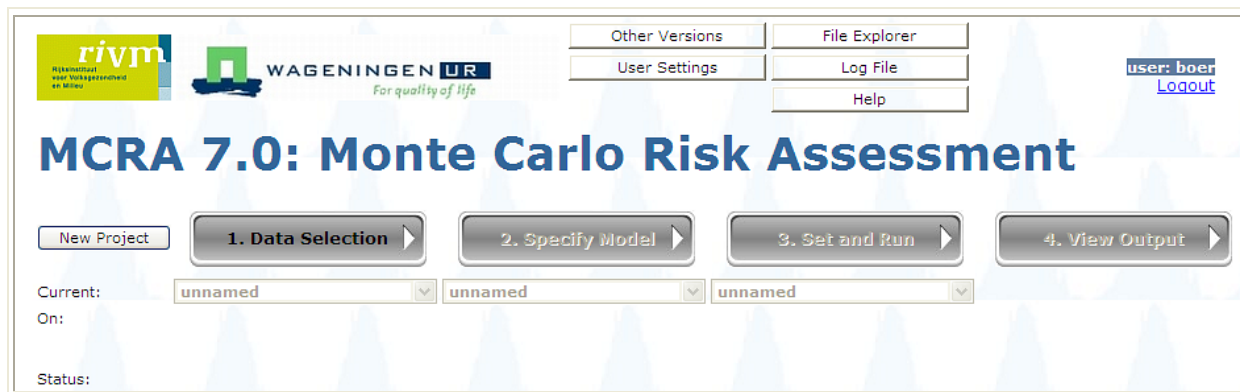# MCRA 7, a quick start

For a quick start in MCRA, the main tasks and steps of the interface are shortly described using a case study as described in de Boer *et al.* (2009). After login, the central menu is entered and from here all tasks with corresponding actions are started.

The central menu contains four main tasks which are described as:
- Data Selection (Access [mdb], Excel [xls] or Simulated Data [xls])
- Specify Model (specification of input options)
- Set and Run (specification of output options, start Monte Carlo Risk Assessment)
- View Output (managing output)

A main task is started by clicking the button. Then, a menu containing actions related to the main task is displayed. A main button can only be pressed when the name of the tasks is displayed in **black**. Names of main tasks that are not availabe or active at the moment, are displayed in grey. After clicking a main button, it turns into blue to indicate that the task is active. For a first time user, the figure above shows the central menu and Data Selection can be started (only available option). Otherwise, press New Project to clear all selections.

In the first example, patulin data are selected (de Boer *et al*. 2009). Patulin is a mycotoxin which is mainly found on apple products. In the reported data, patulin was detected in two foods, apple juice and canned apple sauce. These foods were linked to 83 foods as recorded in the food consumption survey of young children. In total 45 samples were detect, the number of non-detects was 32. Dutch children were in the age of 2 – 6 years and consumptions were recorded on two consecutive days. The interest is in a chronic exposure assessment, using the betabinomialnormal (BBN) model. The transformation to normality is the lognormal. The daily intake frequency and transformed intake amount of patulin is modelled as a function of age using a polynomial. For details of the design of the database (mdb), we refer to the MCRA 7 user manual.

Example: selection of data from MS Access database (mdb)

1. Data Selection	
Data Source	Selection of data source (mdb, xls or simulated data)
Data Server	Selection of data server or file (own data or centrally supplied data from RIVM)
Data Bases	Selection of databases

Data tables	Selection of tables
Compound	Selection of compound, survey and/or covariates
Conversion	Start conversion of food as eaten to food as measured
Subsets	Subset selection of individuals and foods
NonDetects	Estimation of parametric distributions for concentration values

Data Source
- ➤ press New Project
- ➤ check From an Acces File (.mdb)
- ➤ submit

New Project	1. Data Selection	2. Specify Model	3. Set and Run	4. View Output

Data Selection SubSteps: Data Source   Server/File

Data Selection Details:

Previous	Cancel (Back to Central Menu)	Submit

Please choose a method of data entry (see Manual for details):

◉ From an Access File (.mdb)
○ From an Excel File (.xls)
○ Simulate data to an Excel File (.xls)

Data Server
- ➤ check RIVM
- ➤ check Your own database
- ➤ submit

New Project	1. Data Selection	2. Specify Model	3. Set and Run	4. View Output

Data Selection SubSteps: Data Source   Data Server   Data Bases   Data Tables   Compound   Conversion   Subsets   NonDetects

Data Selection Details: Access DB   Database

Previous	Cancel (Back to Central Menu)	Submit

Selection of DataServers

- In the list below you find dataservers that are sharing data with you.
- Select one or more servers whose data you wish to use for a MCRA analysis.

☑ RIVM
☑ Your own database

Data Bases

- ➢ check Own database VCPkids.mdb
- ➢ check Own database VCPkids_Pat_05LOD.mdb
- ➢ check RIVM validation.mdb
- ➢ submit

New Project	1. Data Selection ▶	2. Specify Model ▶	3. Set and Run ▶	4. View Output ▶

Data Selection SubSteps:	Data Source	Data Server	Data Bases	Data Tables	Compound	Conversion	Subsets	NonDetects

Data Selection Details:	Access DB	Database

Previous	Cancel (Back to Central Menu)	Submit

Selection of databases

- In the list below you find dataservers and databases.
- Select one or more databases that you wish to use for a MCRA analysis.
- You can use the File Explorer to upload new files to your webfolder.

Own databases
- ☐ mcraPES_NL_5.mdb
- ☑ VCPkids.mdb
- ☑ VCPkids_PAT_05LOD.mdb

RIVM
- ☐ validation.mdb
- ☐ aa demo CZ.mdb
- ☐ aa demo IT.mdb
- ☐ aa demo NL.mdb
- ☐ aa demo SE.mdb
- ☐ acrylamide demo.mdb

[clear]

Data Tables

- ➢ check requested tables
- ➢ submit

New Project	1. Data Selection ▶	2. Specify Model ▶	3. Set and Run ▶	4. View Output ▶

Data Selection SubSteps:	Data Source	Data Server	Data Bases	Data Tables	Compound	Conversion	Subsets	NonDetects

Data Selection Details:	Access DB	Database	Ready

Previous	Cancel (Back to Central Menu)	Submit

Selection of tables

- Select tables (all tables in a database, or individually selected tables from multiple databases)

Select All Tables	Food consumption	Food	Individual	Compound	Country	Concentration values	Food cons. quantification	Food cons. uncertainty	Food composition	Food Market share	Food properties	Agricultural use	Processing	Variability Prod	Variability Comp Prod	Variability ProcComp Prod	Conc. worst case values
☐ VCPkids.mdb	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
☐ VCPkids_PAT_05LOD.mdb	☑	☑	☐	☑	☑	☑	☐	☐	☑	☐	☑	☐	☑	☐	☐	☐	☐

[clear]

Compound
- ➢ select covariable age
- ➢ select cofactor sex
- ➢ select survey VCP-kids
- ➢ select compound patuline
- ➢ submit

New Project	1. Data Selection	2. Specify Model	3. Set and Run	4. View Output

Data Selection SubSteps:	Data Source	Data Server	Data Bases	Data Tables	Compound	Conversion	Subsets	NonDetects
Data Selection Details:	Access DB	Database	Ready	Ready				

Previous	Cancel (Back to Central Menu)	Submit

Your Database Table selection is complete.

Show DataBase Tables

	covariable	cofactor
choose a covariable and/or cofactor	age	sex
the database contains 1 survey	VCP-kids	
only 1 substance is found	PATULINE	

Conversion
- ➢ check subtype <100%
- ➢ Start Conversion

New Project	1. Data Selection	2. Specify Model	3. Set and Run	4. View Output

Data Selection SubSteps:	Data Source	Data Server	Data Bases	Data Tables	Compound	Conversion	Subsets	NonDetects
Data Selection Details:	Access DB	Database	Ready	Ready	PATULINE			

Previous	Cancel (Back to Central Menu)	Start Conversion

Help Information Overview about choices to be made in this screen

Selected tables
- ☐ use alternative foodnames, e.g. national language
- ☐ count consumptions

Codes for consumed food will be converted. Conversions options are:
- ☑ subtype < 100%
- ☐ allow conversion to supertypes (step 5)
- ☐ allow worstcase concentrations (step 7)

The conversion algorithm converts food as eaten to food as measured. This will take some time depending on the size of the databases.

Conversion continued
- ➢ check continue with 2 foods (for which positive concentration are found)
- ➢ submit

New Project	1. Data Selection ▶	2. Specify Model ▶	3. Set and Run ▶	4. View Output ▶

Data Selection SubSteps:	Data Source	Data Server	Data Bases	Data Tables	Compound	Conversion	Subsets	NonDetects
Data Selection Details:	Access DB	Database	Ready	Ready	PATULINE	Ready but Unspecified		

Previous	Cancel (Back to Central Menu)	Submit

Results of conversion of foodcodes

Click here if you want to redo your Conversion with new settings.

Data selection:	SQL
Data selected on:	11-8-2010 11:55:03
Food consumption survey:	VCP-kids
Substance:	PATULINE
Number of consumed foods:	1200
the number of derived foods with positive concentration values is:	2
the number of derived foods with nondetects only:	23
the number of derived foods with worstcase values only:	NAN
the number of consumed foods with positive concentration values is:	83
the number of consumed foods with nondetects only:	460
the number of consumed foods for which no information is found:	657
overview of foods	show
overview of conversion and download	show

◉ continue with 2 food (for which positive concentrations are found)
○ continue with 2 + 23= 25 food (positive concentrations and nondetects)

After a successful Data Selection, the central menu indicates which steps were performed together with some short information. The selected data is displayed as **unnamed** and can be saved for future use.

New Project	1. Data Selection ▶	2. Specify Model ▶	3. Set and Run ▶	4. View Output ▶

Current:	unnamed	unnamed	unnamed
On:	11-8-2010 11:55:03		
Status:	Database Data Ready		

Data Selection SubSteps:	Data Source	Data Server	Data Bases	Data Tables	Compound	Conversion	Subsets	NonDetects
Data Selection Details:	Access DB	Database	Ready	Ready	PATULINE	Ready and Specified	Original Set	

➢ select scrolldown
➢ save as…Patuline

Example: specification of input options

2. Specify Model ▶	
Risk and concentration modelling	Risk type (acute, chronic), number of Monte Carlo simulations, intake model (BBN, ISUF, LNN, OIM), modelling of concentration data (empirical, parametric), processing and replacement of nondetects by the LOR
Additional modelling	Modelling of intake frequency and amounts

Risk and Concentration modelling

- ➢ check chronic
- ➢ select intake model betabinomialnormal
- ➢ select all foods empirical
- ➢ select replace all nondetects
- ➢ submit

New Project	1. Data Selection	2. Specify Model	3. Set and Run	4. View Output

Current: | Patuline | unnamed | unnamed
On: | 11-8-2010 11:55:03

Model Selection SubSteps: | Risk and Concentration Modelling | Additional Modelling

Cancel (Back to Central Menu)   Submit

Input Form

risk type
○ acute ◉ chronic

number of Monte Carlo simulations | 100000
random seed | 0
intake model | betabinomial/normal [BBN]

Concentration data Processing and non-detects

modeling of concentration distr. | all foods empirical(m1)
replace nondetects by [fraction of] LOR | replace all nondetects
multiplication constant for LOR | 0.5
processing factors | no processing

Additional modelling
- ➢ intake frequency: check
  - o sex effect no
  - o age effect yes
  - o function polynomial
  - o use default for minimum and maximum degrees of freedom for polynomial fit
  - o use default backward selection for testing the degrees of freedom of polynomial fit
  - o use default significance level α = 0.01 for backward testing
- ➢ intake amount: check
  - o transformation before modelling logarithmic
  - o sex effect no
  - o age effect yes
  - o function polynomial
  - o use default for minimum and maximum degrees of freedom for polynomial fit
  - o use default backward selection for testing the degrees of freedom of polynomial fit
  - o use default significance level α = 0.01 for backward testing
- ➢ select scrolldown
- ➢ save as…PatulineBBNage
- ➢ submit

Model Selection SubSteps: | Risk and Concentration Modelling | Additional Modelling

Cancel (Back to Central Menu) | Submit

Input Form

Intake model
Betabinomial for frequency and Normal for transformed amounts

intake frequency

sex effect ○ yes ◉ no

age effect ◉ yes ○ no

function ○ spline ◉ polynomial

minimum degrees of freedom [0 ▾]

maximum degrees of freedom [4 ▾]

testing method ◉ backward ○ forward

testing at level [0.01]

intake amount

transformation before modeling ○ power ◉ logarithmic

sex effect ○ yes ◉ no

age effect ◉ yes ○ no

function ○ spline ◉ polynomial

minimum degrees of freedom [0 ▾]

maximum degrees of freedom [4 ▾]

testing method ◉ backward ○ forward

testing at level [0.01]

Example: specification of output options

3. Set and Run	
Output options	Uncertainty analysis (yes, no), resample consumptions, individuals, concentrations and processing factors (yes, no), options concerning graphical and tabular output.
Start Monte Carlo Simulations	Start a MCRA analysis

Start Monte Carlo Simulations
- ➢ check Perform Uncertainty Analysis is yes
- ➢ use default number of resampled sets is 100
- ➢ use default number of simulations per resampled set is 10.000
- ➢ check resample individuals is yes
- ➢ check resample concentrations is yes
- ➢ select scrolldown
- ➢ save as…PatulineBBNageUnc
- ➢ Start MCRA Analysis

After starting the MCRA analysis, the spinning wheel indicates that the job is running. Note that all main tasks are available except the View Output task. The View Output window automatically opens after a successful run (output not shown).

Example: viewing and saving output

| **Manage output** | Save, Rename, Delete and View output |

View Output
- ➢ check save
- ➢ save output as… PatulineBBNageUnc for future use

System:	Project:	Data:	On:	Model:	On:	Run:	Started:	Completed:	View	Save
current	PatulineBBNageUnc	Patuline (SQL)	11-8-2010 11:55:03	PatulineBBNage	11-8-2010 12:34:37	PatulineBBNageUnc	11-8-2010 12:41:24	11-8-2010 12:42:09	View Output	Save

Project:	Data:	On:	Model:	On:	Run:	Started:	Completed:	View	Rename	Delete
PatulineBBNageUnc	Patuline (SQL)	11-8-2010 11:55:03	PatulineBBNage	11-8-2010 12:34:37	PatulineBBNageUnc	11-8-2010 12:41:24	11-8-2010 12:42:09	View Output	Rename	Delete

Example: user profiles

The scrolldown boxes below the main task button enables the user to manage the data, input models, output options and output of MCRA. At any moment these user profiles can be modified. Available options are:

- save a unnamed selection or model (save as…)
- rename a selection or model (rename)
- delete a selection or model (delete)
- retrieve a former selection or model

Scrolldown
- ➢ Data Selection: save as… Patuline
- ➢ Specify model: save as… PatulineBBNage
- ➢ Set and Run: save as…PatulineBBNageUnc
- ➢ View Output: save as PatulineBBNageUnc

References

Boer, de W.J., Voet van der, H., Bokkers B.G.H., Bakker, M.I., Boon, P.E. (2009). Comparison of two models for the estimation of usual intake adressing zero consumption and non-normality. Food Additives and Contaminants. Part A, 26:11,1433 - 1449