statistics, simple linear regression, and life and health actuarial models.

Attendees are encouraged to bring a laptop computer with Microsoft Excel and R installed. The seminar will presume a working knowledge of statistics, linear regression, and programming in R. Attendees should review these concepts before arriving at the seminar; the first session of the seminar will include a brief review of this material.

## Purpose and Nature

The seminar will cover a broad range of topics in predictive modeling that are relevant to actuarial practice. The seminar begins with a review of the software R, including packages that are most commonly used in actuarial practice. The first day continues with a review of simple linear regression, and quickly shifts to more advanced, multivariate regression techniques that form the basis for many of the models that can be used in actuarial practice. The first day also features lessons aimed at identifying key variables for inclusion in actuarial models. Case studies will be used throughout the day to illustrate the important concepts and allow attendees to learn the techniques by building their own models.

The second day uses a case study format to explore several applications of predictive modeling to actuarial practice. The day begins with a case study on using logistic regression to predict claim events. The day concludes with an in-depth, technical exploration of generalized linear models that can be used to fit actuarial assumptions, and a demonstration of how this can improve the accuracy of financial models.

## Language

The language of the seminar will be English.

## Lecturers

### Andrew H. Dalton

Andrew is a Principal and Consulting Actuary in Milliman's Philadelphia office. Andrew's professional experience includes work on actuarial appraisals for mergers and acquisitions, asset and liability analysis, predictive modeling, and economic capital for life and health

companies. Andrew is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. He holds a Masters Degree in Business Administration, concentrating in Finance and Statistics, from the Leonard N. Stern School of Business of New York University.

### Robert Eaton

Robert is a Consulting Actuary in Milliman's Tampa, Florida office. Robert specializes in long-term care, life insurance, and combination life and health insurance products. Robert is the Chairperson of the Society of Actuaries' Long-Term Care Section Council. He serves on the Executive Committee for the Intercompany Long-Term Care Insurance conference. Robert is a Fellow in the Society of Actuaries and a Member of the American Academy of Actuaries. He holds Bachelor's degrees in Mathematics and Industrial Engineering from the University of Florida.

### Dominik Sznajder

Dominik is an actuarial consultant in Milliman's Brussels office. He is a leader of Data Analytics team at Milliman Benelux which supports insurance companies in predictive analytics, data visualizations, data management, processes automation and big data projects. His work experience includes parameter studies and assumption setting (mortality, lapse and disability rates) for life insurance products and developing cost equalization schemes for the Dutch Health regulator. Dominik holds a PhD in Mathematical Statistics from KU Leuven in Belgium and a master degree in Actuarial Sciences from the University of Warsaw in Poland.

## **Preliminary Programme**

### Thursday, 15 November 2018

08.45 - 09.00	Registration
09.00 - 09.15	Introduction & welcome (EAA)
09.15 - 10.45	Review of programming in R Overview of key R packages used in actuarial work Brief review of simple linear regression Begin Case Study #1: Using R to apply regression models to interest rates and inflation
10.45 - 11.00	Coffee Break
11.00 - 12.30	Conclude Case Study #1 Multivariate techniques Variable transformations
12.30 - 13.30	Lunch
13.30 - 15.00	Variable selection techniques Illustrative applications of multivariable models to life & health insurance
15.00 - 15.15	Coffee Break
15.15 - 17.00	Case Study #2: Selecting variables that predict claim incidence in a multivariable model
approx. 19.30	Dinner

### Friday, 16 November 2018

09.00 - 10.45	Theory of logistic regression Technical background Probit and logit functions
---------------	---

	Practical examples in life & health insurance
	Begin Case Study #3: Underwriting and claim management: using logistic regression to predict claim incidence
10.45 - 11.00	Coffee Break
11.00 - 12.30	Conclude Case Study #3
	Introduction to Generalized Linear Models (GLM)
	Binomial, Poisson, Gamma and inverse Gaussian models
12.30 - 13.30	Lunch
13.30 - 15.10	Applications of GLM to Life & Health actuarial assumptions
	Case Study #4: claim incidence assumption fitting
15.10 - 15.15	Concluding remarks, closing of seminar (EAA)

## Fees & Registration

Please register for the seminar as soon as possible because of the expected demand. If there are more persons interested in this seminar than places available we will give priority to the registrations received first. Please send your registration as soon as possible by using our online registration form at [www.actuarial-academy.com](http://www.actuarial-academy.com).

Your registration is binding. Cancellation is only possible up to 4 weeks before the first day of seminar. If you cancel later, the full seminar fee is due. You may appoint someone to take your place, but must notify us in advance. EAA has the right to cancel the event if the minimum number of participants is not reached.

Please always give your invoice number when you effect payment. All bank charges are to be borne by the participant. We will send you an invoice, please allow a few days for handling.

Your early-bird registration fee is € 790.00 plus 21 % VAT until 15 September 2018. After this date the fee will be € 970.00 plus 21 % VAT.

## Venue & Accommodation

The seminar will take place at the hotel

### Sallés Hotel Pere IV

Calle Pallars 128-130

08018 Barcelona, Spain

[Hotel website](#)

We have arranged special prices for accommodation. The special rate is 99,00 € per night, including breakfast and VAT. It is valid for bookings by 14 October 2018 out of our allotment "EAA Seminar". Our allotment includes a limited number of rooms. Kindly book your accommodation directly with the hotel by sending an email to [grupos1@sallehotels.com](mailto:grupos1@sallehotels.com) (reference code *EAA seminar*), and note the hotel's reservation terms and conditions and the hotel's cancellation policy.

## CPD

For this seminar, the following CPD points are available under the CPD scheme of the relevant national actuarial association:

Austria:	11 points
Belgium:	11 points
Bulgaria:	12 points
Czech Republic:	2-3 points (individual accreditation)
Estonia:	11 hours
Germany:	12 hours
Hungary:	12 hours
Italy:	approx. 4 credits (GdLA individual accreditation)
Netherlands:	approx. 11 PE-points (individual accreditation)
Russia:	40 points
Slovakia:	8 CPD points
Slovenia:	50 points
Switzerland:	15 points

No responsibility is taken for the accuracy of this information.