

# PK Simulations of 100 mg IV in Patients with Modified CL and F

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2015-12-09

```
# required libraries
library("PKPDmisc")
library("ggplot2")
library("dplyr")

##
## Attaching package: 'dplyr'
##
## The following objects are masked from 'package:stats':
##
##   filter, lag
##
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

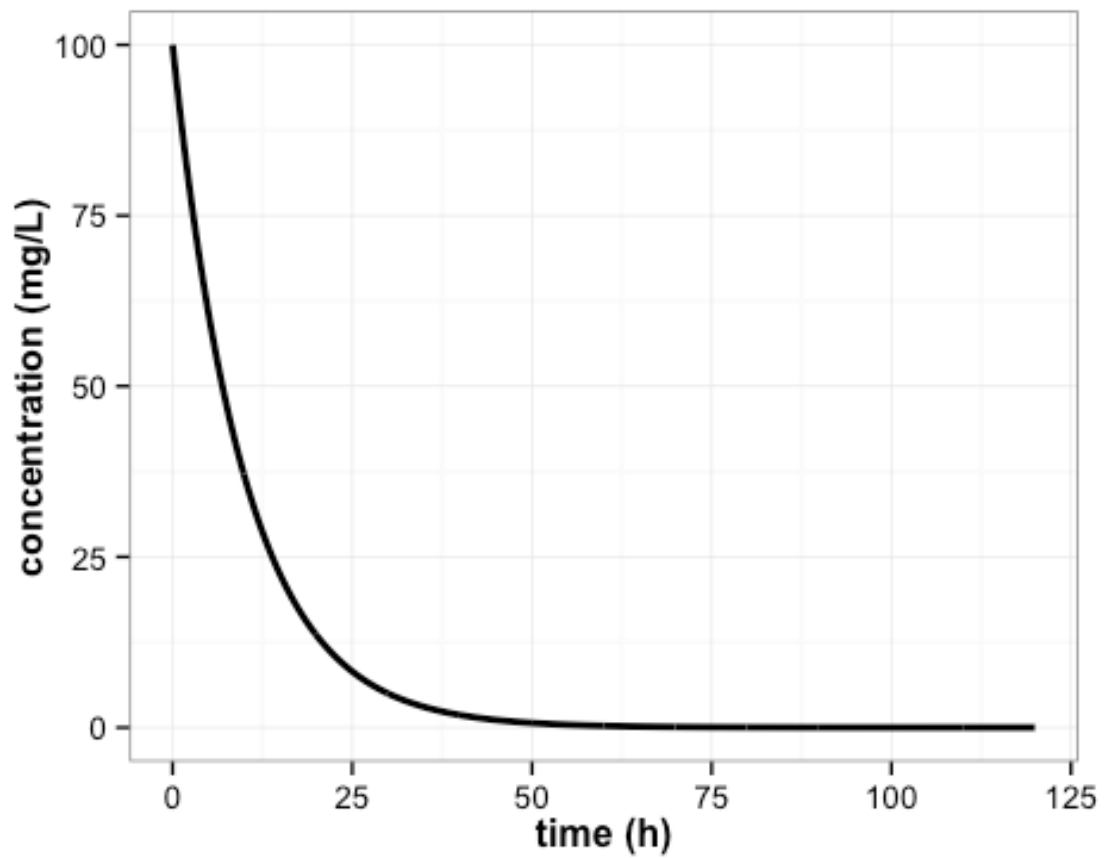
library("mlxR")
library("reshape2")
library("knitr")

knitr::opts_chunk$set(echo=FALSE)
```

## IV FORMULATION

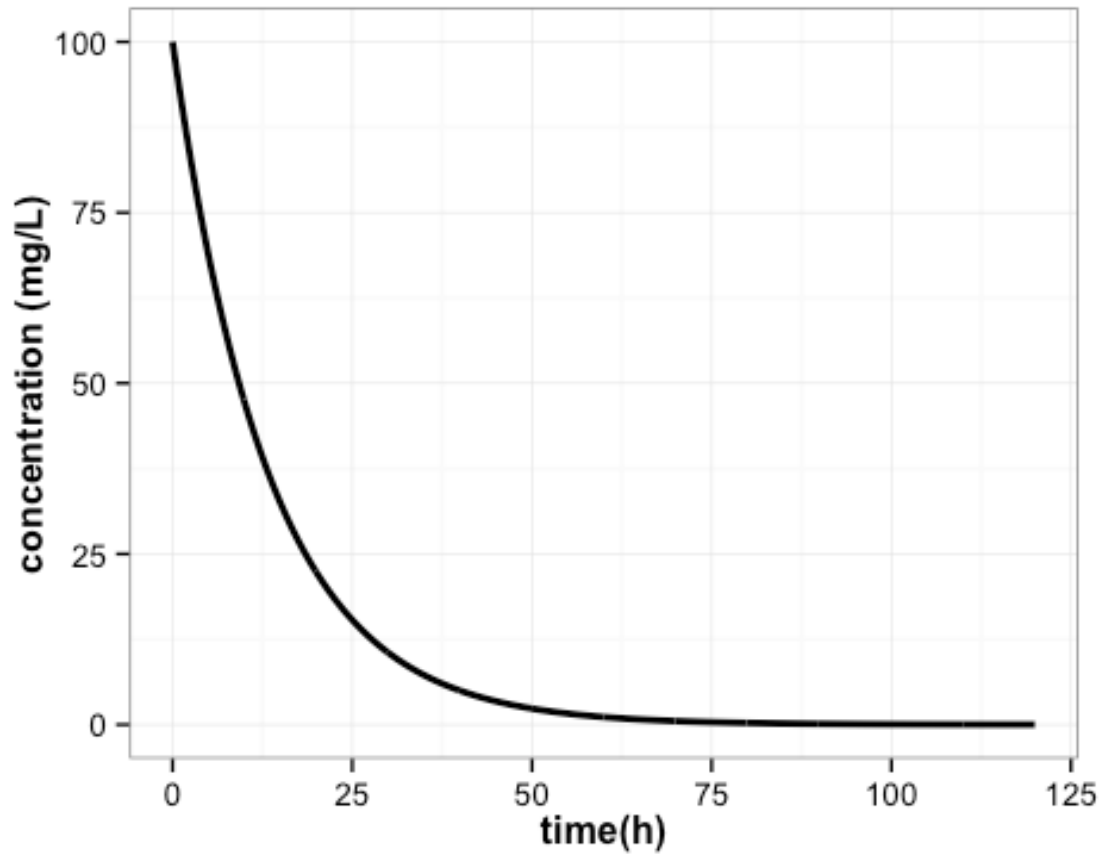
### 1. PK profile of 100 mg IV bolus administered as a single dose.

*(PK profile of 100 mg IV bolus (SD),  $CL = 0.1$  L/hr,  $V = 1$  L)*



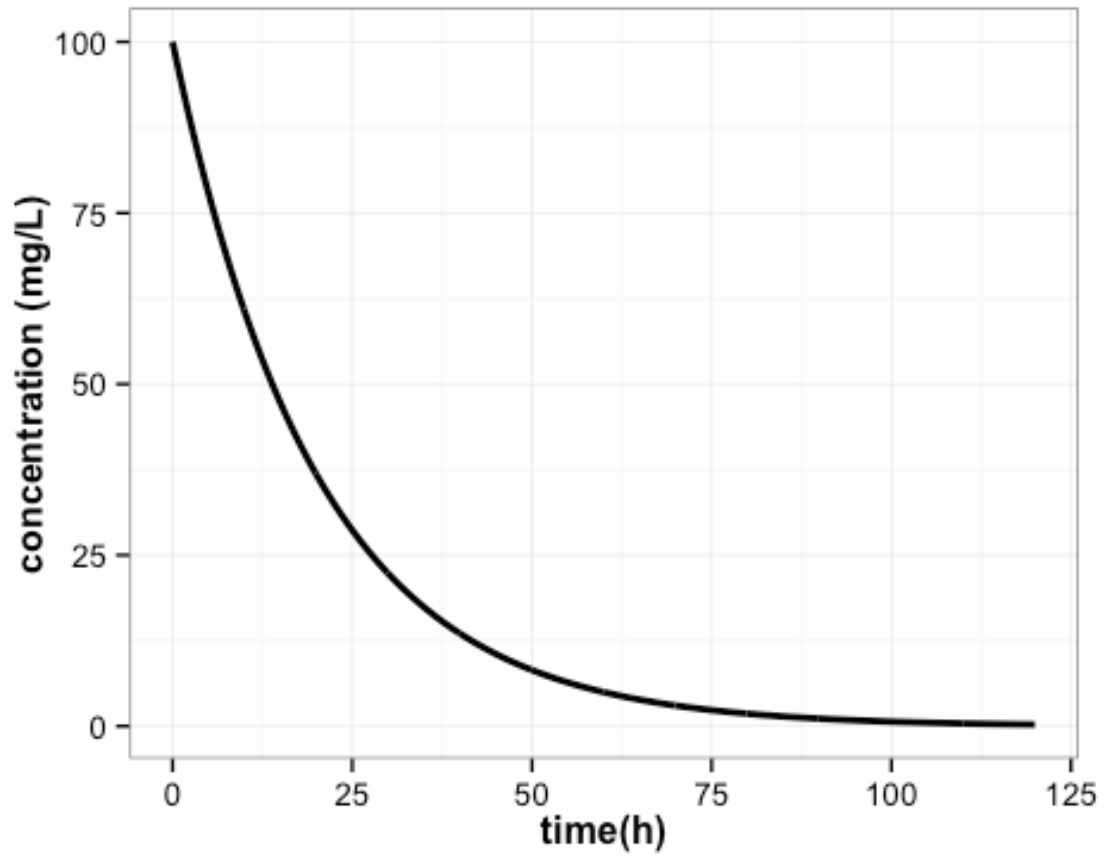
**1a. Patient's clearance decreases by 25%.**

*(PK profile of 100 mg IV bolus (SD),  $CL = 0.075$  L/hr,  $V = 1$  L)*



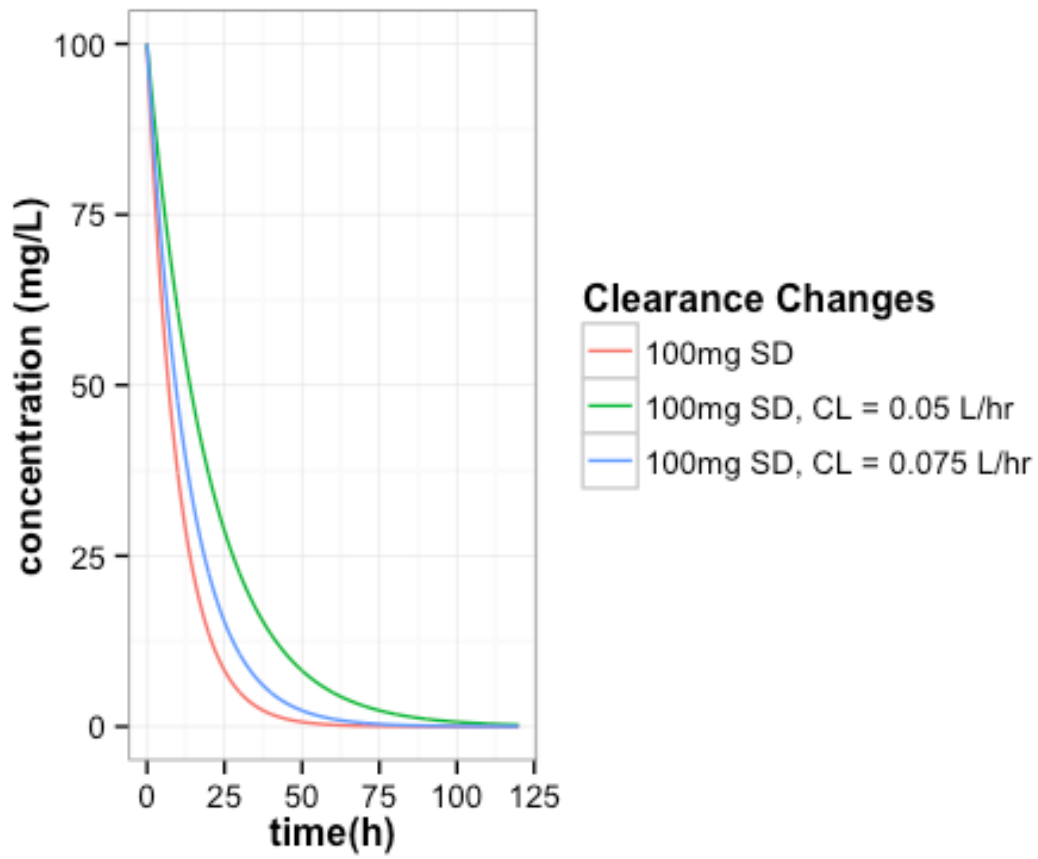
**1b. Patient's clearance decreases by 50%.**

*(PK profile of 100 mg IV bolus (SD),  $CL = 0.05$  L/hr,  $V = 1$  L)*



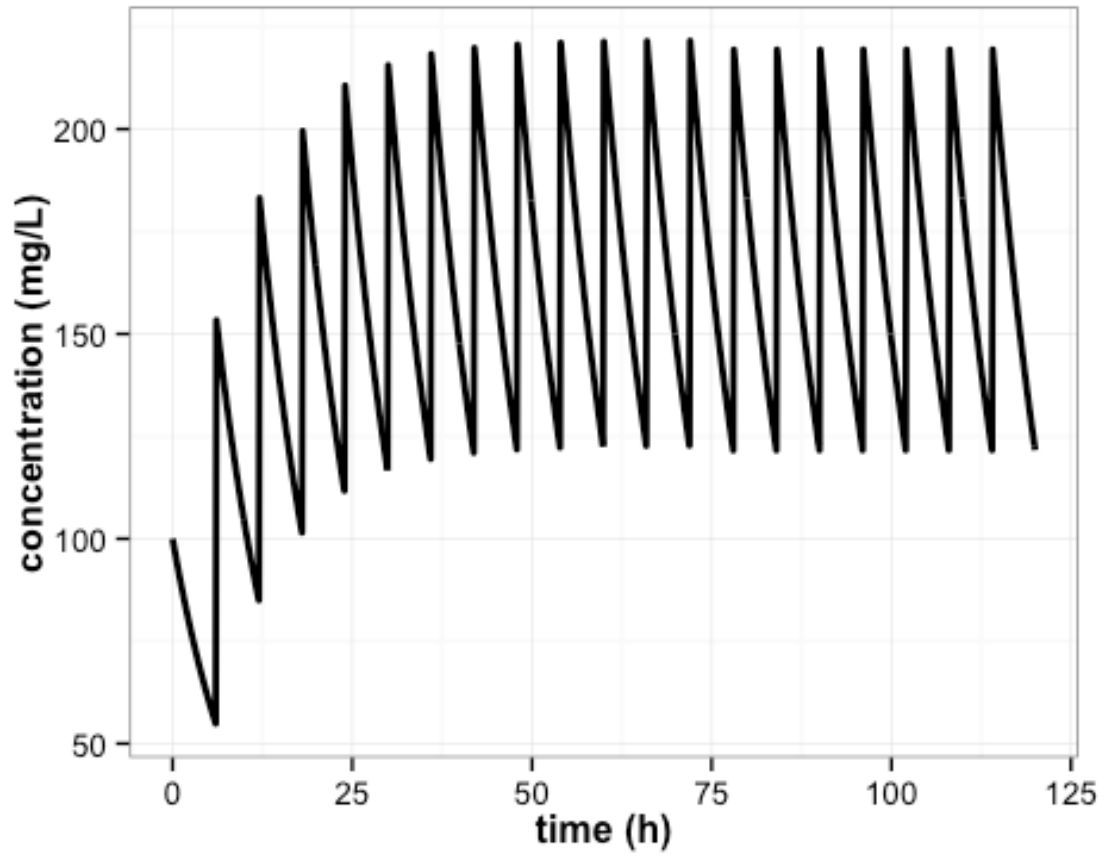
### 1c. Overlay PK profiles of patient with normal clearance and decreased clearance

(PK profile of 100 mg IV bolus (SD),  $V = 1\text{ L}$ ,  $CL = 0.1\text{ L/hr}$ ,  $0.05\text{ L/hr}$ ,  $0.075\text{ L/hr}$ )



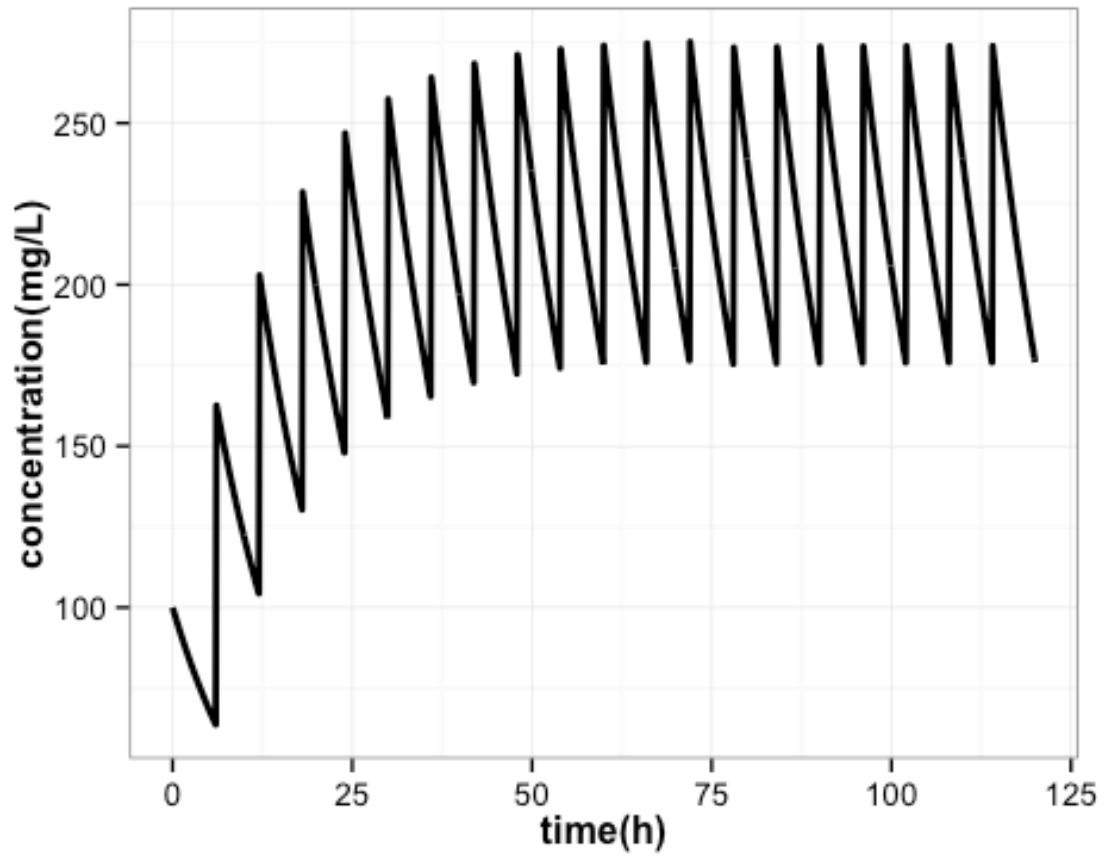
## 2. PK profile of 100 mg IV bolus administered every 6 hours

(PK profile of 100 mg IV bolus, LD ( $t = 0$ ), MD ( $q = 6$  hr), CL = 0.1 L/hr, V = 1 L)



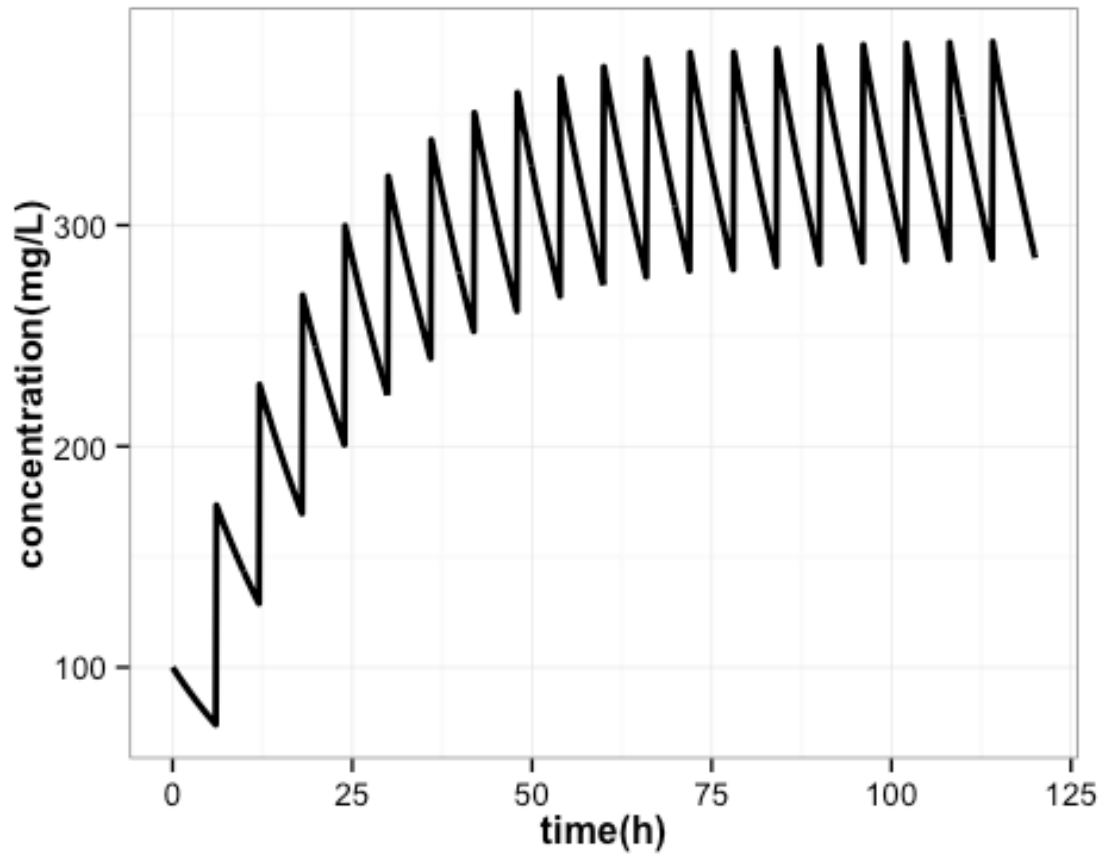
**2a. Patient's clearance decreases by 25%.**

*(PK profile of 100 mg iv bolus, LD ( $t=0$ ), MD ( $q=6\text{hr}$ ),  $CL = 0.075\text{ L/hr}$ ,  $V = 1\text{ L}$ )*



**2b. Patient's clearance decreases by 50%.**

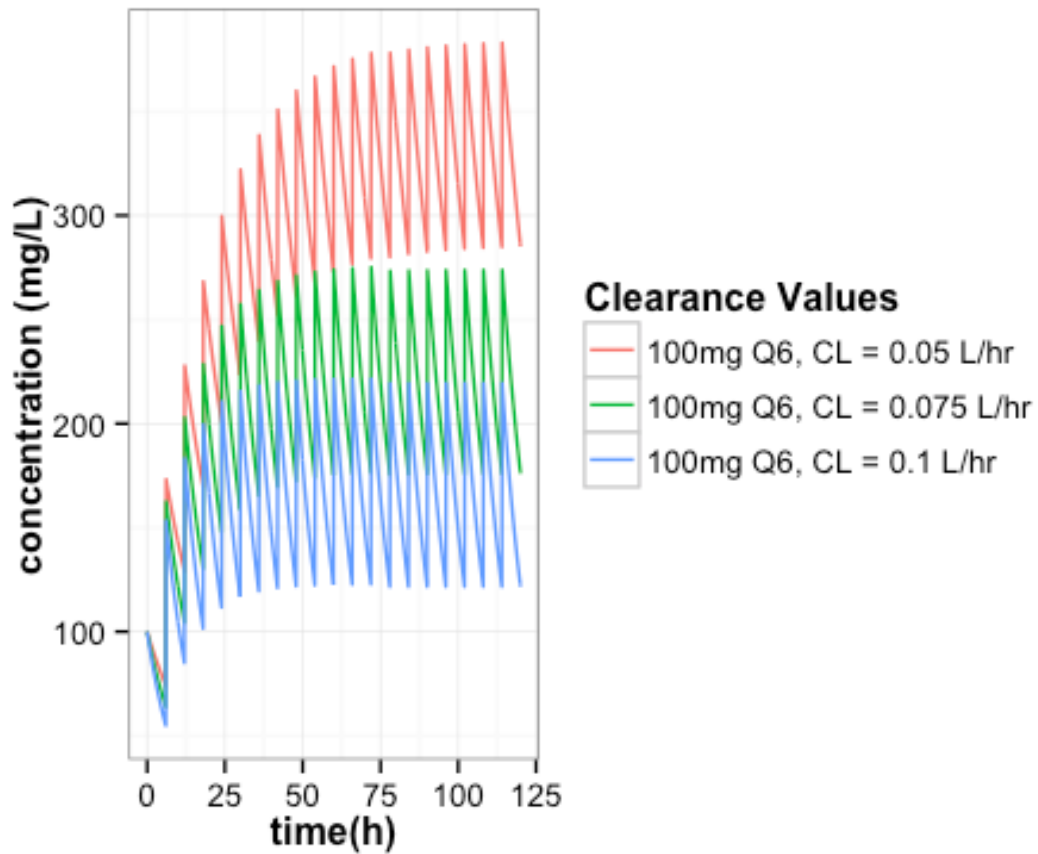
*(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=6\text{hr}$ ),  $CL = 0.05\text{ L/hr}$ ,  $V = 1\text{ L}$ )*





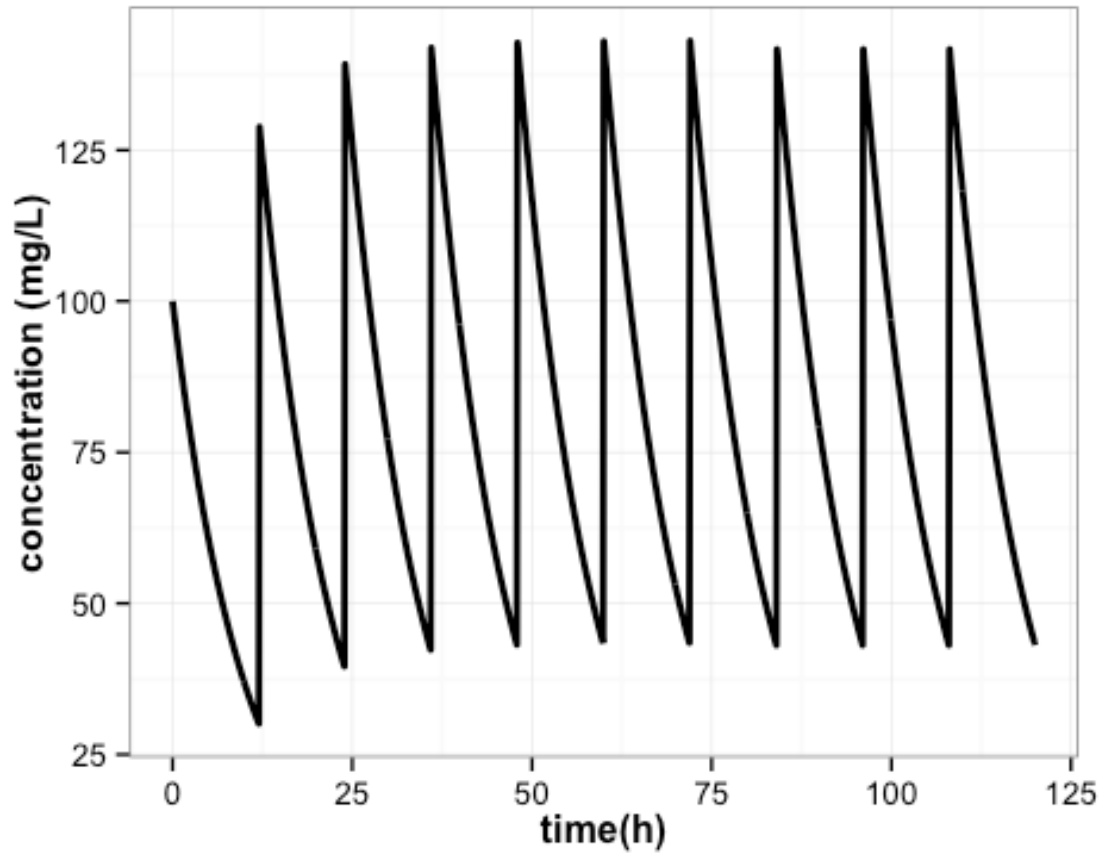
## 2c. Overlay PK profiles plot of patient with normal clearance and decreased clearance

(PK profile of 100 mg IV bolus, LD( $t=0$ ), MD ( $q=6\text{hr}$ ),  $V = 1\text{ L}$ ,  $CL = 0.1\text{ L/hr}$ ,  $0.05\text{ L/hr}$ ,  $0.075\text{ L/hr}$ )



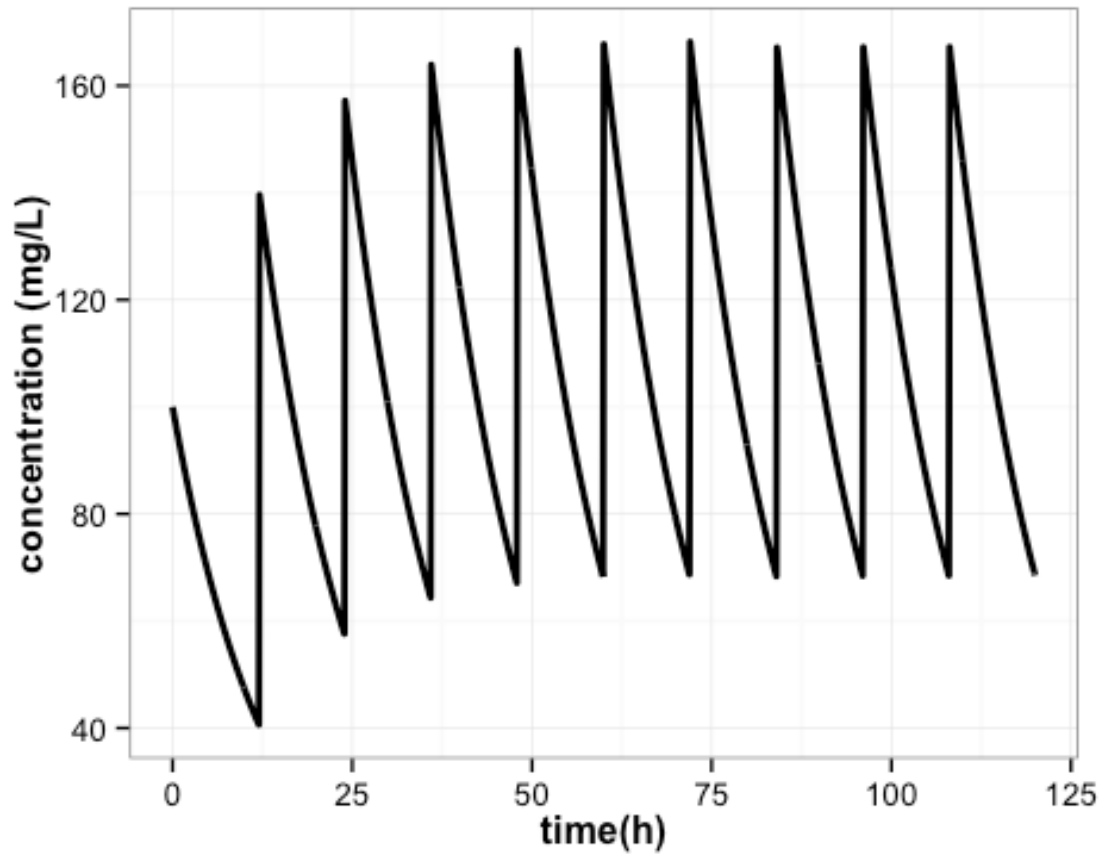
### 3. PK profile of 100 mg IV bolus given every 12 hours

(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=12$  hr),  $CL=0.1$  L/hr,  $V=1$  L)



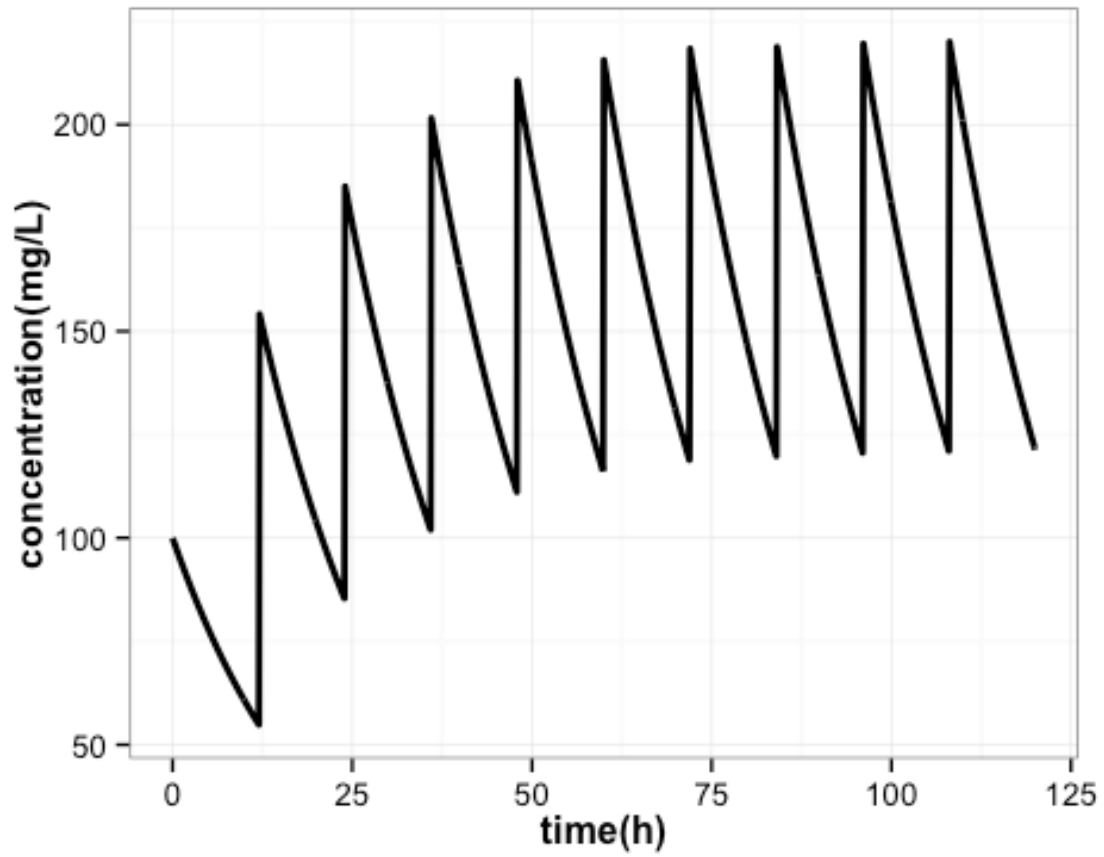
### 3a. Patient's clearance decreases by 25%.

(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=12\text{hr}$ ),  $CL = 0.075\text{ L/hr}$ ,  $V = 1\text{ L}$ )



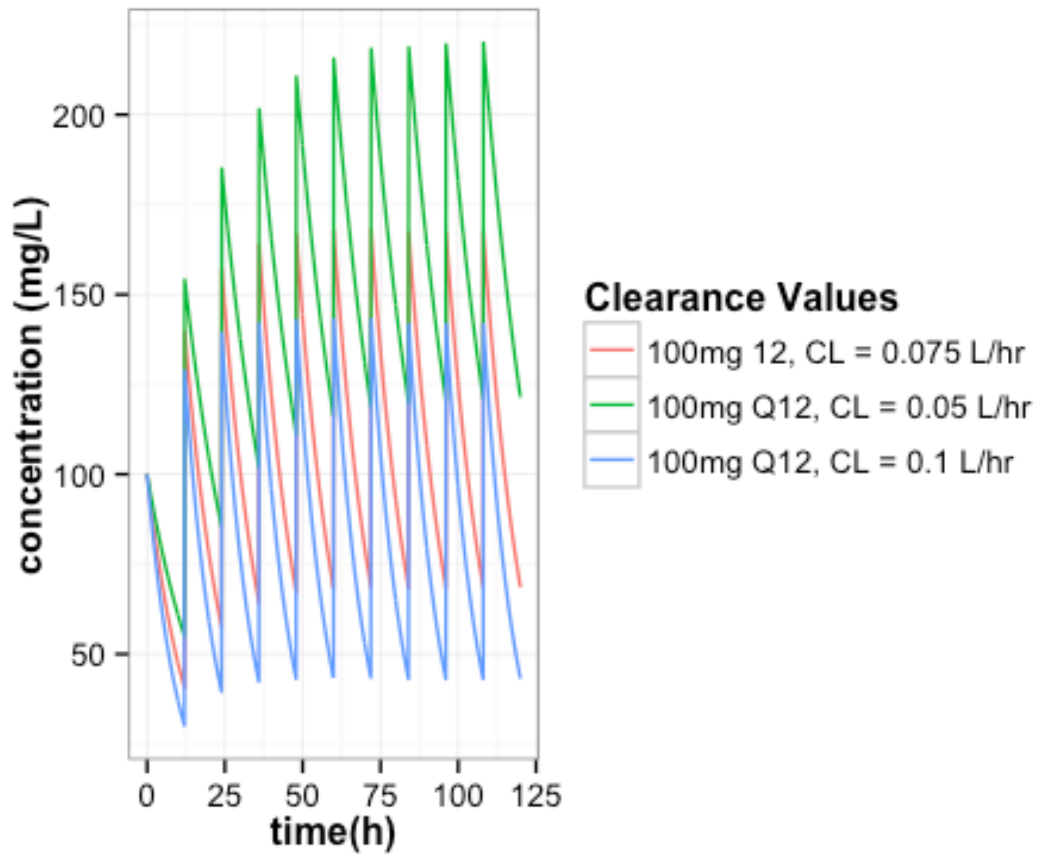
### 3b. Patient's clearance decreases by 50%.

(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=12\text{hr}$ ),  $CL = 0.05\text{ L/hr}$ ,  $V = 1\text{ L}$ )



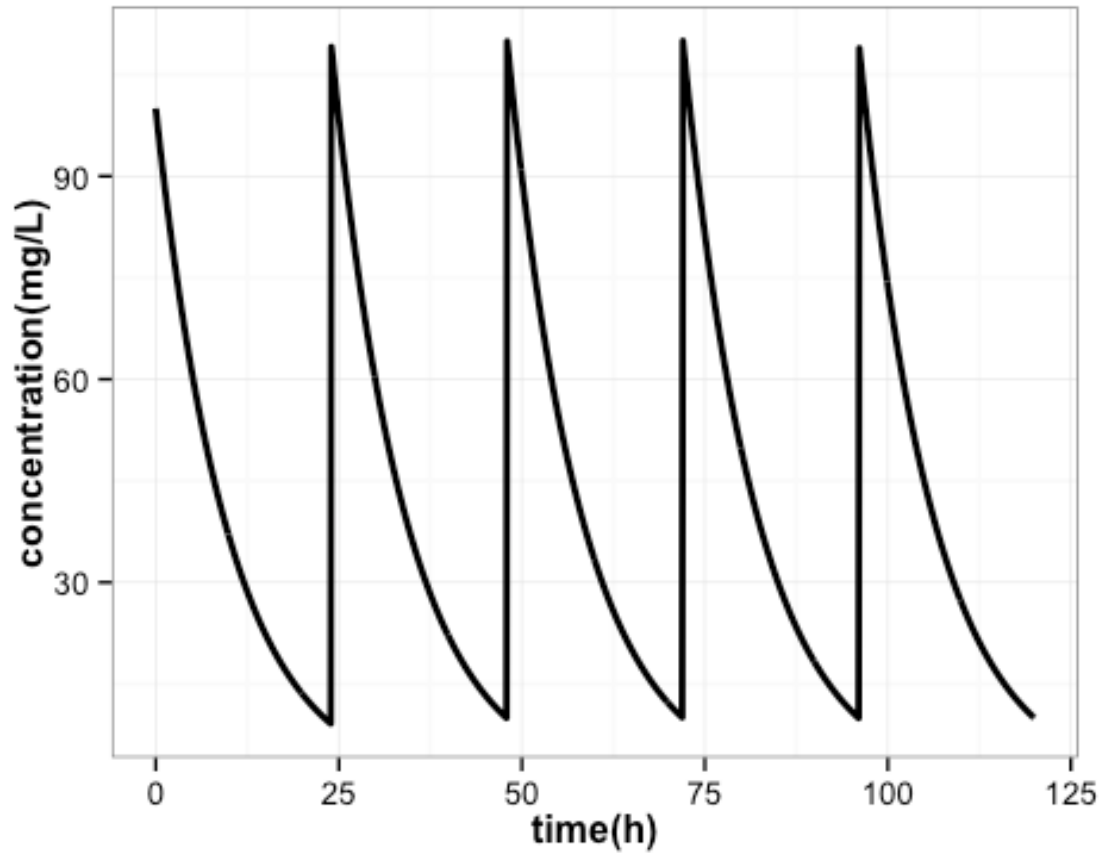
### 3c. Overlay PK profiles of patient with normal clearance and decreased clearance

(PK profile of 100 mg iv bolus, LD( $t=0$ ), MD ( $q=12\text{hr}$ ),  $V = 1\text{ L}$ ,  $CL = 0.1\text{ L/hr}$ ,  $0.05\text{ L/hr}$ ,  $0.075\text{ L/hr}$ )



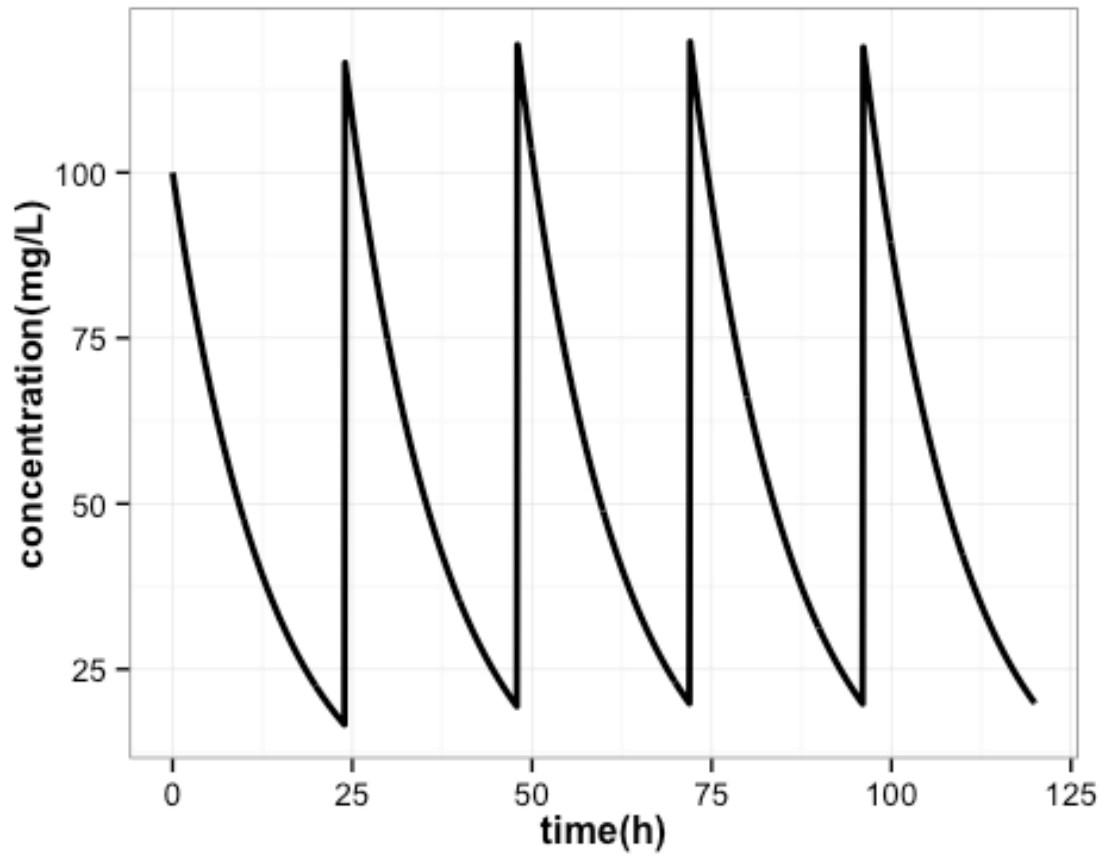
#### 4. PK profile of 100 mg IV bolus administered every 24 hours

(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=24$  hr),  $CL=0.1$  L/hr,  $V = 1$  L)



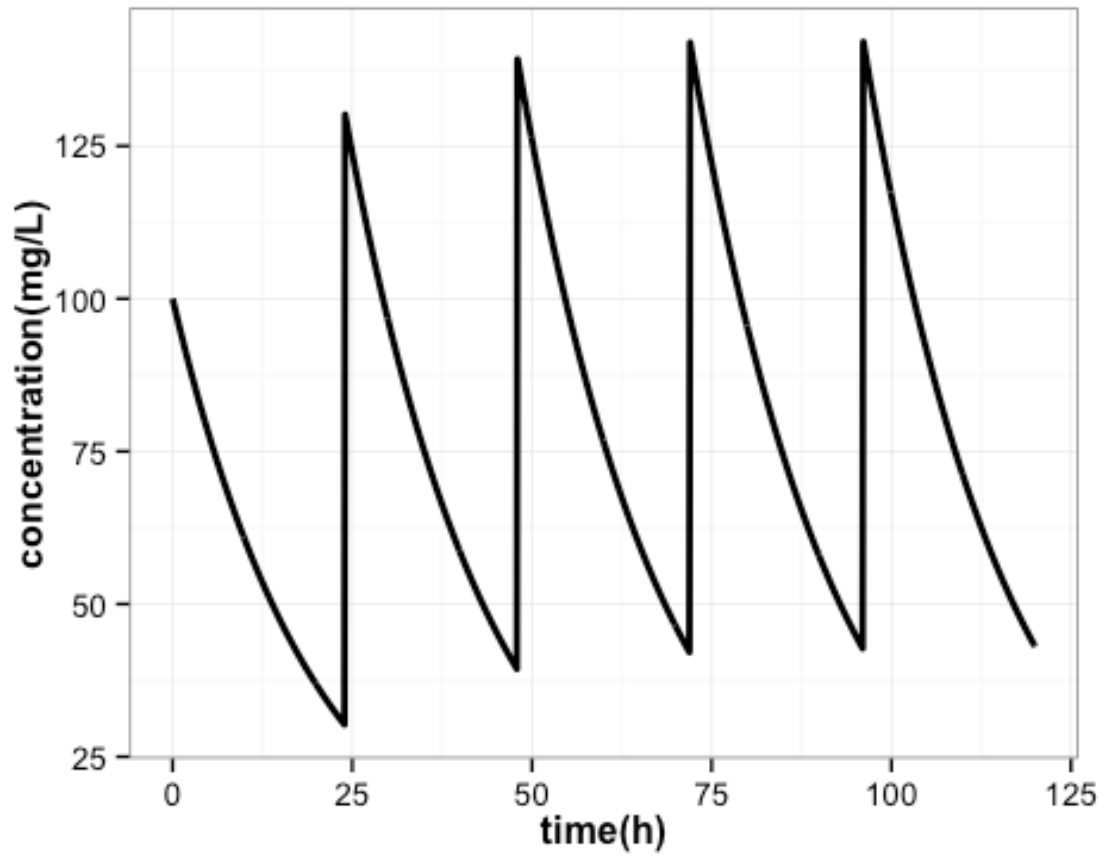
**4a. Patient's clearance decreases by 25%.**

*(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=24\text{hr}$ ),  $CL = 0.075\text{ L/hr}$ ,  $V = 1\text{ L}$ )*



**4b. Patient's clearance decreases by 50%.**

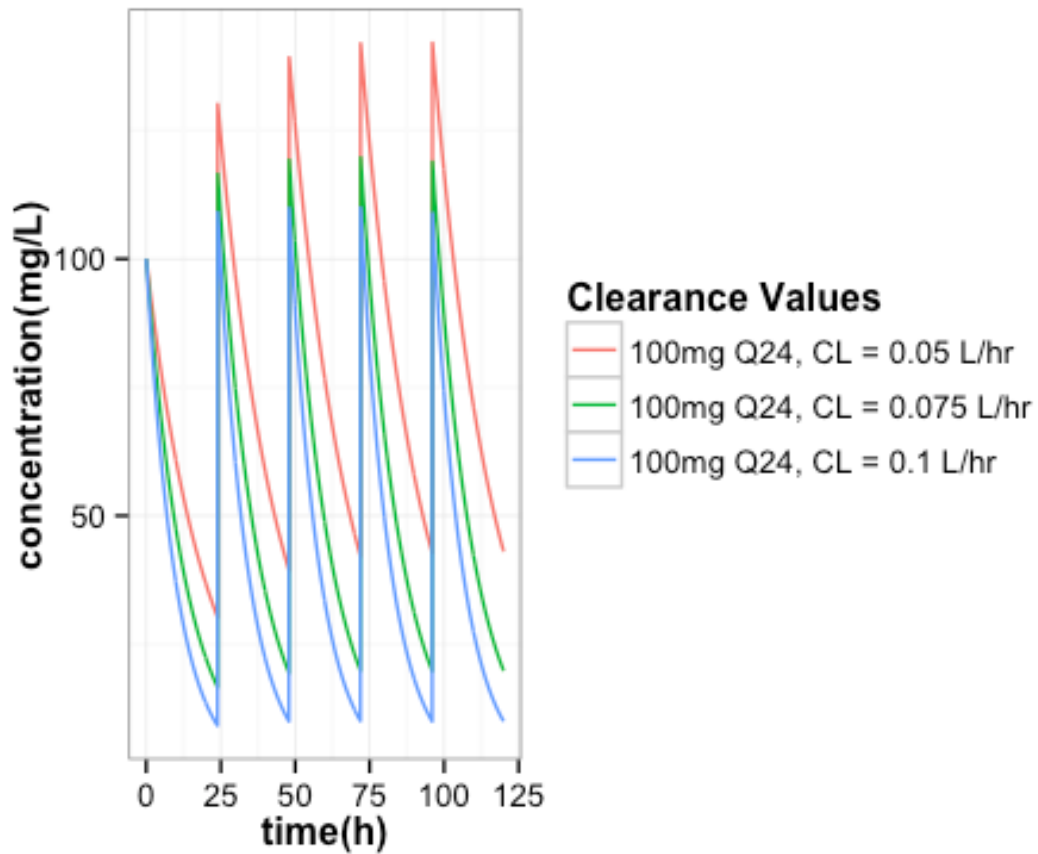
*(PK profile of 100 mg IV bolus, LD ( $t=0$ ), MD ( $q=24\text{hr}$ ),  $CL = 0.05\text{ L/hr}$ ,  $V = 1\text{ L}$ )*



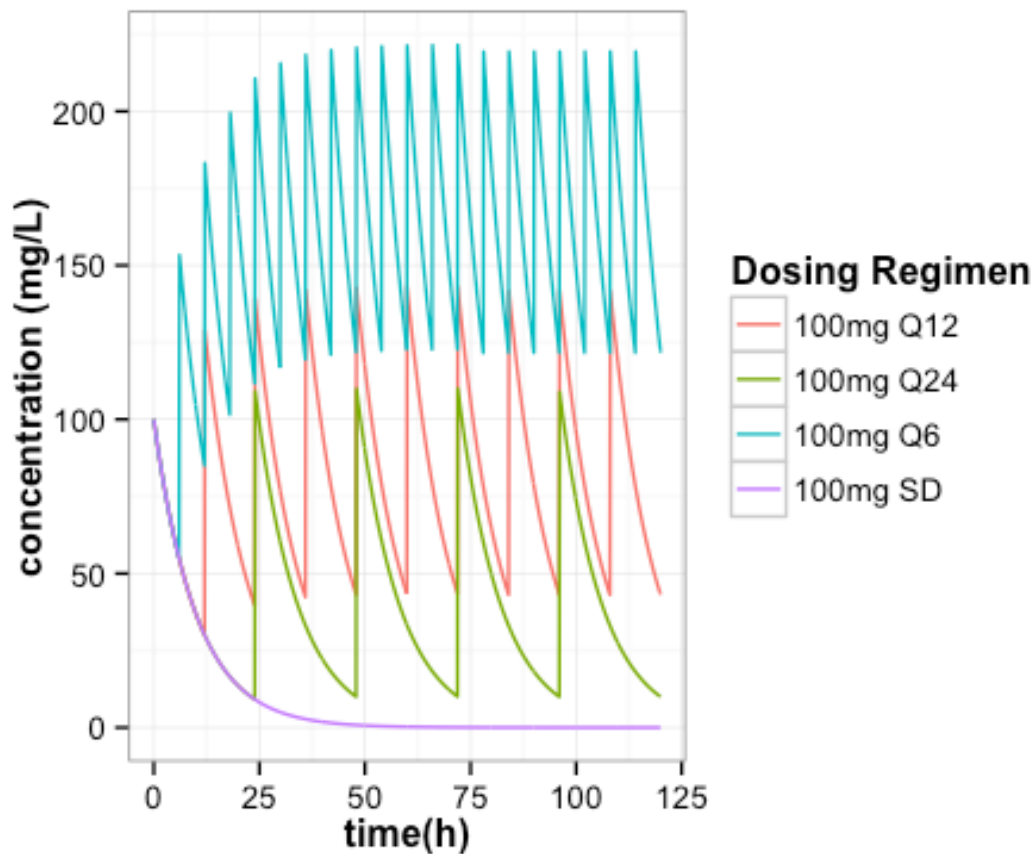


#### 4c. Overlay PK profiles of patient with normal clearance and decreased clearance

(PK profile of 100 mg iv bolus, LD( $t=0$ ), MD ( $q=24\text{hr}$ ),  $V = 1\text{ L}$ ,  $CL = 0.1\text{ L/hr}$ ,  $0.05\text{ L/hr}$ ,  $0.075\text{ L/hr}$ )



## 5. Overlay plots of all dosing intervals



```
## Session info -----
##
## setting      value
## version      R version 3.2.2 (2015-08-14)
## system       x86_64, darwin13.4.0
## ui           X11
## language      (EN)
## collate      en_US.UTF-8
## tz           America/New_York
## date         2015-12-09
##
## Packages -----
##
## package      * version  date      source
## assertthat    0.1      2013-12-06 CRAN (R 3.2.0)
## colorspace    1.2-6    2015-03-11 CRAN (R 3.2.0)
## DBI           0.3.1    2014-09-24 CRAN (R 3.2.0)
## devtools      1.9.1    2015-09-11 CRAN (R 3.2.0)
## digest        0.6.8    2014-12-31 CRAN (R 3.2.0)
```

```

## dplyr      * 0.4.3    2015-09-01 CRAN (R 3.2.0)
## evaluate   0.8       2015-09-18 CRAN (R 3.2.0)
## formatR    1.2.1     2015-09-18 CRAN (R 3.2.0)
## ggplot2    * 1.0.1    2015-03-17 CRAN (R 3.2.0)
## gtable     0.1.2     2012-12-05 CRAN (R 3.2.0)
## htmltools  0.2.6     2014-09-08 CRAN (R 3.2.0)
## knitr      * 1.11     2015-08-14 CRAN (R 3.2.2)
## labeling   0.3       2014-08-23 CRAN (R 3.2.0)
## lazyeval   0.1.10    2015-01-02 CRAN (R 3.2.0)
## magrittr   1.5       2014-11-22 CRAN (R 3.2.0)
## MASS       7.3-44    2015-08-30 CRAN (R 3.2.0)
## memoise    0.2.1     2014-04-22 CRAN (R 3.2.0)
## mlxR       * 2.2.0     2015-05-31 CRAN (R 3.2.0)
## munsell    0.4.2     2013-07-11 CRAN (R 3.2.0)
## PKPDmisc   * 0.3.4.3    2015-10-17 Github (dpastoor/PKPDmisc@2d99b00)
## plyr       1.8.3     2015-06-12 CRAN (R 3.2.0)
## proto      0.3-10    2012-12-22 CRAN (R 3.2.0)
## R6         2.1.1     2015-08-19 CRAN (R 3.2.0)
## Rcpp       0.12.1    2015-09-10 CRAN (R 3.2.0)
## reshape2   * 1.4.1    2014-12-06 CRAN (R 3.2.0)
## rmarkdown  0.8.1     2015-10-10 CRAN (R 3.2.2)
## scales     0.3.0     2015-08-25 CRAN (R 3.2.0)
## stringi    0.5-5     2015-06-29 CRAN (R 3.2.0)
## stringr    1.0.0     2015-04-30 CRAN (R 3.2.0)
## XML        3.98-1.3  2015-06-30 CRAN (R 3.2.0)
## yaml       2.1.13    2014-06-12 CRAN (R 3.2.0)

```