



MW PHARM++
The best choice for TDM.

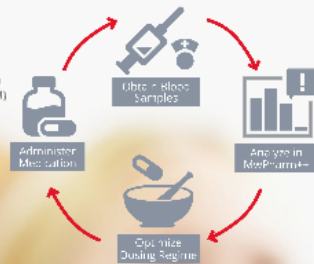
Among all available Therapeutic Drug Monitoring software MWPHARM++ has the largest database:

175 drugs with their pharmacokinetic properties
285 population models.



MW PHARM++

MwPharm++ is an efficient application for Therapeutic Drug Monitoring (TDM) to optimize pharmacotherapy by establishing a proper dosing regimen based on population PK parameters from an extensive drug database and individual physiological patient parameters



MW PHARM++
The best choice for TDM.

20+ years MWPHARM is trusted in clinical practice for 20+ years
1991 Dutch Standard since 1991 by the Dutch Association of Hospital Pharmacists (NVZA)



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The best choice for TDM.



MWPHARM has been awarded in 2013 to be the world's best solution for TDM software

Sucha A. Gupta, Thomas Sauer, E. Wouter N. van der Wal, Therapeutic Drug Monitoring software: a review of available computer tools. Therapeutic Drug Monitoring, 2013, 35(1):2-10. doi: 10.1007/s12325-012-0001-0

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Julia A. Goff, C. Thom, S. Barth, M. van N. B. and others. Best awarding therapeutic drug monitoring software in a review of available computer based drug therapeutics and pharmacokinetic data for the pharmaceutical industry.

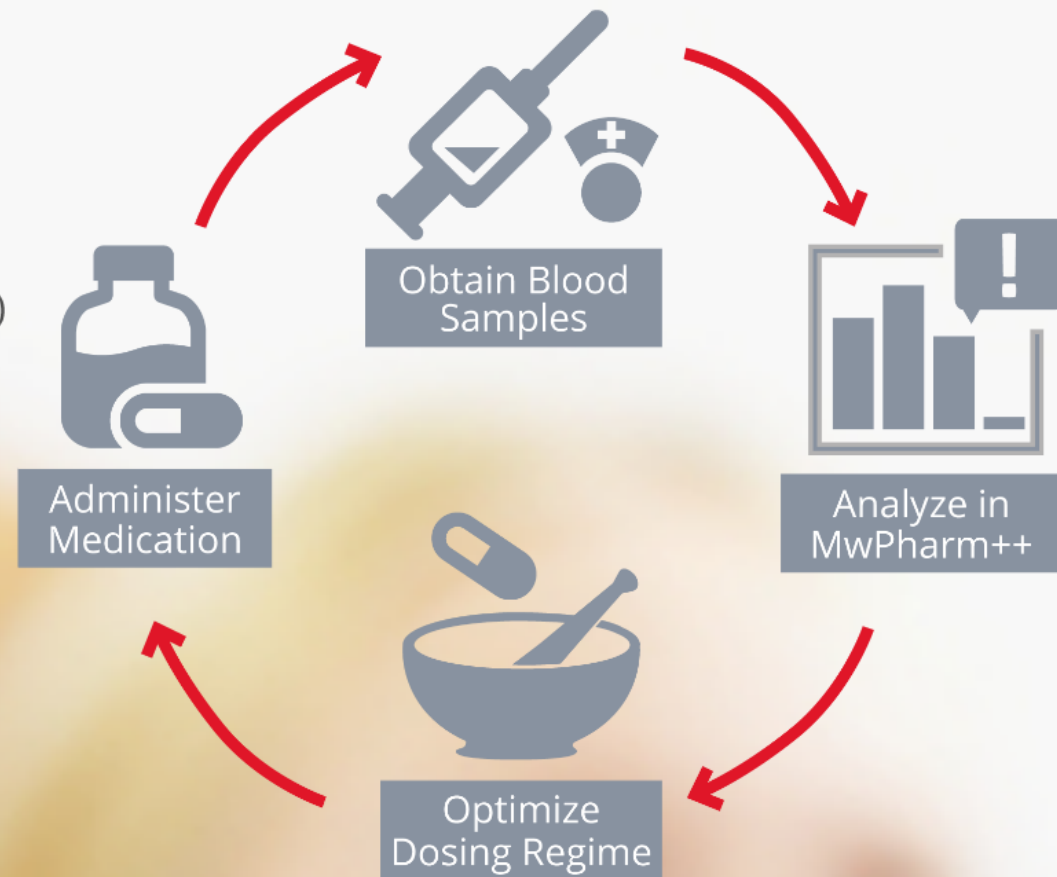
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System Requirements

Minimum Requirements

Processor: 1.2 GHz or higher
(32-bit (x86) or 64-bit (x64) processor)

RAM: 512 MB or more
(available for the application)

Harddisk space: 1 GB

Supported Operating Systems:
Windows Vista SP2, Windows 7,
Windows 8, Windows 8.1

Virtual desktop environments such as Citrix
are also possible after configuration



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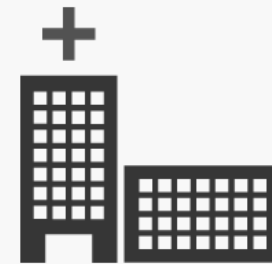
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to be the world's best solution for TDM software**

Fuchs A, Csajka C, Thoma Y, Buclin T, Widmer N.: Benchmarking therapeutic drug monitoring software: a review of available computer tools. *Clinical Pharmacokinetics*. 2013 Jan; 52(1):9-22. doi: 10.1007/s40262-012-0020-y

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*Dutch Standard since
1991*

NVZA - the Netherlands



*CE-marking
Software conforms to
legal requirements*

Europe



*ISO 13485 Certified
quality management system for
medical devices*

Europe



*ISO 9001 Certified
quality management system for
organisations*

Europe

MwPharm DOS has been casting its light for more than 20 years

MWPHARM++ has been greatly improved to have it rock solid for the next 20+ years. For this, a new foundation has been developed for MWPHARM++ called EDSIM++

MW PHARM++

The approach to TDM you are familiar with

EDSIM++

The new foundation for MWPHARM++ with new PK/PD simulation capabilities

Log in

Additional users can be created under the User tab.

Model Results Notes MwPharm

USERS

Name

Username

Password

Level

Administrator
Super User
Normal User


Insert

MwPharm++

File Model Chart Macro Object Help

Name: Type:

Model MwPharm



Therapeutic Drug Management

MwPharm++ is an efficient TDM application for establishing a proper dosing regimen based on population PK parameters from an extensive drug database and individual physiological patient parameters.

Username

Password

Author	Mediware Development Team	Name	MwPharm	Date	29-9-2014
Copyright	Mediware a.s.	Version	1.1.8.476		

Sim



The best choice for TDM.

The approach to TDM you are familiar with

"Ease of transition for existing users is one of the focus areas for MwPharm++"

While MwPharm++ is built on the new foundation Edsim++,

this version has the look & feel you are familiar with

(see for example, the Patient tab on the right),

to ease the transition from MwPharm DOS to MwPharm++.

Off course, shortcut keys (such as **F12**) are still present in MwPharm++.

The screenshot shows the MwPharm++ application window. The interface is divided into several sections:

- PATIENT** section on the left, containing fields for Patient Number (1234567890), Name and Initials (Johnson, D.), Date of Birth (18-10-1955), Sex (Female), Address, Postcode / Zipcode, City, Family Doctor, Requesting Physician, Ward, Room Number, Description, Medication Date (21-3-1990), Age (34 years), Last Medication (gentamicin), and Date of Change (11-10-2015).
- Table** on the right with columns for Dob, Number, and Name. The table lists various cases, with the entry for 18-10-1955, 1234567890, Johnson, D. highlighted in blue.
- Buttons** at the bottom of the table: Standard, Load, Active, Delete, Update, Insert.
- Navigation** at the bottom: Login, Patient, Status, Case, History, Simulation, Fitting, Dosing, Users, Settings, Help, About.

Status tab

After selecting a patient, you can fill in the physiological patient parameters in the Status tab.

Select for example: the Renal Function of the patient

You can also see a small summary of the Population model here

The screenshot displays the MwPharm++ software interface. The 'Model' tab is active, showing patient status and population model parameters.

STATUS

Weight	68.0 kg	Bsa	1.73 m ²
Height	162 cm	Bmi	25.9 kg/m ²
Sex	Female	Lbm	54.2 kg
Race	Caucasian	Lbmc	59.7 kg
RF Weight Measure	Lbm	Ffm	41.7 kg
RF Schwartz Constant k	0.55	Age	34 years

Renal Function (mL/min) Johnson, D. (18-10-1955)

Renal Function dropdown menu:

- Jelliffe II - 1 serum creatinine level
- Jelliffe II - 2 serum creatinine level
- MDRD
- MDRD revised IDMS (175)
- CKD-EPI
- Lund-Malmö Revised
- Lund-Malmö Revised (LBM variant)
- User-estimated creatinine clearance

Creatinine Clearance: 51.5 mL/min/1.73m², 51.4 mL/min

Pathology: [Redacted]

Renal Function (mL/min) Reference Patients

Reference Patient	Renal Function (mL/min)
Pat	~50
Opt	~80
Std	~95
P20	~110
P30	~105
P40	~95
P50	~85
P60	~75
P70	~65
P80	~55
P90	~45

Population gentamicin [gentamicin_C1]

CL	1.74 L/h	t _{1/2}	5.00 h
V	12.54 L		
fe	0.8918		

Manage cases of patients with ease

After selecting a patient:

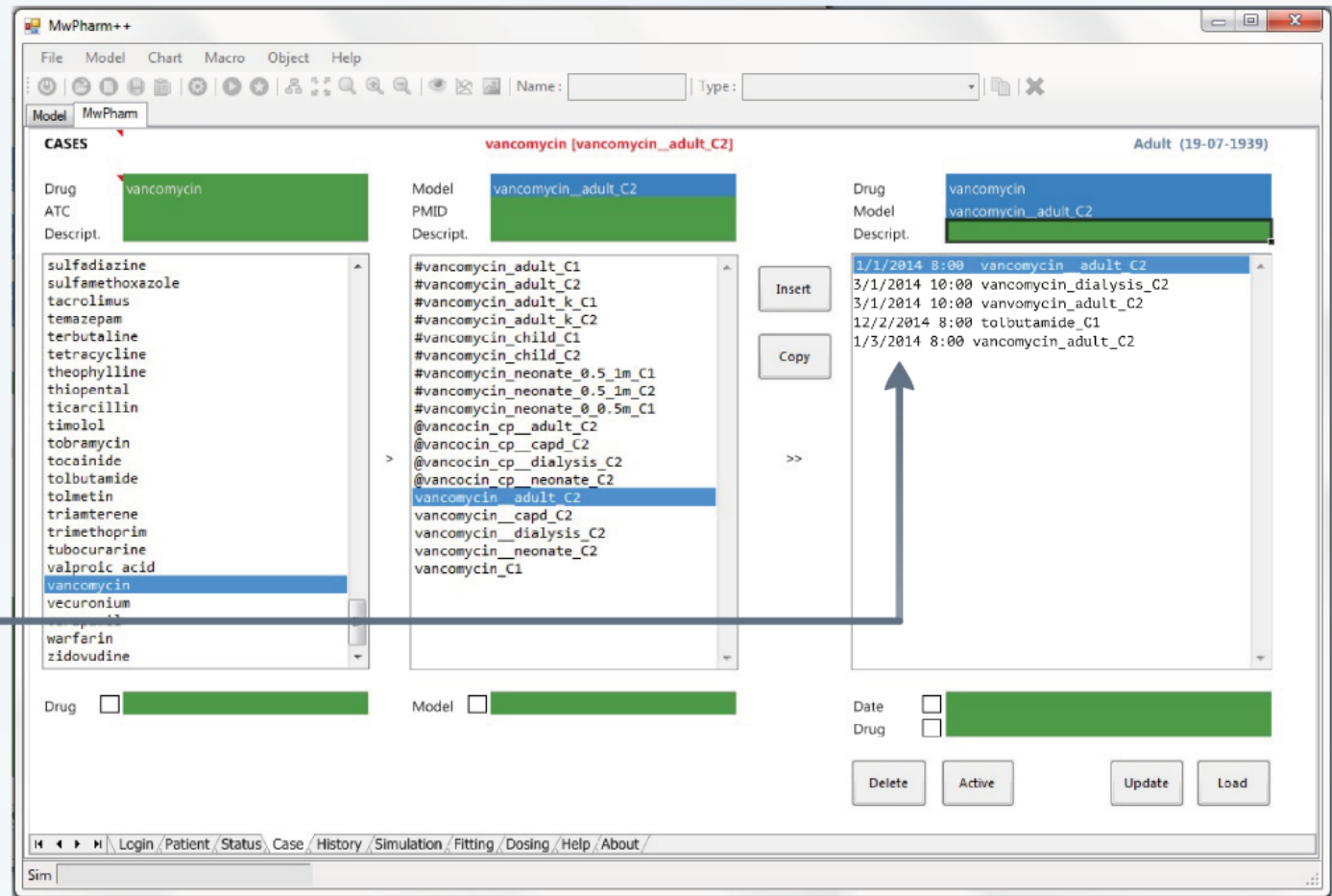
Select one of the 175 drugs and one of the 285 population models

Click on *Insert* to create a Case

You can add as many cases to the same patient as you prefer.

In MwPharm DOS it was common to create an additional record of the same patient (and include date and/or patient number in the name of the record) for creating a new dosing regime.

The benefit of creating Cases is that the list of patients under Patient tab will contain only unique patients.



The approach to TDM you are familiar with

You can still deselect a row using the Space bar on the keyboard.

Hemodialysis can also be added.

You can find the familiar shortcut keys under the red triangles.

Time	Time Entry Rules
08:00	
20:00	p : present time
21:00	= : copy last time
07:55	+ : last time + 1 hour
08:00	- : last time - 1 hour
07:55	If the user enters a time without a date the following rules apply:
09:00	Time > Last Time: Date = Last Date
07:55	Time < Last Time: Date = Last Date + 1 Day

MwPharm++

File Model Chart Macro Object Help

Name: Type:

Model Results Notes MwPharm

HISTORY gentamicin [gentamicin_C1] Johnson, D. (18-10-1955)

Dose Status Sim Sort Clear Store R

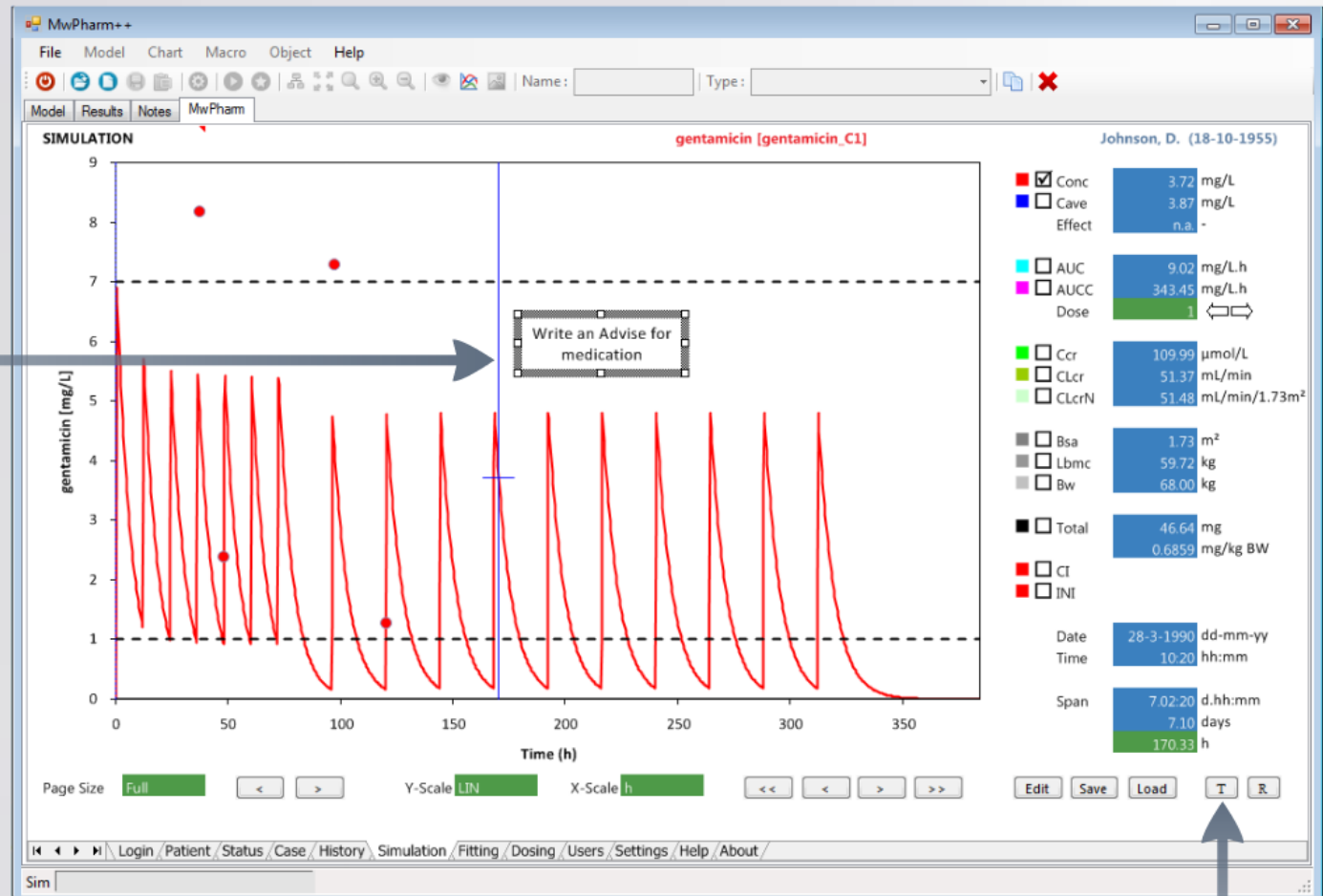
Date	Time	Roa	Value	Unit	No	Interv [h]	T(inf) [h]	Conc. mg/L	Weight kg	Creat. μmol/L	Effect [-]
21-3-1990	08:00	iv	90	mg	1		0.5		68	100	
21-3-1990	20:00	iv	60	mg	5	12	0.5				
22-3-1990	21:00							8.2			
23-3-1990	07:55							2.4			
24-3-1990	08:00	iv	60	mg	11	24	0.5		70	97	
25-3-1990	07:55							1.5			
25-3-1990	09:00							7.3			
26-3-1990	07:55							1.3	68	110	
25-3-1990	07:55	hd	50	mL/min	3	8	4				

Sim

Simulation tab

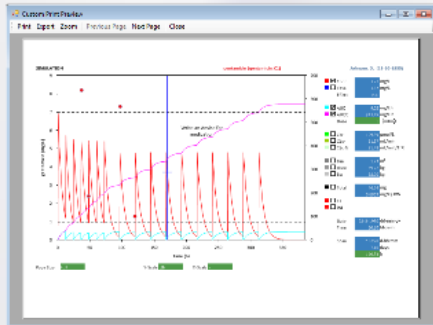
Generate a simulation based on the Dosage regimen created in the History tab.

Create an advise with the Text tool

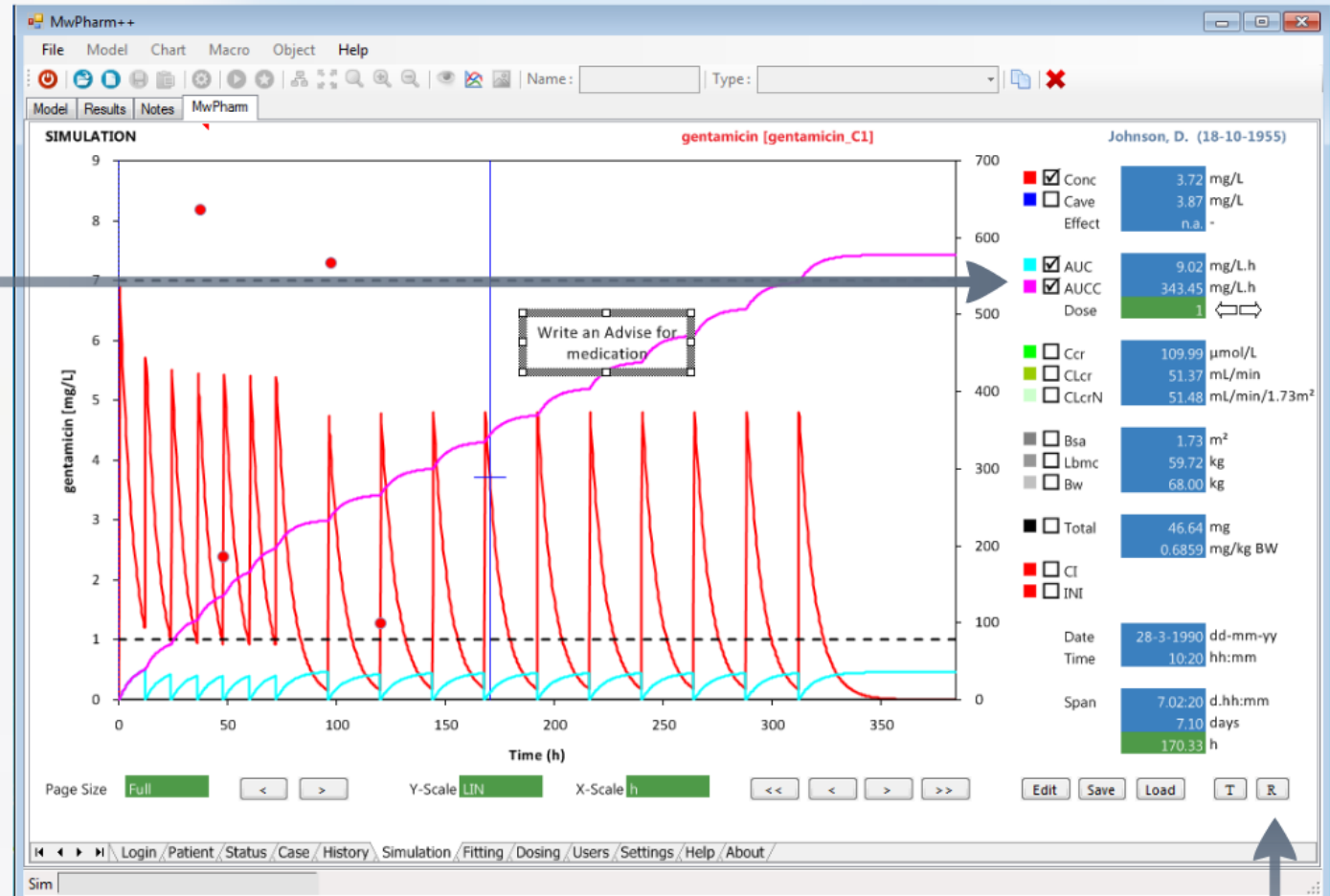


Simulation tab

Toggle check boxes to show other parameters such as Area Under Curve and Area Under Curve Cumulative.



Generate a Report (via R button). This can create a PDF that can be saved, printed, e-mailed et cetera.



Fitting tab

Generate a Fitting

See the difference between the unfitted simulation and the fitted simulation.

The unfitted simulation

FITTING gentamicin [gentamicin_C1] Johnson, D. (18-10-1955)

Bayes Fit

Algorithm Marquardt

Iterations 5

WSS 0.157535191

RMS 0.280655653

R2 0.933711119

Akaike -3.509043456

Generate Bayesian Parameters B

Par. Error (%) 10

Var. Error (%) 10

Show only fitted parameters R

Parameter	Unit	Population	Sd	Initial	Final	Se	Type
C01.V	L/kgLbmc	0.21	0	0.21	0.181599422	0.05066016	Non-Bayesian
RE.k	1/h/(mL/min/1.73m ²)	0.0024	0	0.0024	0.001178218	0.000282164	Non-Bayesian

Fitting tab

3. Lastly, press Fit to generate a Fitting with Bayesian Parameters included.

1. Generate Bayesian Parameters

2. After generating the Bayesian Parameters, set type to Bayesian.

Standard Deviation (SD)
This is what the Bayesian Parameters will generate based on the population model.

The screenshot shows the MwPharm++ software interface. The main window title is "MwPharm++". The menu bar includes "File", "Model", "Chart", "Macro", "Object", and "Help". The toolbar contains various icons for file operations and simulation. The main workspace is titled "gentamicin [gentamicin_C1]" and "Johnson, D. (18-10-1955)".

The "FITTING" panel on the left includes the following settings:

- Bayes: (with a "Fit" button)
- Algorithm: Marquardt
- Iterations: 5
- WSS: 21.51282178
- RMS: 2.319095825
- R2: 0.909476678
- Par. Error (%): 10
- Var. Error (%): 10
- Generate Bayesian Parameters:
- Show only fitted parameters

The graph on the right shows "Variable." on the y-axis (0 to 10) and "Time (h)" on the x-axis (0 to 350). It displays a red oscillating curve representing the concentration of gentamicin over time, with a dotted line indicating the fitted model.

Below the graph is a table of parameters:

Parameter	Unit	Population	Sd	Initial	Final	Se	Type
C01.V	L/kgLbmc	0.21	0.021	0.21	0.162957511	0.023732789	Bayesian
RE k	1/h/(mL/min/1.73m ²)	0.0024	0.00024	0.0024	0.001389638	0.000165088	Bayesian

The "Type" column is highlighted in green for both parameters, indicating they are Bayesian parameters.

Dosing tab

Generated optimized dosing regime (black) based on Fitting.

Dosing regime (red) based on personal settings (in this case: 24 hours, 8 dosages)

Change dosing regime to preferred settings. In this case: every 24 hours and 8 dosages.

Add the dosage regime with preferred settings to History (will be added to a new row).

DOSE CALCULATOR gentamicin [gentamicin_C1] C01.C (mg/L)

Johnson, D. (18-10-1955)

Profile

	User	Exact	P1	P2	P3	P4
Load	65.0	69.6	60	60	60	80
Dose	65.0	60.1	20	40	60	80
Tint	24.00	22.98	12	12	24	24
Ndos	8	2	6	3	3	3
Max	7.47	7.00	3.13	6.20	6.88	9.18
Min	0.98	1.00	1.16	2.29	0.90	1.20
Tmax	0.50	0.50	0.50	0.50	0.50	0.50
Tmin	24.00	22.98	12.00	12.00	24.00	24.00
Ave	3.22	3.10	1.99	3.94	2.96	3.95
pSS	100	100	101	100	100	100

Targets

Target	Value	Unit
Max	7.00	mg/L
Min	1.00	mg/L
Ave	4.00	mg/L
Tint	12.00	h

Route

Input: IV
Duration: 0.50 h

Reference

Levels: R01
Variable: C01.C

Method

Target: MIN_MAX
Algorithm: EXP
Speed: 1 ms

Add to History



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Felix A. Coble, PharmD, David C. Smith, MD, and A. Brockmeyer, PharmD, MSc, awarded as winners of a global competition for Therapeutic Drug Monitoring software organized by the International Society of Therapeutic Drug Monitoring (ISTDM).

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