Course Announcement – PAGE Satellite meeting June 12th 2007

Stochastic Differential Equations in NONMEM VI

This full day course offers an introduction to the most central aspects of using stochastic differential equations (SDEs) within PK/PD-modelling. The course will enable participants to implement simple SDE models in NONMEM VI, and aims to motivate future independent research within the field.

The course is composed of a series of lectures and exercises, as follows:

Lecture 1: **A short introduction to SDEs** and to the continuous-discrete stochastic state space model. The benefits of using SDEs as compared to ODEs in modelling will be illustrated with a few examples.

Lecture 2: **Simulation of SDEs with NONMEM**. The objective of this lecture is to introduce a simple implementation for simulation of non-linear mixed-effects models based on SDEs in NONMEM. The simulation properties of SDE models will be compared to those of ODE models through various PK/PD examples.

Lecture 3: **Introduction, Implementation, and Application of Kalman Filtering**. The objective of this lecture is to give a brief introduction to Kalman Filtering and its implementation and application within SDE-based non-linear mixed-effects modelling using NONMEM VI.

Lecture 4: **Parameter tracking with SDEs in PK/PD**. With tracking, which is based on Kalman Filtering, the unknown time-course of time-varying input rates or parameters can be visualized graphically. A special case of parameter tracking is deconvolution of input rates. This lecture gives a short introduction to the theory and practical implementation of parameter tracking with SDEs. The lecture will be based on an example where an unknown absorption rate is tracked to help determine an appropriate parametric description for the absorption process.

Exercise 1: **The Kalman Filter**. To illustrate how the Kalman Filter is implemented in NONMEM VI, this exercise aims at a complete derivation and implementation of a simple IV-bolus (1-comp) PK model.

Exercise 2: **Simulation of SDEs**. This exercise aims to give hands-on experience with simulation of SDEs in NONMEM, and focuses on various diagnostic plots that will be relevant when dealing with SDEs.

Exercise 3: **Parameter tracking**. To illustrate how SDEs in PK/PD-models may facilitate parameter tracking, this exercise will show how the unknown rate of insulin (or C-peptide) secretion can be reconstructed and visualized graphically based on C-peptide measurements.

The course will start June 12th at 9:00, and conclude at 17:00 at the venue of the PAGE-meeting in Copenhagen (The Black Diamond).

Registration etc.
Course Fee:
Industry: 400 euro
Academic: 200 euro
Please register via the NHG web page (link to follow) before April 10.
A 50 % refund is given for cancellations before May 20.
No refund is given for cancellations after May 20.

The organizers reserve the right to cancel in case of low interest.

Faculty:
Henrik Madsen, Professor (Institute of Mathematical Modelling, Technical University of Denmark)
Rune Overgaard, PhD (Biomodelling, Novo Nordisk, Denmark)
Niels Kristensen, PhD (Biomodelling, Novo Nordisk, Denmark)
Christoffer Tornöe, PhD (Pharmacometrics, Food and Drug Administration, USA)
Søren Klim, PhD student (Biomodelling, Novo Nordisk/ Institute of Mathematical Modelling, Technical University of Denmark)

Further information
Please contact Rune Overgaard for further information (ruvo@novonordisk.com)