STP-BRIOCHE : A priori MIPD - Amoxicillin

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Preface

This book contains all that is related to the a priori MIPD developped in STP-BRIOCHE

Part I

Validation of implementation from articles

1 Validation PKpop Amox Carlier 2013

2 Paper

(Carlier et al. 2013)

3 Model description

The same model describe both amoxicillin and clavulanic acid concentrations.

Table 3.1: Model description

DOI	Structural model	Variability model	Covariates effects	Number of patients	Free or total concentrations	Unbound fraction
10.1093/jac/dkx240	2 linked compartments	log-normal clearance	creatinine clearance on clearance	13	free	0.83

3.1 Model parameters

Table 3.2: Model parameters for amoxicillin

parameter_name	parameter_description	unit	mean
CLpop	Typical clearance (for a patient with creatinin clearance of 102 mL/min)	L/h	10.0
Q	Intercompartmental clearance	L/h	15.6
Vcpop	Typical central volume of distribution (for a patient with creatinin clearance of 102 mL/min)	L	13.7
Vp	Peripheral volume of distribution	L	13.7
cv_iiv_CL	Coefficient of variation of the inter individual variability on clearance (%)	unitless	39.9
cv_iiv_Vc	Coefficient of variation of the inter individual variability on central volume of distribution (%)	unitless	38.7
ruv	Coefficient of variation of the residual variability	unitless	22.0

3.2 Inter-individual variability and covariate effects

Covariate effect :

$$TVCL_i = CLpop * \frac{CLCR_i}{102} * e^{\eta_i}$$

With :
$TVCL_i$: Amoxicillin clearance for individual i
$CLpop$: Typical amoxicillin clearance (L/h)
$CLCR_i$: 24h urinary creatinin clearance (mL/min) for individual i
η_i : Normal variable with mean 0 and variance ω^2_{CL}
102 : population's median urinary creatinine clearance in mL/min