



QMRA for exposure to waterborne pathogens

27th – 31st March 2017 Salto, Uruguay by Dr. Jack Schijven

Outline

The basic steps of Quantitative Microbial Risk Assessment are explained. The focus is on exposure to waterborne pathogens and the associated infection risks.

Suggested reading: Quantitative microbial risk assessment - Application for water safety management – WHO, 2016 from

http://www.who.int/water_sanitation_health/publications/qmra/en/

During the course, applicants work on their own case studies (in groups of three persons). It is advantageous to bring your own microbial data.

This 5-day course is very much hands-on using the open source programming language **R** for all calculations, fitting of distributions to data and Monte Carlo simulations.

It is recommended to get acquainted with **R** prior to the course. The participants should have installed **R** and **Rstudio** on their computer.

A number of interactive QMRA tools is introduced including theory and application.

The tools may be used for the case studies. QMRAtools:

- **QMRAspot** for QMRA of drinking water from surface water.
- **QMRAcatch**, microbial quality simulation of water resources including infection risk assessment.
- **QMRAwell**, for QRMA of drinking water from groundwater and calculation of setback distances.

At the end of the course, the participants present their case study in 10 minutes with 5 minutes of discussion.

Required downloads

- **R** including manuals from <https://www.r-project.org/>
- **Rstudio** from <https://www.rstudio.com/>
- **QMRAspot** tool, associated spreadsheets, manual and scientific article from http://www.rivm.nl/en/Topics/W/WHO_Collaborating_Centre_Risk_Assessment_of_Pathogens_in_Food_and_Water/Tools/QMRAspot
- **QMRAcatch** tool , associated spreadsheets, manual and scientific articles from http://www.rivm.nl/en/Topics/W/WHO_Collaborating_Centre_Risk_Assessment_of_Pathogens_in_Food_and_Water/Tools/QMRAcatch
- **QMRAwell** will be disseminated during the course.
- **CDF Player**, from Wolfram to run all QMRA tools <https://www.wolfram.com/cdf-player/>

COURSE PROGRAM

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00-10:30	Welcome Introduction to QMRA	Distributions	Dose-response models	QMRAcatch	QMRAwell
10:30-10:45	Break	Break	Break	Break	Break
10:45-12:30	Definition of case studies (group work) and pitch	Maximum likelihood estimation	QMRAspot using parameter settings	Group work	Group work
12:30-13:30	Lunch	Lunch	Lunch	Lunch	Lunch
13:30-15:00	Getting started with R Deterministic QMRA	Monte Carlo simulation	QMRAspot using data	Fate and transport of microorganisms in groundwater	Presentation of group work, discussion
15:00-15:15	Break	Break	Break	Break	Break
15:15-~17:00	Group work deterministic QMRA	Group work Stochastic QMRA	Group work	Group work	Final questions Closure

Lecturer

Prof. Dr. Jack Schijven



Chair Quantitative Microbial Water Safety
Environmental Hydrogeology,
Geosciences, Utrecht University
Statistics, Informatics and Modelling,
National Institute of Public Health and the
Environment
WHO Collaborating Centre for Risk
Assessment of Pathogens in Water and
Food
Utrecht/Bilthoven, the Netherlands
Jack.Schijven@rivm.nl

Course local organisers

Prof. Dr. Pablo Gamazo



Civil Engineer, PhD in
Hydrogeology
Associate Professor
Water Department
Director
North Littoral Regional
University Center
Republic University
gamazo@unorte.edu.uy

Prof. Dr. Rodney Colina



Biologist, PhD in Biological
Sciences
Associate Professor
Virology Laboratory
Director
North Littoral Regional
University Center,
Republic University
rodneycolina1@gmail.com