



Modeling Food Safety and Animal Health Risks Using R

ISVEE 15 Pre-Symposium Workshop, 10-11 November 2018

This 2-day hands-on workshop will cover essential risk modeling methods available in food safety and animal health, particularly emphasizing microbial, antimicrobial, and trade risk analysis applications. Course participants will learn simulation and calculation methods in the R statistical language, while the solution to course exercises and models will also be provided in @RISK with Excel for those participants who may want to transition between software platforms. Participants will also learn how to select appropriate distributions, use data and expert opinion, and avoid common modeling mistakes. Example models from the instructors, including antimicrobial risk assessments, and animal health risk assessments will be used to reinforce the methods and best modeling practices discussed during the class.

Who should attend?

This workshop is a recently updated introduction to our risk analysis course in Animal Health and Food Safety, which has been successfully taught for over a decade. This 2-day version contains the key elements of risk modeling, and applied case studies are used to guide participants through the main development steps of a risk assessment model. The course is taught using the R statistical language and ModelAssist, which are free of cost.

This course is well suited to anyone that needs to conduct, present, or critique quantitative risk analyses in food safety, animal health, or One health. This course is also of interest to professionals providing inputs to risk analyses or those who need to use risk analysis results. Also, this workshop is well suited for people who have experience in risk modeling using spreadsheets but want to learn how to use a more flexible modeling environment such as R.

There is no pre-requisite for attendance to the workshop. However, participants are strongly encouraged to prepare for the class by reviewing [this document](#). Although prior experience using R or other simulation tools is not required, participants with no prior R experience are encouraged to learn fundamentals of R programming by reviewing online material such as [Code School TryR](#) and/or [DataCamp's free Introduction to R](#).

[ModelAssist](#) is a comprehensive risk analysis training reference and is free of cost. This reference tool provides an in-depth explanation of all risk analysis concepts, techniques and methods introduced in this course, and greatly complements the course material.

Workshop details

The course will be delivered in English.

Participants are required to bring laptops loaded with R and a pdf reader. R is an open-source freeware that works for Windows, Mac, or Linux and can be downloaded free of charge from the [R Project website](#). As R is updated constantly, please download the latest version before attending the course.

Also, it is recommended that participants use a code editor to facilitate the writing and storage of code: we recommend [RStudio](#) for Windows or Mac users, or [Tinn-R](#) (Windows-only).

Lecture notes both in hard copy and in a USB drive will be provided. Participants will also have access to a web-drive where they will be able to retrieve course exercise files simultaneously, as the instructor develops them during the class.

Contents and Schedule

All of EpiX Analytics' courses aim to help the participants understand risk analysis from the bottom-up, which is achieved through a relaxed, informal and interactive environment using plenty of examples and hands-on exercises where students apply and adapt what they have learned.

Day 1: Introduction and foundational concepts

- Welcome and introduction to the workshop
- Brief introduction to food safety and animal health risk modeling
 - Codex, EPA, OIE code
 - Link between epidemiology and risk assessment
- Introduction to risk modeling
 - Introduction to some commonly used probability distributions
 - Using the R statistical environment for probability calculations and Monte Carlo simulation
 - Presenting and interpreting risk analysis in a coherent way
- Basic stochastic processes: Binomial and Poisson
 - Population and individual state with imperfect test
 - Modeling rates with uncertainty
 - Combining Poisson and Binomial in a risk assessment
- **Case study:** Modeling foodborne illnesses and hospitalizations from raw and pasteurized milk consumption

*For any questions about this workshop, please contact Barbara O'Neill
Phone: +13034408524, boneill@epixanalytics.com*

Day 2: Applications and working with data

- Basic principles of microbial dose-response models
- Using data and expert opinion for risk analysis
 - Fitting distributions to data
 - Incorporating expert opinion into a model
 - Modeling epistemic uncertainty
- **Case Studies:**
 - Modeling the risk of antimicrobial resistance transfer from meat pathogens to humans
 - Modeling the introduction of a pig disease into a free area
- Wrap up and review of course material

Instructors

Francisco Zagmutt

[Dr. Francisco J. Zagmutt](#) is a managing director at EpiX Analytics, where he uses innovative risk modeling and analytics methods to help clients make key decisions under uncertainty. Francisco has led projects in a wide variety of industries and organizations on every continent, giving him a broad viewpoint on the use of decision-analytical methods in different applications. He is also affiliate faculty at Colorado State University, and a member of the US National Advisory Committee on Microbiological Criteria for Foods (NACMCF), which has played a fundamental role providing impartial scientific advice to US federal agencies. Francisco teaches several public and private courses with EpiX, as well as at the Colorado State University College of Business and formerly at the Royal Veterinary College. Francisco is the lead instructor for this course, with additional instructors depending on the number of participants

Solenne Costard

[Dr. Solenne Costard](#) is a senior consultant at EpiX Analytics. As part of her consulting and research work, Solenne applies risk analysis modeling and other analytical techniques to a broad range of projects in a variety of industries worldwide, including food safety and animal health. Solenne is one of the instructors of public and private courses given by EpiX in quantitative risk analysis in general, and epidemiology and food safety in particular. She also participated to the development of new courses, offered by EpiX Analytics and/or in collaboration with other institutions.

Huybert Groenendaal

[Dr. Groenendaal](#) is a managing director at EpiX Analytics. He is an affiliate faculty at Colorado State University and was mentor at the Wharton Customer Analytics Initiative, Wharton School of Business. Huybert teaches a variety of risk analysis training courses with EpiX, lectures on the use of risk modeling in business at the executive MBA program at the Leeds School of Business, University of Colorado at Boulder, and teaches an online risk analysis course at Statistics.com.

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Registration

Please arrange for your conference and workshop registrations via the [ISVEE 15 website](#). Workshop registration is available at: <http://isvee.net/scientific-information/pre-post-symposium-workshop/>

Regular fee: \$800

Student fee: \$650

To encourage participation from students with limited budget, **one free registration award** will be offered to post-graduate (Master or PhD) students currently working on risk analysis-related projects as part of their thesis. The award recipient will be selected by EpiX Analytics based on the relevance of the project and the applicant's need for economic support.

Participants interested in group discounts, and graduate students interested in applying for the registration award should contact Barbara O'Neill (boneill@epixanalytics.com) for further details.

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