Model of FMT effect on white blood cell counts.

```r
library(nlme)
library(dplyr)
library(tidyverse)
library(tidyr)
library(ggplot2)
```

```r
d <- read.csv('../tidy_WBC_FMT_data_4r.csv', header = TRUE, )
length(unique(d$pid))
```
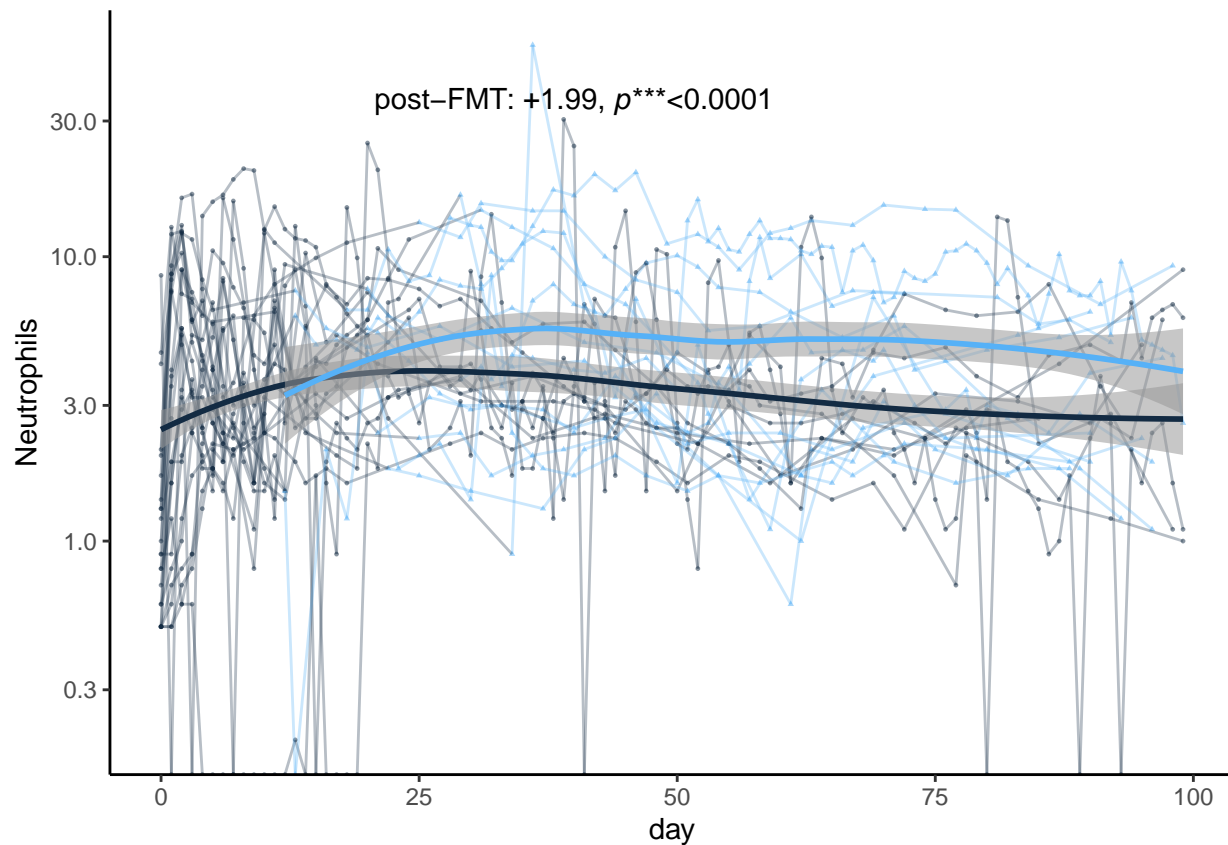
```
## [1] 24
```

```r
library(effects)
require(lmerTest)
subsetd <- subset(d, d$wbc%in%c('neutrophils'))
subsetd <- subset(subsetd, subsetd$day<100)

# armpost: 1 only iff post randomization and treated with FMT
subsetd$armpost <- subsetd$arm * subsetd$postrandomization

subsetd$dayfactor <- as.factor(subsetd$day)
subsetd$patientfactor <- as.factor(subsetd$patientid)
fitn <- lme(fixed=value~armpost,random=list(~1|dayfactor, ~1|patientfactor),data=subsetd)
fitl <- lm(value~armpost,data=subsetd)
```

```
##               numDF denDF   F-value  p-value
## (Intercept)       1   820 1183.5514   <.0001
## armpost           1   820   44.8281   <.0001

## Approximate 95% confidence intervals
##
##  Fixed effects:
##                lower      est.     upper
## (Intercept) 3.912569 4.252921 4.593273
## armpost     1.406547 1.989926 2.573306
## attr(,"label")
## [1] "Fixed effects:"
```

post−FMT: +1.99, p***<0.0001

```r
library(effects)
require(lmerTest)
subsetd <- subset(d, d$wbc%in%c('lymphocytes'))
subsetd <- subset(subsetd, subsetd$day<100)

# armpost: 1 only iff post randomization and treated with FMT
subsetd$armpost <- subsetd$arm * subsetd$postrandomization

subsetd$dayfactor <- as.factor(subsetd$day)
subsetd$patientfactor <- as.factor(subsetd$patientid)

fitn <- lme(fixed=value~armpost,random=list(~1|dayfactor, ~1|patientfactor),data=subsetd)
```
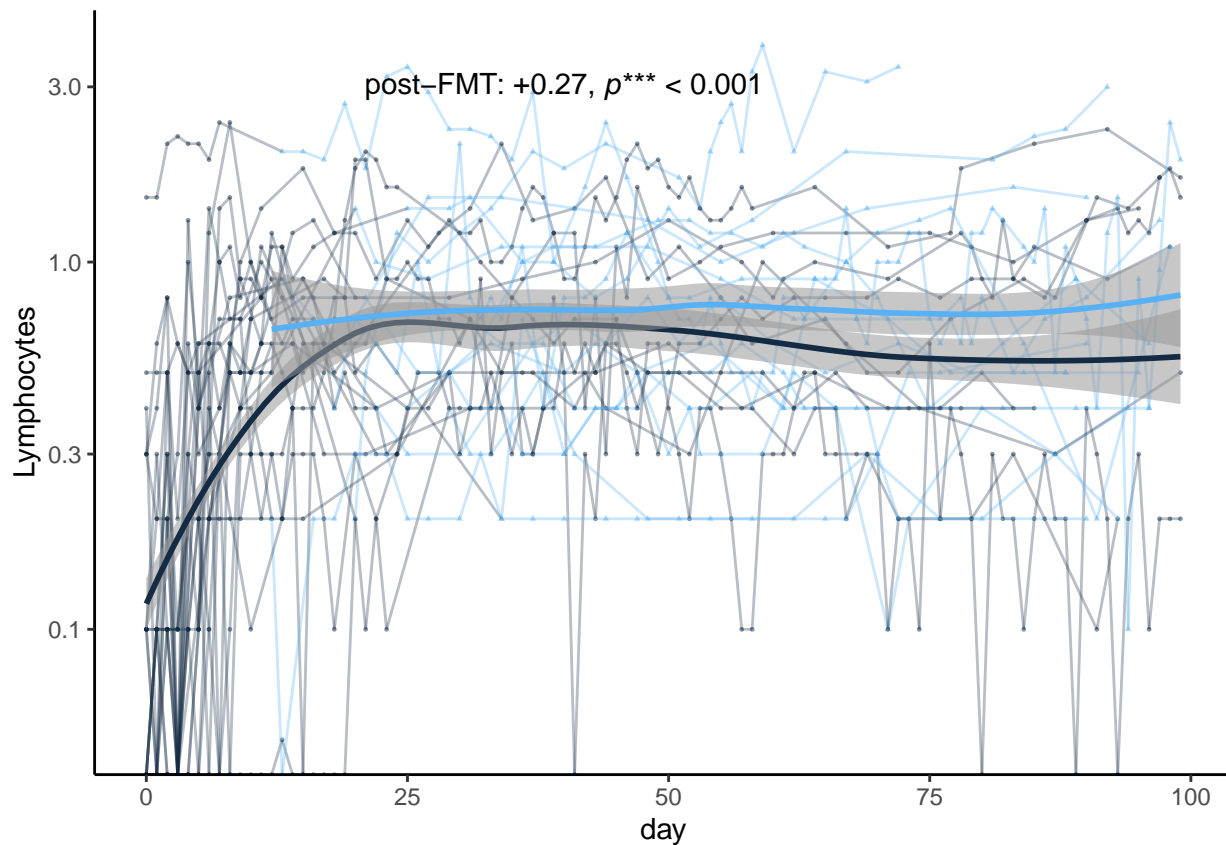
```
##              numDF denDF  F-value p-value
## (Intercept)     1   820 958.4423  <.0001
## armpost         1   820  41.4363  <.0001

## Approximate 95% confidence intervals
##
##  Fixed effects:
##                 lower      est.     upper
## (Intercept) 0.5658711 0.6196076 0.6733440
## armpost     0.1848796 0.2659868 0.3470939
## attr(,"label")
## [1] "Fixed effects:"
```

post–FMT: +0.27, $p^{***} < 0.001$

```
library(effects)
require(lmerTest)
subsetd <- subset(d, d$wbc%in%c('monocytes'))
subsetd <- subset(subsetd, subsetd$day<100)

# armpost: 1 only iff post randomization and treated with FMT
subsetd$armpost <- subsetd$arm * subsetd$postrandomization

subsetd$dayfactor <- as.factor(subsetd$day)
subsetd$patientfactor <- as.factor(subsetd$patientid)

fitn <- lme(fixed=value~armpost,random=list(~1|dayfactor, ~1|patientfactor),data=subsetd)
#summary(fitn)
```
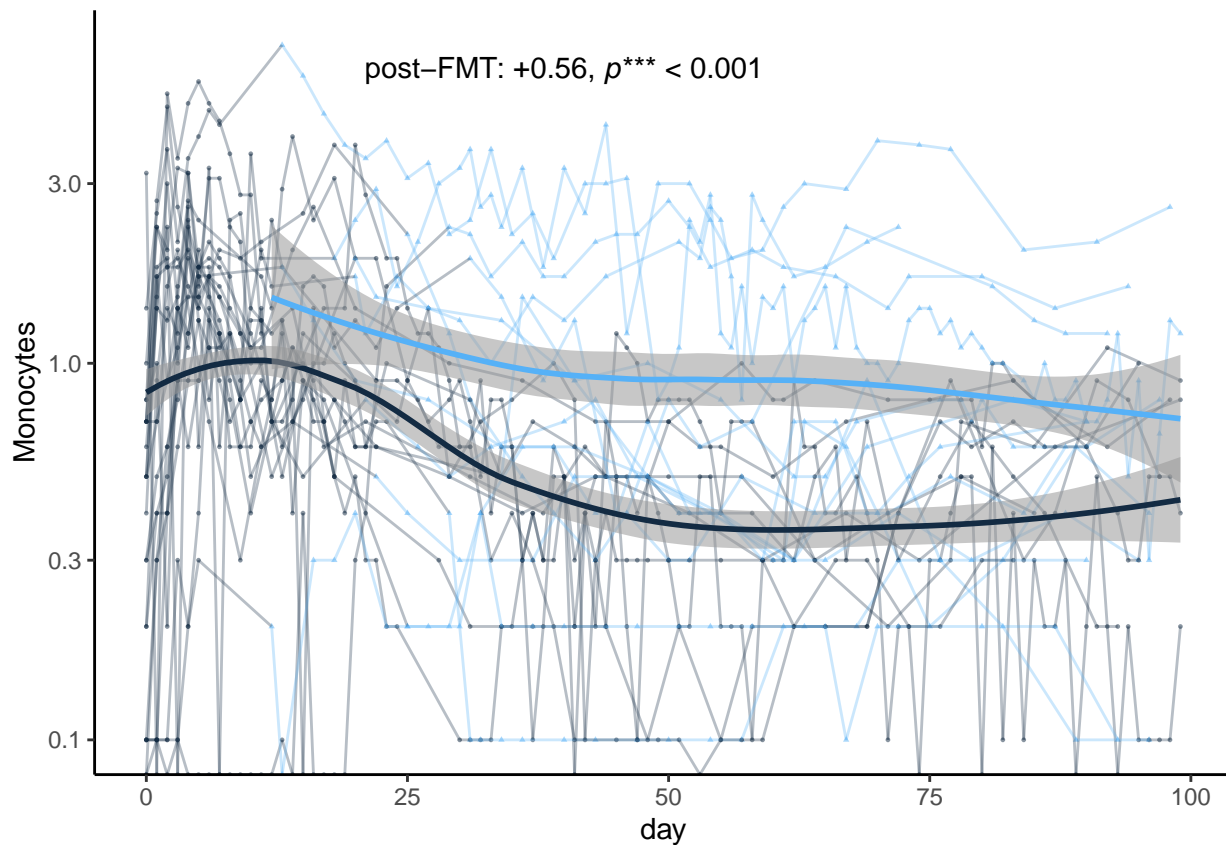
```
##              numDF denDF  F-value  p-value
## (Intercept)      1   820 434.6799  <.0001
## armpost          1   820  70.3229  <.0001

## Approximate 95% confidence intervals
##
##  Fixed effects:
##                 lower      est.     upper
## (Intercept) 0.6400576 0.7424106 0.8447636
## armpost     0.4319588 0.5639645 0.6959703
## attr(,"label")
## [1] "Fixed effects:"
```

post−FMT: +0.56, $p^{***} < 0.001$

```r
library(effects)
require(lmerTest)
subsetd <- subset(d, d$wbc%in%c('wbctotal'))
subsetd <- subset(subsetd, subsetd$day<100)

# armpost: 1 only iff post randomization and treated with FMT
subsetd$armpost <- subsetd$arm * subsetd$postrandomization

subsetd$dayfactor <- as.factor(subsetd$day)
subsetd$patientfactor <- as.factor(subsetd$patientid)

fitn <- lme(fixed=value~armpost,random=list(~1|dayfactor, ~1|patientfactor),data=subsetd)
#summary(fitn)
```

```
##            numDF denDF   F-value p-value
## (Intercept)    1   820 1562.6573  <.0001
## armpost        1   820   57.0658  <.0001

## Approximate 95% confidence intervals
##
##  Fixed effects:
##               lower      est.    upper
## (Intercept) 5.576004 5.989349 6.402694
## armpost     1.952193 2.637519 3.322845
## attr(,"label")
## [1] "Fixed effects:"
```

```
?intervals
```

```
## Help on topic 'intervals' was found in the following packages:
##
##   Package                Library
##   lubridate              /Library/Frameworks/R.framework/Versions/3.6/Resources/library
##   nlme                   /Library/Frameworks/R.framework/Versions/3.6/Resources/library
##
##
## Using the first match ...
```
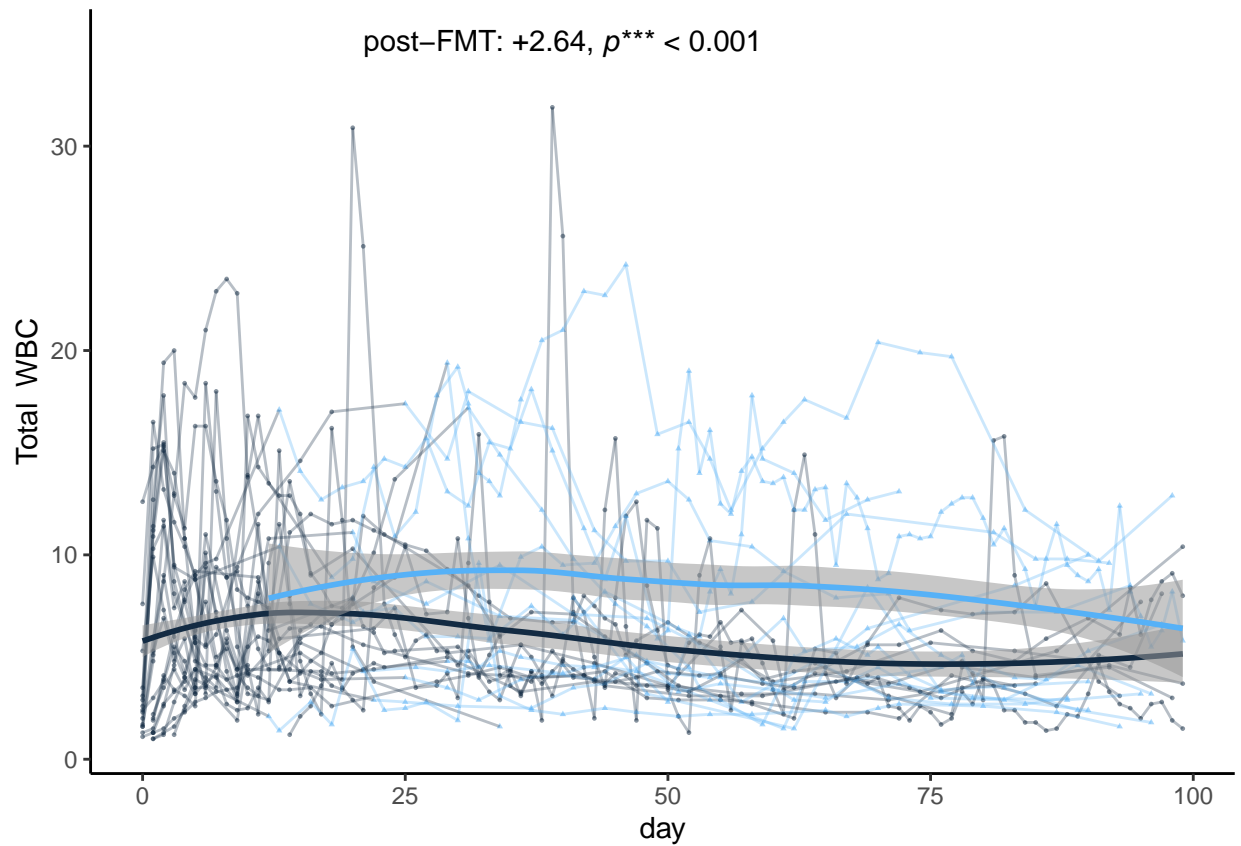
post–FMT: +2.64, $p^{***} < 0.001$

"`