

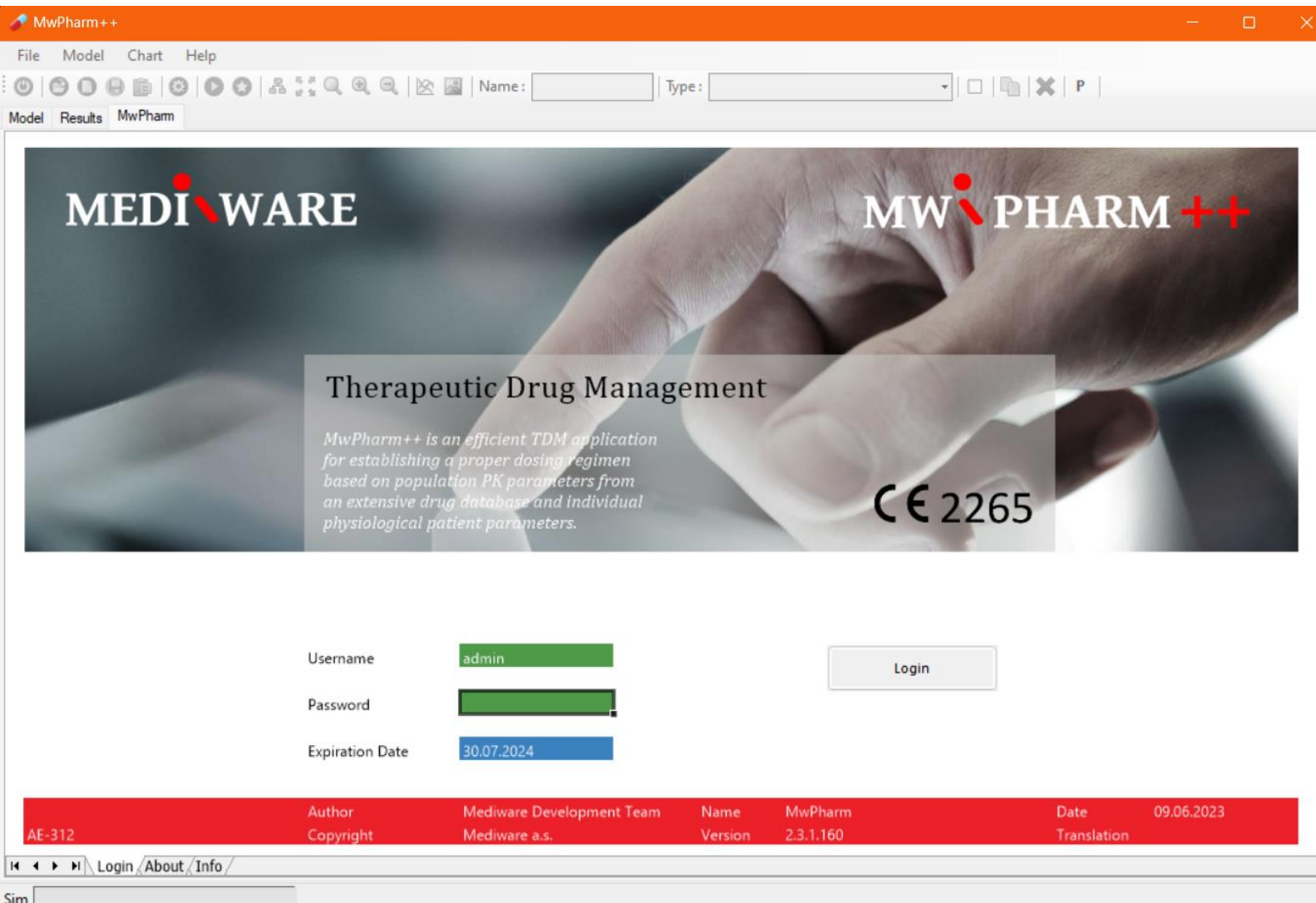
MWPHARM++ USER MANUAL

LOGIN SCREEN

After launching and loading the app, it is necessary to log in. By default (until the user changes it), the account logins are:

Administrator:	Username: admin	Password: admin
Super user:	Username: super	Password: super
Normal user:	Username: user	Password: user
Guest:	Username: guest	Password: guest

The application supports **multiple user accounts**.



PATIENT SCREEN – CREATING A NEW RECORD

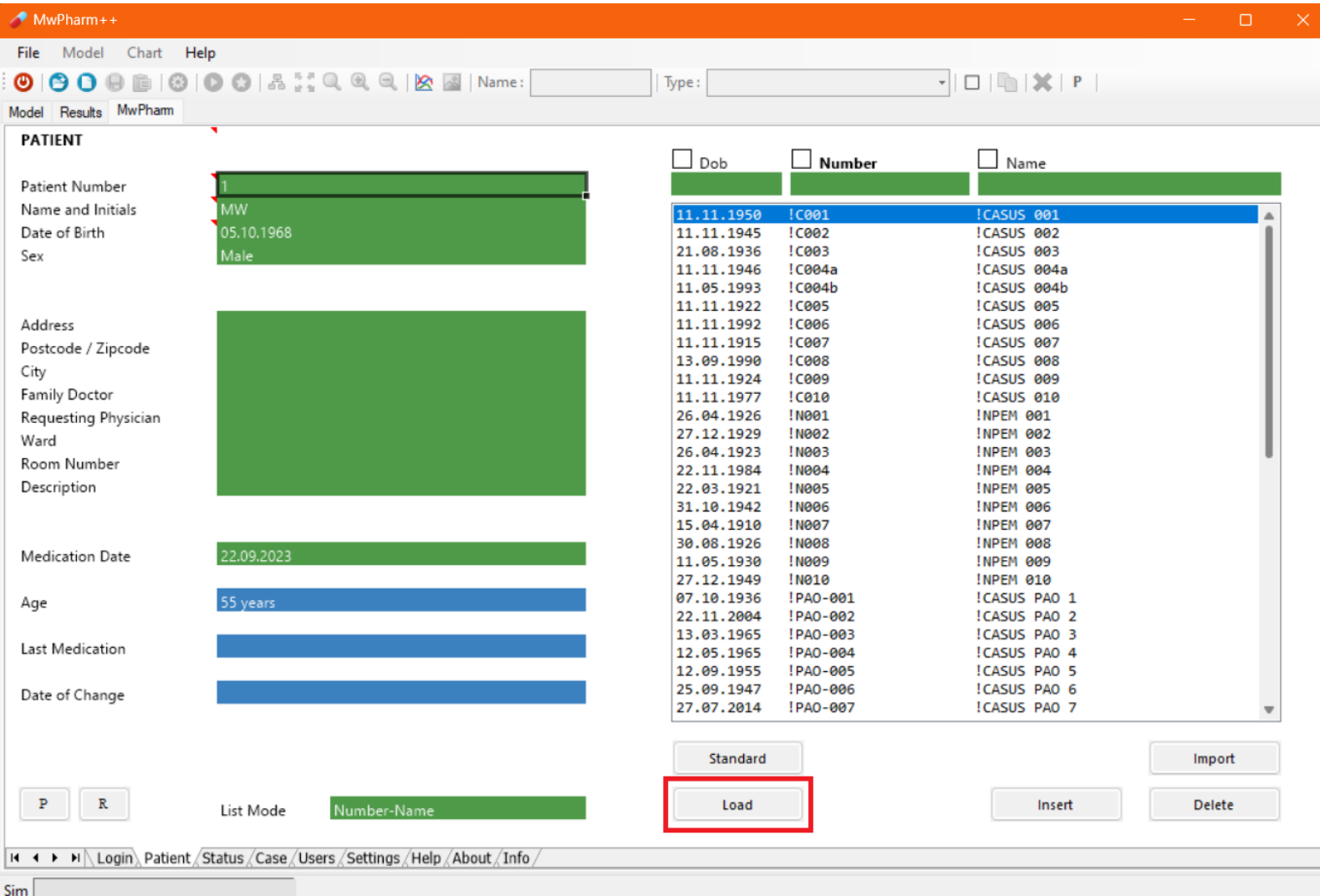
Click on **Standard** button to create a new record in the patient database. Fill the Patient Number, Name, Date of Birth and Sex and click on **Insert** button. New patient will be inserted into the database.

The screenshot shows the MwPharm++ Patient screen. The interface includes a menu bar (File, Model, Chart, Help), a toolbar, and a patient form on the left. The form fields are: Patient Number (1), Name and Initials (MW), Date of Birth (05.10.1968), Sex (Male), Address (2), Postcode / Zipcode, City, Family Doctor, Requesting Physician, Ward, Room Number, and Description. Below these are Medication Date (22.09.2023), Age (55 years), Last Medication, and Date of Change. At the bottom left are buttons for 'P' and 'R', and a 'List Mode' dropdown set to 'Number-Name'. On the right is a table of existing patients with columns for 'Dob', 'Number', and 'Name'. At the bottom right are buttons for 'Standard' (1), 'Insert' (3), and 'Import'.

Dob	Number	Name
11.11.1950	!C001	!CASUS 001
11.11.1945	!C002	!CASUS 002
21.08.1936	!C003	!CASUS 003
11.11.1946	!C004a	!CASUS 004a
11.05.1993	!C004b	!CASUS 004b
11.11.1922	!C005	!CASUS 005
11.11.1992	!C006	!CASUS 006
11.11.1915	!C007	!CASUS 007
13.09.1990	!C008	!CASUS 008
11.11.1924	!C009	!CASUS 009
11.11.1977	!C010	!CASUS 010
26.04.1926	!N001	!NPEM 001
27.12.1929	!N002	!NPEM 002
26.04.1923	!N003	!NPEM 003
22.11.1984	!N004	!NPEM 004
22.03.1921	!N005	!NPEM 005
31.10.1942	!N006	!NPEM 006
15.04.1910	!N007	!NPEM 007
30.08.1926	!N008	!NPEM 008
11.05.1930	!N009	!NPEM 009
27.12.1949	!N010	!NPEM 010
07.10.1936	!PA0-001	!CASUS PAO 1
22.11.2004	!PA0-002	!CASUS PAO 2
13.03.1965	!PA0-003	!CASUS PAO 3
12.05.1965	!PA0-004	!CASUS PAO 4
12.09.1955	!PA0-005	!CASUS PAO 5
25.09.1947	!PA0-006	!CASUS PAO 6
27.07.2014	!PA0-007	!CASUS PAO 7

PATIENT SCREEN – SELECTING EXISTING PATIENT

Select the patient and click **Load** button to load existing patient from the database.



PATIENT

Patient Number: [i]
 Name and Initials: MW
 Date of Birth: 05.10.1968
 Sex: Male

Address:
 Postcode / Zipcode:
 City:
 Family Doctor:
 Requesting Physician:
 Ward:
 Room Number:
 Description:

Medication Date: 22.09.2023
 Age: 55 years
 Last Medication:
 Date of Change:

Standard Import
Load Insert Delete

<input type="checkbox"/> Dob	<input type="checkbox"/> Number	<input type="checkbox"/> Name
11.11.1950	!C001	!CASUS 001
11.11.1945	!C002	!CASUS 002
21.08.1936	!C003	!CASUS 003
11.11.1946	!C004a	!CASUS 004a
11.05.1993	!C004b	!CASUS 004b
11.11.1922	!C005	!CASUS 005
11.11.1992	!C006	!CASUS 006
11.11.1915	!C007	!CASUS 007
13.09.1990	!C008	!CASUS 008
11.11.1924	!C009	!CASUS 009
11.11.1977	!C010	!CASUS 010
26.04.1926	!N001	!NPEM 001
27.12.1929	!N002	!NPEM 002
26.04.1923	!N003	!NPEM 003
22.11.1984	!N004	!NPEM 004
22.03.1921	!N005	!NPEM 005
31.10.1942	!N006	!NPEM 006
15.04.1910	!N007	!NPEM 007
30.08.1926	!N008	!NPEM 008
11.05.1930	!N009	!NPEM 009
27.12.1949	!N010	!NPEM 010
07.10.1936	!PAO-001	!CASUS PAO 1
22.11.2004	!PAO-002	!CASUS PAO 2
13.03.1965	!PAO-003	!CASUS PAO 3
12.05.1965	!PAO-004	!CASUS PAO 4
12.09.1955	!PAO-005	!CASUS PAO 5
25.09.1947	!PAO-006	!CASUS PAO 6
27.07.2014	!PAO-007	!CASUS PAO 7

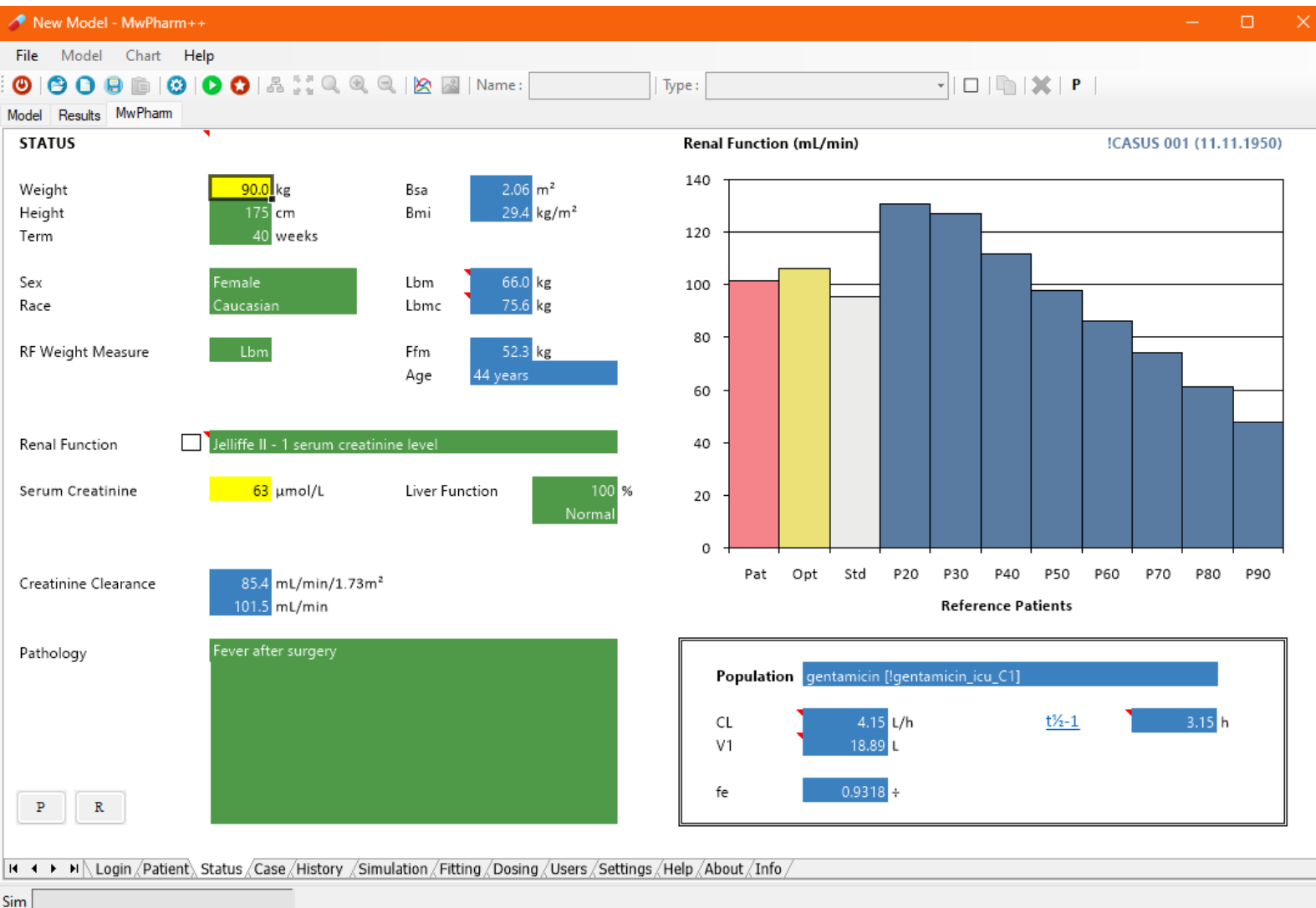
P R List Mode: Number-Name

Login Patient Status Case Users Settings Help About Info

Sim

STATUS SCREEN

Specify the data of your patient: weight, height, sex, etc.



STATUS

Weight: 90.0 kg
 Height: 175 cm
 Term: 40 weeks

Sex: Female
 Race: Caucasian

RF Weight Measure: Lbm

Renal Function: Jelliffe II - 1 serum creatinine level

Serum Creatinine: 63 µmol/L
 Liver Function: 100% Normal

Creatinine Clearance: 85.4 mL/min/1.73m²
 101.5 mL/min

Pathology: Fever after surgery

Renal Function (mL/min) !CASUS 001 (11.11.1950)

Bar chart showing Renal Function (mL/min) for Reference Patients (Pat, Opt, Std, P20, P30, P40, P50, P60, P70, P80, P90).

Population gentamicin [!gentamicin_icu_C1]

CL: 4.15 L/h
 V1: 18.89 L
 t_{1/2}-1: 3.15 h
 fe: 0.9318 +

List of abbreviations (Status screen):

- Bsa Body surface area
- Bmi Body mass index
- Lbm Lean body mass
- Lbmc Corrected lean body mass
- Ffm Fat-free mass
- CL Total clearance

- V1 Volume of distribution
- fe Fraction excreted unchanged
- t_{1/2} Elimination half-life

Select appropriate renal function:

New Model - MwPharm++

File Model Chart Help

Name: Type: P

Model Results MwPharm

STATUS

Weight: 90.0 kg Bsa: 2.06 m²
 Height: 175 cm Bmi: 29.4 kg/m²
 Term: 40 weeks

Sex: Female Lbm: 66.0 kg
 Race: Caucasian Lbmc: 75.6 kg

RF Weight Measure: Lbm Ffm: 52.3 kg
 Age: 44 years

Renal Function: **Jelliffe II - 1 serum creatinine level**

Serum Creatinine

Creatinine Clearance: 101.5 mL/min

Pathology: Fever after surgery

Renal Function (mL/min) !CASUS 001 (11.11.1950)

Reference Patient	Renal Function (mL/min)
Pat	100
Opt	105
Std	95
P20	130
P30	125
P40	110
P50	95
P60	85
P70	75
P80	65
P90	50

Population: gentamicin [gentamicin_icu_C1]

CL: 4.15 L/h t_{1/2}-1: 3.15 h
 V1: 18.89 L
 fe: 0.9318 ±

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CASE SCREEN

To administer a drug to the patient, select appropriate one from the left column (1).

In the middle column, there are listed available models of the chosen drug for specific groups of patients (specific PK parameters). By selection of the appropriate model from the middle column (2) and clicking **Insert** button (3) is the drug assigned to the patient and the History screen is opened.

To edit or view an existing case, select the case in the right column (4) and click **Load** button (5).

The screenshot displays the MwPharm++ Case Screen interface. The window title is "MwPharm++" and the menu bar includes "File", "Model", "Chart", and "Help". The main area is divided into three columns:

- Left Column (1):** A list of drugs. "gentamicin" is selected and highlighted with a red circle.
- Middle Column (2):** A list of models for the selected drug. "!gentamicin_icu_C1" is selected and highlighted with a red circle.
- Right Column (4):** A list of existing cases. "01.11.1994 6:00 !gentamicin_icu_C1" is selected and highlighted with a red circle.

Buttons and actions are indicated by red circles and numbers:

- 3:** The "Insert >" button is highlighted.
- 5:** The "Load" button is highlighted.

At the bottom, the status bar shows navigation options: "Login", "Patient", "Status", "Case", "History", "Simulation", "Fitting", "Dosing", "Users", "Settings", "Help", "About", "Info".

HISTORY SCREEN

Fill the drug administration history: date, time, route of administration, and dosing.

When you move cursor over the red triangle, the help text describing function of the particular field appears.

To save the patient history, click **Store** button or get back to the Case screen and click on **Update** button under right column.

To perform the simulation, click **Sim** button or move forward to the Simulation screen.

The screenshot shows the MWP Pharm++ History screen for gentamicin. The table displays the following data:

Date	Time	Roa	Value	Unit	No	Interv [h]	T(inf) [h]	Conc. mg/L	Weight kg	Creat. μmol/L	Liver %
01.11.1994	06:00	iv	120	mg		3	12	0.7	90	63	
02.11.1994	05:30							0.37			
02.11.1994	07:20							4.58			
02.11.1994	18:00	iv	160	mg		8	12	0.5			

A tooltip for the 'Liver' column is shown, containing the text 'Liver function'.

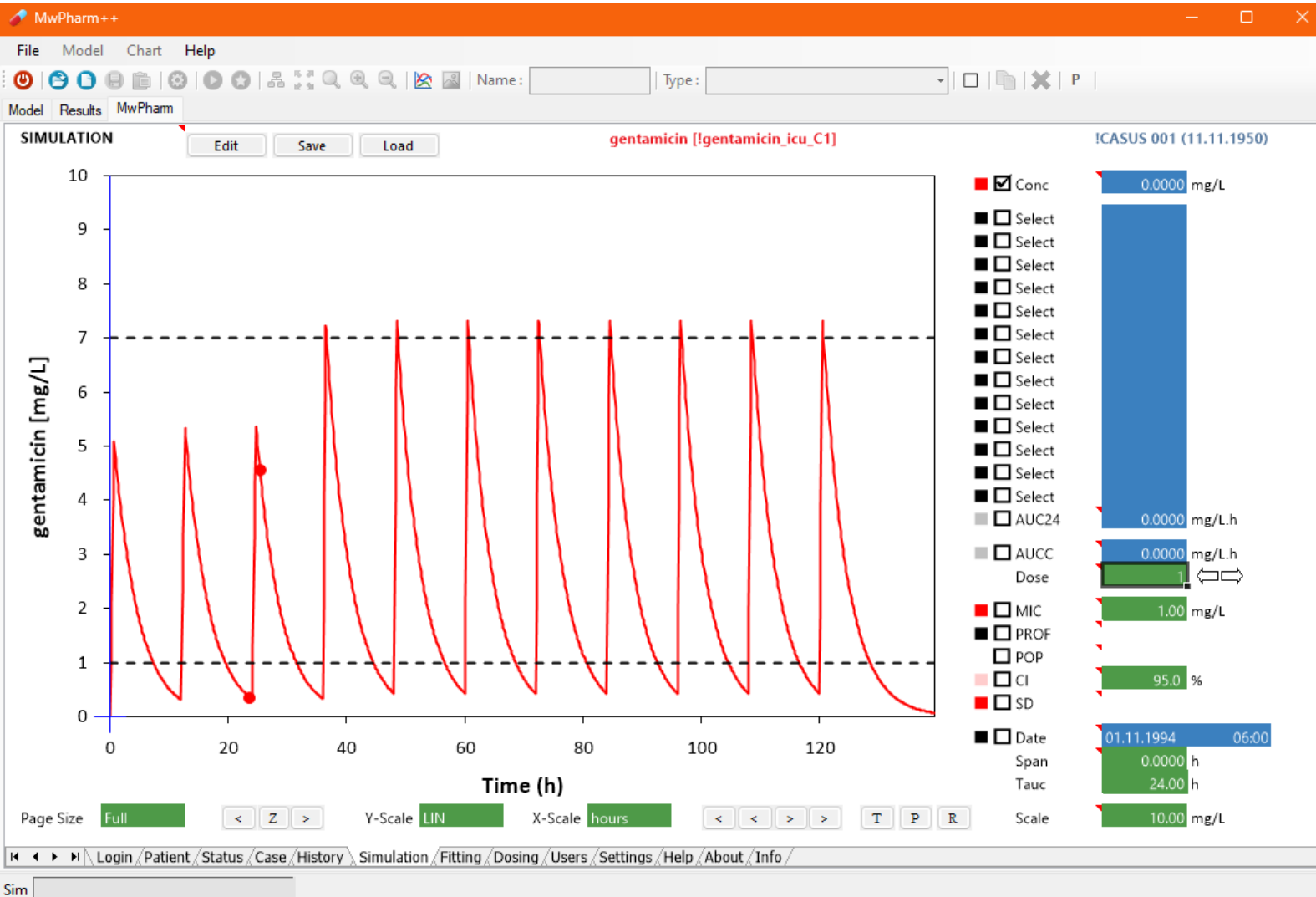
List of abbreviations (History screen):

- Roa Road of administration
- No Number of administrations or dialyses
- Interv Time interval between administrations or dialyses
- T(inf) Duration of administrations or dialyses
- Conc. Drug concentration
- Creat. Creatinine level

SIMULATION SCREEN

By checking the boxes, user can show different curves in the graph such as: concentration, AUC (under every peak), AUCC (from zero to the infinity), creatinine clearance confidence interval etc. By clicking the **Select** field, user can add additional observable curves to the right panel.

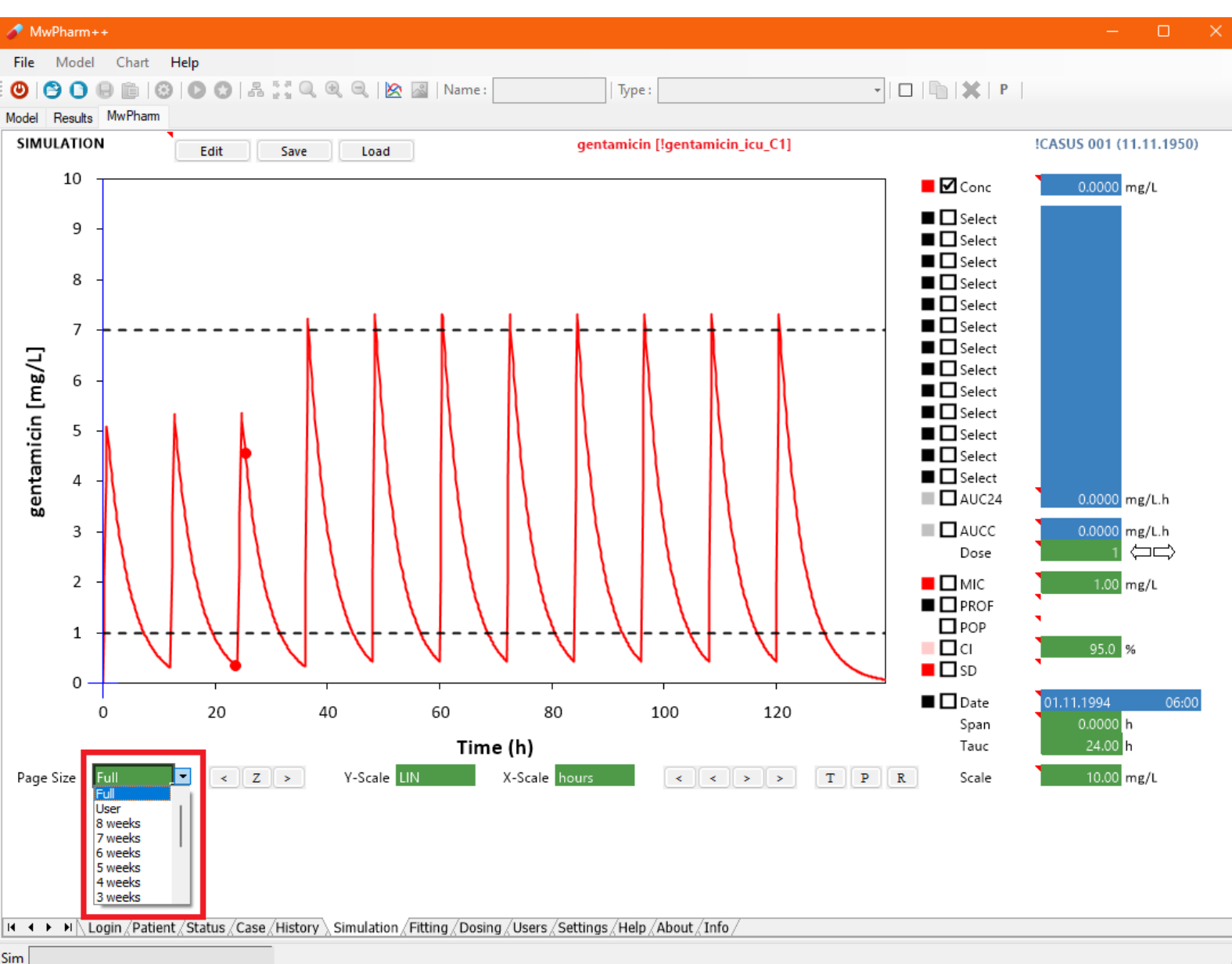
To perform the fitting, move to the Fitting screen.



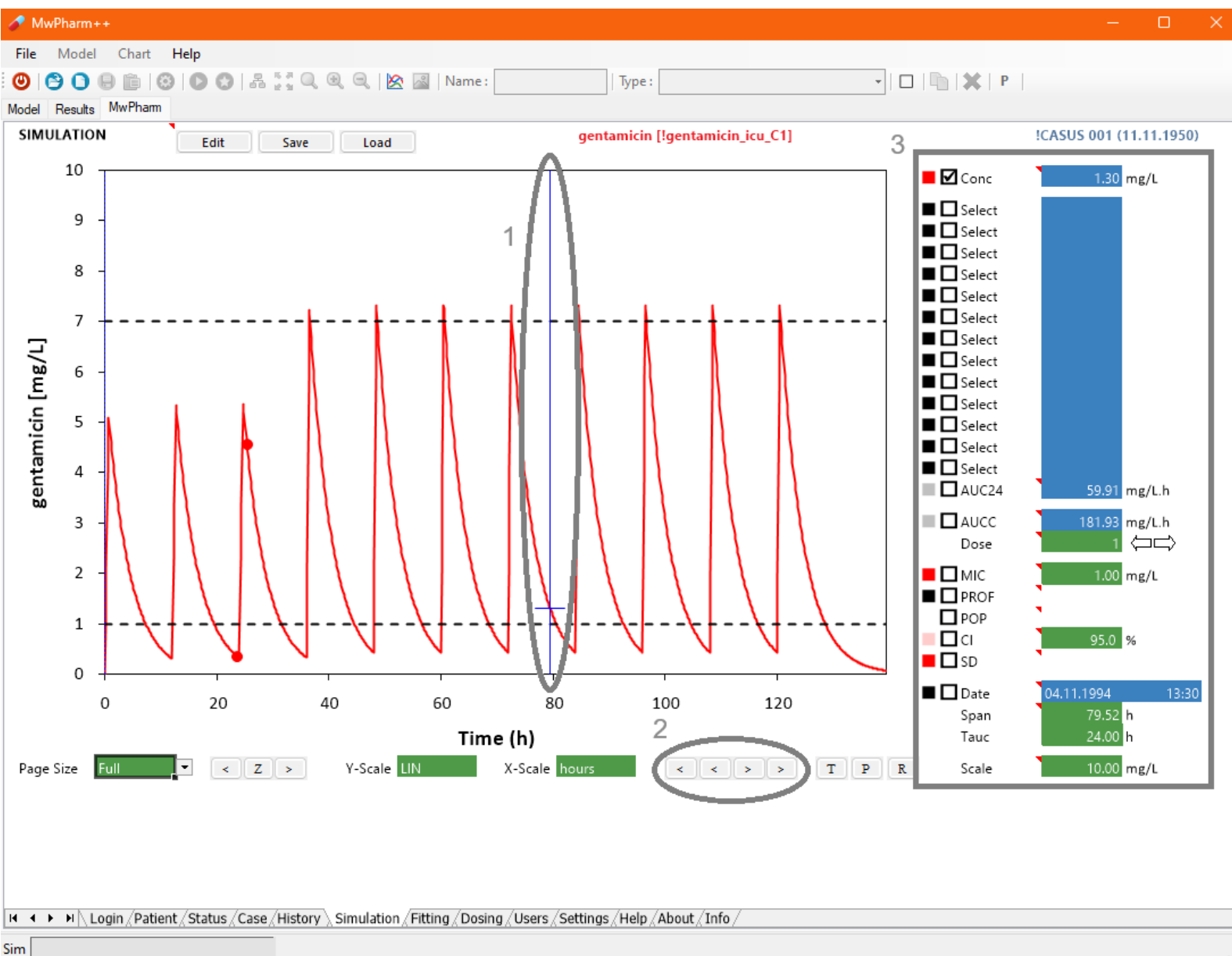
List of the main abbreviations (Simulation screen):

Conc	Concentration	CLcrN	Normalized creatinine clearance
Cave	Average concentration	Bsa	Body surface area
AUC	Area under curve	Lbmc	Corrected lean body mass
AUCC	Area under curve from zero to infinity	Bw	Body weight
Ccr	Creatinine concentration	CI	Confidence interval
CLcr	Creatinine clearance	INI	Initial prefit curve

To zoom the graph, select particular time interval.



To find out exact concentration, AUC etc. at specific time, use the **arrow** (1) buttons to move the blue indicator (2). Values will appear in the boxes on the right side of the screen (3).

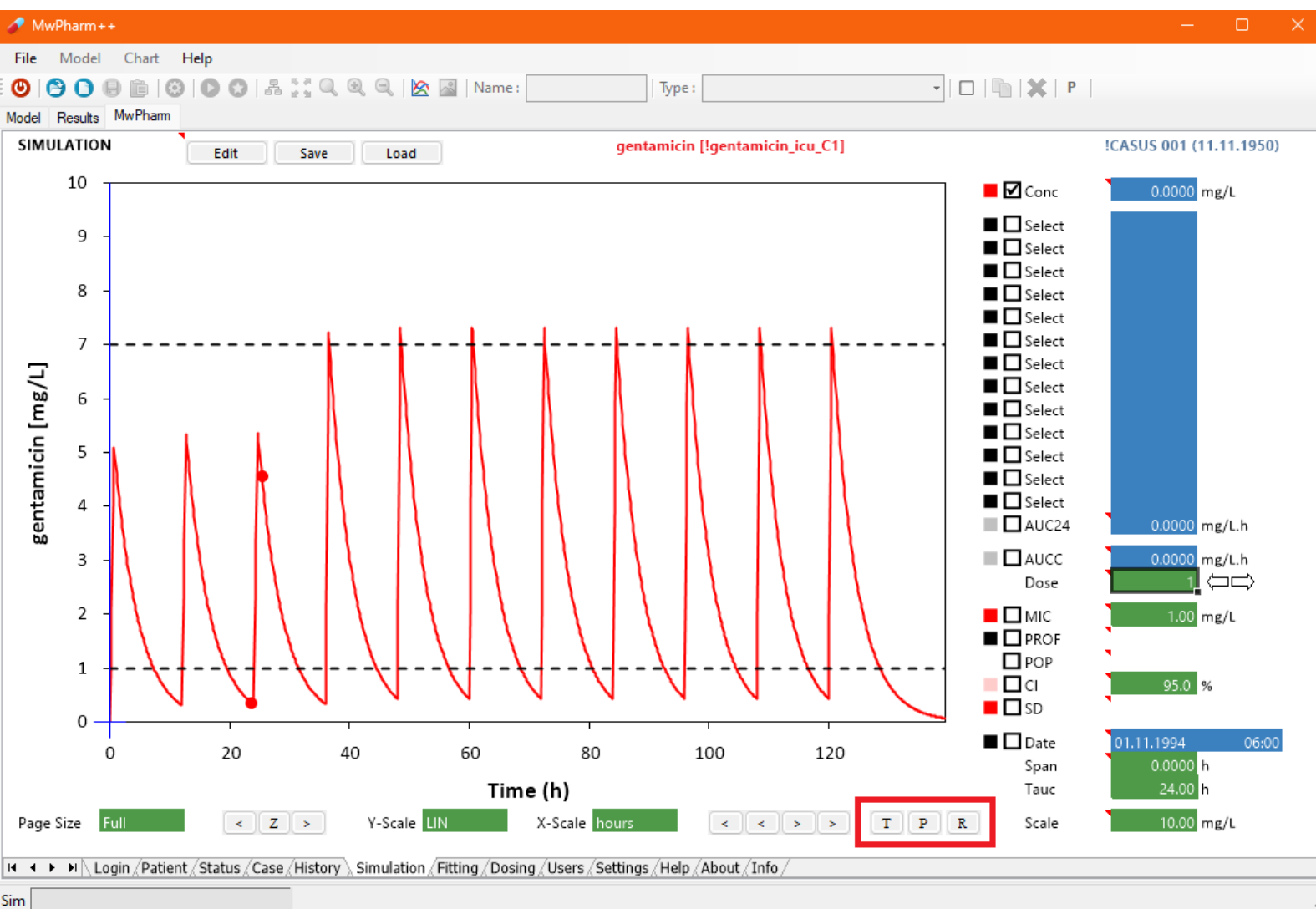


By clicking **T** button, you can add a text to the simulation graph.

By clicking **P** button, a prinscreen is created.

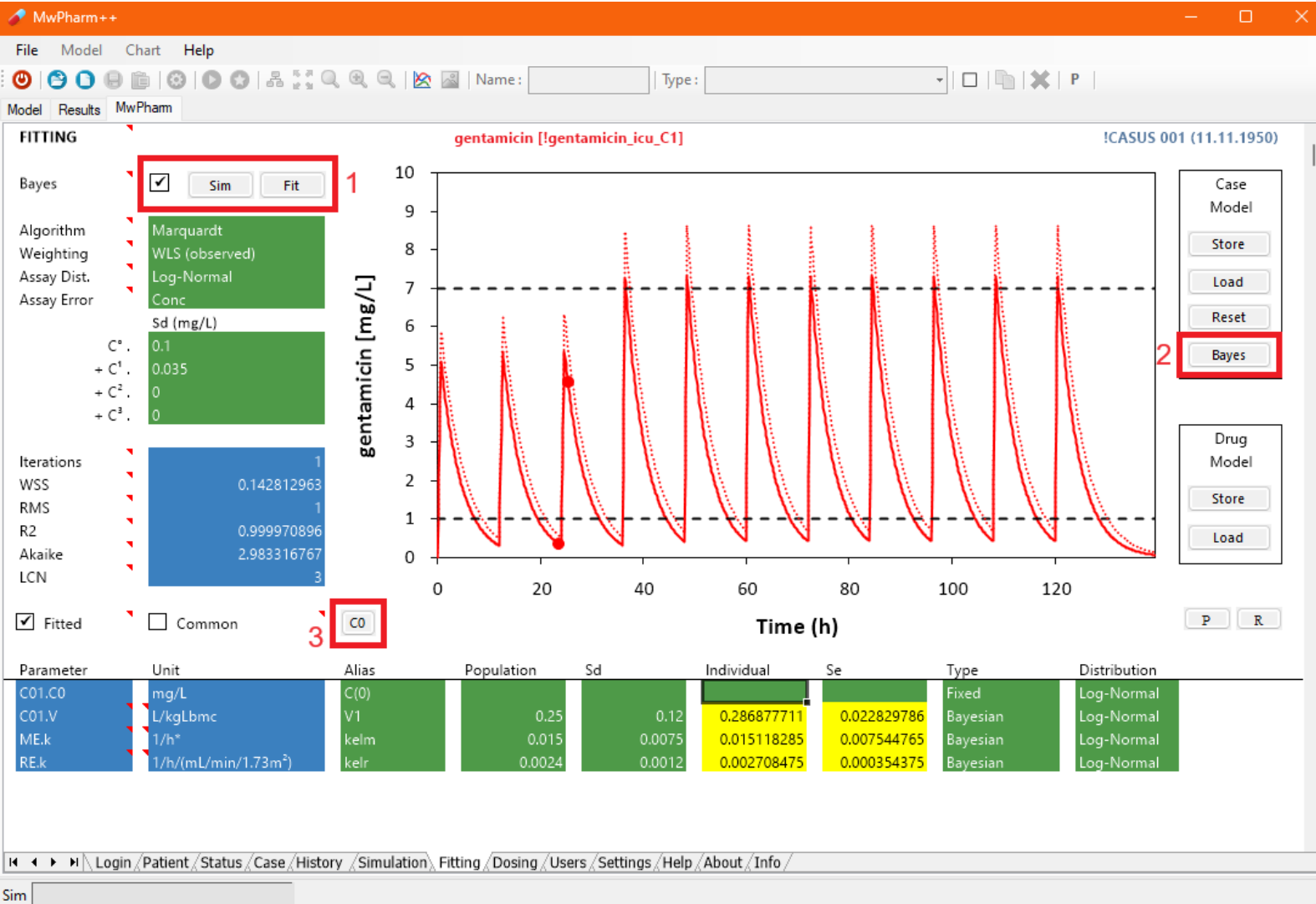
By clicking **R** button, a new report is generated.

R and **P** buttons can be found on Patient, Status, History, Simulation, Fitting, and Dosing screen.



FITTING SCREEN

To fit the PK parameters, click on **Fit** button (1). To Bayes fitting, check the **Bayes** checkbox (1). If the Bayesian Parameters aren't already generated, you can set them by clicking the **Bayes** button (2). You can also use the **C0-Wizard** for the model adjusting (3).



gentamicin [!gentamicin_icu_C1] ICASUS 001 (11.11.1950)

FITTING

Bayes 1

Algorithm: Marquardt
 Weighting: WLS (observed)
 Assay Dist.: Log-Normal
 Assay Error: Conc

Sd (mg/L): 0.1
 + C¹: 0.035
 + C²: 0
 + C³: 0

Iterations: 1
 WSS: 0.142812963
 RMS: 1
 R2: 0.999970896
 Akaike: 2.983316767
 LCN: 3

Fitted Common 3 3

Case Model: 2

Drug Model:

Parameter	Unit	Alias	Population	Sd	Individual	Se	Type	Distribution
C01.C0	mg/L	C(0)					Fixed	Log-Normal
C01.V	L/kgLbmc	V1	0.25	0.12	0.286877711	0.022829786	Bayesian	Log-Normal
ME.k	1/h*	kelm	0.015	0.0075	0.015118285	0.007544765	Bayesian	Log-Normal
RE.k	1/h/(mL/min/1.73m ²)	kelr	0.0024	0.0012	0.002708475	0.000354375	Bayesian	Log-Normal

Login Patient Status Case History Simulation Fitting Dosing Users Settings Help About Info

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List of abbreviations (Fitting screen):

- WSS Weighted sum of squares
- RMS Root mean squares
- R2 Correlation coefficient
- Akaike Akaike information criterion
- LCN Number of lost significant digits (log10)
- WSS Weighted sum of squares
- RMS Root mean squares
- R2 Coefficient of determination
- Akaike Duration of administrations or dialyses

After the fitting, there are the individual PK parameters on the Status screen. Individual parameters can be deleted by clicking on **POP** button.

The screenshot displays the MwPharm++ software interface. The main window is titled "MwPharm++" and contains several sections:

- STATUS:** A list of patient characteristics including Weight (90.0 kg), Height (175 cm), Term (40 weeks), Sex (Female), Race (Caucasian), RF Weight Measure (Lbm), Bsa (2.06 m²), Bmi (29.4 kg/m²), Lbm (66.0 kg), Lbmc (75.6 kg), Ffm (52.3 kg), and Age (44 years).
- Renal Function (mL/min):** A bar chart titled "Renal Function (mL/min)" for "ICASUS 001 (11.11.1950)". The chart shows values for various reference patients: Pat (100), Opt (105), Std (95), P20 (130), P30 (125), P40 (110), P50 (95), P60 (85), P70 (75), P80 (65), and P90 (50).
- Renal Function Parameters:** Jelliffe II - 1 serum creatinine level (checkbox), Serum Creatinine (63 μmol/L), Liver Function (100% Normal), Creatinine Clearance (85.4 mL/min/1.73m² and 101.5 mL/min).
- Pathology:** Fever after surgery.
- Individual PK Parameters:** A table showing parameters for "gentamicin [gentamicin_icu_C1]":

Individual	gentamicin [gentamicin_icu_C1]		POP
CL	5.34 L/h	t _{1/2-1}	2.81 h
V1	21.68 L		
fe	0.9386 +		

The "POP" button is highlighted with a red box in the screenshot.

DOSing SCREEN

On Dosing screen, you can compare different estimated dosing regimens by checking individual dosing regimens checkboxes and observing corresponding curves in the graph.

DOSE CALCULATOR gentamicin [!gentamicin_icu_C1] C01.C (mg/L)

Profile

	User	Exact	P1	P2	P3	P4	
Load	161.3	161.3	160	160	160	160	mg
Dose	140.9	140.9	120	140	140	160	mg
Tint	8.40	8.40	8	8	12	12	h
Ndos	2	2	3	2	2	2	-
Tdur	0.50	0.50	0.50	0.50	0.50	0.50	h
Max	7.00	7.00	6.07	7.04	6.44	7.30	mg/L
Min	1.00	1.00	0.96	1.11	0.38	0.43	mg/L
Tmax	0.50	0.50	0.50	0.50	0.50	0.50	h
Tmin	8.40	8.40	8.00	8.00	12.00	12.00	h
Ave	3.14	3.14	2.82	3.27	2.19	2.49	mg/L
pSS	100	100	100	100	100	100	%

Targets

- Max 7.00 mg/L
- Min 1.00 mg/L
- Ave 4.00 mg/L
- Tint 12.00 h
- AUC24 96.00 mg/L.h
- Error No
- P-Mode Practical

Route Input IV

Reference

- Levels R01
- Variable C01.C

Method

- Load Optimal
- Dose Min-Max
- Algorithm EXP
- Force DIF
- Speed 114 ms

Buttons: Add to History, P, R

List of abbreviations (Fitting screen):

- Load Loading dose
- Dose Maintenance dose
- Tint Time interval between doses
- Ndos Number of doses

You can select appropriate route of administration and define different therapeutic range. C checkbox is for choosing continuous infusion.

New Model - MwPharm++

File Model Chart Help

Name: Type: P

Model Results MwPharm

DOSE CALCULATOR gentamicin [!gentamicin_icu_C1] C01.C (mg/L)

C01.C (mg/L) ICASUS 001 (11.11.1950)

Profile	User	Exact	P1	P2	P3	P4	
Load	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	161.3 mg
Dose	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	140.9 mg
Tint	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8.40 h
Ndos	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2 -
Tdur	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.50 h
Max	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7.00 mg/L
Min	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.00 mg/L
Tmax	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.50 h
Tmin	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8.40 h
Ave	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.14 mg/L
pSS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 %

Targets

Max 7.00 mg/L

Min 1.00 mg/L

Ave 4.00 mg/L

Tint 12.00 h

AUC24 96.00 mg/L.h

Error No Log Scale

P-Mode Practical

Route Input IV C

Reference Levels R01

Variable C01.C

Method Load Optimal

Dose Min-Max

Algorithm EXP

Force DIF

Speed 114 ms

Add to History P R

Sim

By clicking the **arrow** button (1) next to the abbreviation of regimen, it is possible to load practical regimen to the User regimen. In the User regimen column (2), user can adjust the regimen parameters (loading dose, maintenance dose, time interval, and number of doses). User dosing regimen can be added to History screen by clicking on **Add to History** button (3).

The screenshot displays the MwPharm++ interface for a DOSE CALCULATOR. The main window is titled "gentamicin [!gentamicin_icu_C1]" and shows a line graph of concentration (C01.C in mg/L) over 30 hours. The graph shows a loading dose followed by three maintenance doses. A bar chart on the right compares regimens: USR (red), EXA (black), P1 (blue), P2 (blue), P3 (blue), and P4 (blue). Below the graphs is a table of parameters for regimens User, Exact, P1, P2, P3, and P4. The "Exact" and "P1" columns are highlighted with a red box and labeled "2". The "Add to History" button in the settings panel is highlighted with a red box and labeled "3".

Profile	User	Exact	P1	P2	P3	P4	Units
Load	161.3	161.3	160	160	160	160	mg
Dose	140.9	140.9	120	140	140	140	mg
Tint	8.40	8.40	8	8	12	12	h
Ndos	2	2	3	2	2	2	-
Tdur	0.50	0.50	0.50	0.50	0.50	0.50	h
Max	7.00	7.00	6.07	7.04	6.44	7.30	mg/L
Min	1.00	1.00	0.96	1.11	0.38	0.43	mg/L
Tmax	0.50	0.50	0.50	0.50	0.50	0.50	h
Tmin	8.40	8.40	8.00	8.00	12.00	12.00	h
Ave	3.14	3.14	2.82	3.27	2.19	2.49	mg/L
pSS	100	100	100	100	100	100	%