

GIPCR

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Read Data

```
library("readxl")
GIPCR <- read_excel("GIPCR.xlsx", skip=1)
```

Describe data

```
library(psych)
describe(GIPCR)
```

```
##              vars   n    mean      sd    median    trimmed
## Study Period*      1 188      1.57    0.50        2.0        1.59
## MRN                 2 188 4465725.86 2016148.59 5245994.0 4619913.24
## Stool Culture Ordered* 3 188      2.48    0.51        2.0        2.48
## Stool Culture Results* 4 187      3.47    0.60        3.0        3.46
## GI Panel Ordered*    5 188      2.20    0.98        3.0        2.24
## GI Panel Results*    6 187      9.43    1.73       10.0        9.54
## Abx of interest Ordered?* 7 129     33.16   17.01       30.0       33.70
## DOT per med*        8 128     34.84   23.34       35.5       34.12
## DOT                 9 128      9.29    9.84        6.0        7.39
## LOT                10 128      6.84    7.11        4.0        5.49
## Patient Days Present* 11 184     19.90    9.63       22.0       20.53
##              mad    min    max   range  skew kurtosis
## Study Period*      0.00      1      2      1 -0.28   -1.93
## MRN                2090735.83 298671 6774609 6475938 -0.47   -1.23
## Stool Culture Ordered* 0.00      1      3      2 -0.03   -1.71
## Stool Culture Results* 0.00      1      6      5  0.11    1.58
## GI Panel Ordered*    0.00      1      3      2 -0.40   -1.85
## GI Panel Results*    1.48      1     16     15 -1.65    9.63
## Abx of interest Ordered?* 23.72      1     57     56 -0.13   -1.24
## DOT per med*        27.43      1     80     79  0.14   -1.10
## DOT                 5.19      1     65     64  2.69    9.46
## LOT                 2.97      1     51     50  2.86   11.58
## Patient Days Present* 10.38      1     33     32 -0.57   -1.01
##              se
## Study Period*      0.04
## MRN                147042.75
## Stool Culture Ordered* 0.04
## Stool Culture Results* 0.04
## GI Panel Ordered*    0.07
## GI Panel Results*    0.13
```

```
## Abx of interest Ordered?*      1.50
## DOT per med*                   2.06
## DOT                             0.87
## LOT                             0.63
## Patient Days Present*          0.71
```

```
table(GIPCR$`Study Period`)
```

```
##
## Post-Intervention Group  Pre-Intervention Group
##                        81                        107
```

```
table(GIPCR$`Stool Culture Ordered`)
```

```
##
## Negative      NO      YES
##           1      96      91
```

```
table(GIPCR$`Stool Culture Results`)
```

```
##
##                        Aeromonas caviae
##                        1
##                        Campylobacter jejuni
##                        2
##                        n/a
##                        96
##                        No organism detected
##                        85
## No organism detected; No organism detected
##                        2
##                        Shigella sonnei
##                        1
```

```
table(GIPCR$`GI Panel Ordered`)
```

```
##
##                        NO No GI Panel Performed      YES
##                        75                        1      112
```

```
table(GIPCR$`GI Panel Results`)
```

```
##
##                        astrovirus
##                        2
##                        campylobacter
##                        1
##                        campylobacter; cryptosporidium
##                        1
## campylobacter; cryptosporidium; shigella/enteroinvasive e. coli (eiec)
```

```

##                                     1
##                                cryptosporidium
##                                     2
##                        enteropathogenic e. coli (epec)
##                                     3
##                                giardia lamblia
##                                     1
##                        giardia lamblia; norovirus gi/gii
##                                     1
##                                     n/a
##                                     75
##                        No organism detected
##                                     83
##                                norovirus gi/gii
##                                     11
##                        norovirus gi/gii; shigella/enteroinvasive e. coli (eiec)
##                                     1
##                                norovirus gi/gii; yersinia enterocolitica
##                                     1
##                                salmonella
##                                     2
##                                shigella/enteroinvasive e. coli (eiec)
##                                     1
##                        vibrio (parahaemolyticus, vulnificus); vibrio cholerae
##                                     1

```

```
table(GIPCR$`Abx of interest Ordered?`)
```

```

##
##                        amoxicillin-clavulanate; cefepime; metronidazole
##                                     1
##                        amoxicillin-clavulanate; metronidazole; piperacillin-tazobactam
##                                     1
##                        amoxicillin-clavulanate; piperacillin-tazobactam
##                                     1
##                        ampicillin-sulbactam; cefepime; metronidazole
##                                     2
##                                azithromycin; cefepime
##                                     4
##                                azithromycin; cefepime; levofloxacin
##                                     1
##                        azithromycin; cefepime; levofloxacin; meropenem
##                                     1
##                        azithromycin; cefepime; levofloxacin; metronidazole
##                                     1
##                                azithromycin; ceftriaxone
##                                     1
##                                azithromycin; ceftriaxone; cefepime
##                                     1
##                        azithromycin; ceftriaxone; cefepime; meropenem; metronidazole
##                                     1
##                                azithromycin; ceftriaxone; metronidazole
##                                     1
##                                cefepime

```

##		8
##	cefepime; ciprofloxacin; ertapenem; metronidazole	
##		1
##	cefepime; ciprofloxacin; meropenem	
##		1
##	cefepime; ciprofloxacin; metronidazole	
##		2
##	cefepime; levofloxacin	
##		1
##	cefepime; levofloxacin; meropenem	
##		2
##	cefepime; levofloxacin; meropenem; metronidazole	
##		1
##	cefepime; levofloxacin; meropenem; metronidazole; piperacillin-tazobactam	
##		1
##	cefepime; levofloxacin; metronidazole	
##		1
##	cefepime; levofloxacin; metronidazole; piperacillin-tazobactam	
##		1
##	cefepime; meropenem	
##		1
##	cefepime; meropenem; metronidazole	
##		1
##	cefepime; meropenem; metronidazole; piperacillin-tazobactam	
##		1
##	cefepime; metronidazole	
##		14
##	cefepime; metronidazole; piperacillin-tazobactam	
##		2
##	cefepime; piperacillin-tazobactam	
##		2
##	ceftriaxone	
##		7
##	ceftriaxone; cefepime	
##		3
##	ceftriaxone; cefepime; ciprofloxacin; ertapenem; metronidazole	
##		1
##	ceftriaxone; cefepime; ertapenem; meropenem	
##		1
##	ceftriaxone; cefepime; levofloxacin; metronidazole	
##		1
##	ceftriaxone; cefepime; meropenem	
##		1
##	ceftriaxone; cefepime; meropenem; metronidazole	
##		1
##	ceftriaxone; ciprofloxacin	
##		1
##	ceftriaxone; ciprofloxacin; metronidazole	
##		2
##	ceftriaxone; ciprofloxacin; metronidazole; piperacillin-tazobactam	
##		1
##	ceftriaxone; ciprofloxacin; piperacillin-tazobactam	
##		1
##	ceftriaxone; levofloxacin; meropenem; metronidazole; piperacillin-tazobactam	

```

##                                     1
##                                ceftriaxone; meropenem
##                                     1
##                                ceftriaxone; metronidazole
##                                     3
##                                ceftriaxone; piperacillin-tazobactam
##                                     1
##                                ciprofloxacin
##                                     3
##                                ciprofloxacin; metronidazole
##                                     4
##                                ciprofloxacin; metronidazole; piperacillin-tazobactam
##                                     3
##                                ertapenem; meropenem
##                                     1
##                                levofloxacin
##                                     1
##                                levofloxacin; metronidazole
##                                     1
##                                levofloxacin; piperacillin-tazobactam
##                                     1
##                                meropenem
##                                     7
##                                meropenem; metronidazole
##                                     4
##                                meropenem; metronidazole; piperacillin-tazobactam
##                                     1
##                                meropenem; piperacillin-tazobactam
##                                     1
##                                metronidazole
##                                     8
##                                No
##                                     1
##                                piperacillin-tazobactam
##                                     11

```

```
table(GIPCR$`Patient Days Present`)
```

```

##
##          1          10          11          12
##          2          7          6          6
##         13         14         15         16
##          4          5          2          4
##         18         19          2         20
##          3          2          8          1
##         22         23         24         26
##          2          1          2          1
##         28          3         31         33
##          1         14          2          1
##         37          4         43         47
##          3         20          1          1
##          5         58          6         64
##         20          1         23          1
##          7          8         82          9

```

```
##          15          9          1          9
## outpatient collect
##          6
```

```
table(GIPCR$`GI Panel Results`,GIPCR$`Study Period`)
```

```
##
##
##          Post-Intervention Group
##  astrovirus                                0
##  campylobacter                             1
##  campylobacter; cryptosporidium             0
##  campylobacter; cryptosporidium; shigella/enteroinvasive e. coli (eiec) 1
##  cryptosporidium                           2
##  enteropathogenic e. coli (epec)            3
##  giardia lamblia                           1
##  giardia lamblia; norovirus gi/gii          0
##  n/a                                         0
##  No organism detected                      58
##  norovirus gi/gii                          10
##  norovirus gi/gii; shigella/enteroinvasive e. coli (eiec) 0
##  norovirus gi/gii; yersinia enterocolitica 1
##  salmonella                                2
##  shigella/enteroinvasive e. coli (eiec)     1
##  vibrio (parahaemolyticus, vulnificus); vibrio cholerae 1
##
##          Pre-Intervention Group
##  astrovirus                                2
##  campylobacter                             0
##  campylobacter; cryptosporidium             1
##  campylobacter; cryptosporidium; shigella/enteroinvasive e. coli (eiec) 0
##  cryptosporidium                           0
##  enteropathogenic e. coli (epec)            0
##  giardia lamblia                           0
##  giardia lamblia; norovirus gi/gii          1
##  n/a                                         75
##  No organism detected                      25
##  norovirus gi/gii                          1
##  norovirus gi/gii; shigella/enteroinvasive e. coli (eiec) 1
##  norovirus gi/gii; yersinia enterocolitica 0
##  salmonella                                0
##  shigella/enteroinvasive e. coli (eiec)     0
##  vibrio (parahaemolyticus, vulnificus); vibrio cholerae 0
```

```
table(GIPCR$`Abx of interest Ordered?`,GIPCR$`Study Period`)
```

```
##
##
##          Post-Intervention
##  amoxicillin-clavulanate; cefepime; metronidazole
##  amoxicillin-clavulanate; metronidazole; piperacillin-tazobactam
##  amoxicillin-clavulanate; piperacillin-tazobactam
##  ampicillin-sulbactam; cefepime; metronidazole
##  azithromycin; cefepime
##  azithromycin; cefepime; levofloxacin
```

```

## azithromycin; cefepime; levofloxacin; meropenem
## azithromycin; cefepime; levofloxacin; metronidazole
## azithromycin; ceftriaxone
## azithromycin; ceftriaxone; cefepime
## azithromycin; ceftriaxone; cefepime; meropenem; metronidazole
## azithromycin; ceftriaxone; metronidazole
## cefepime
## cefepime; ciprofloxacin; ertapenem; metronidazole
## cefepime; ciprofloxacin; meropenem
## cefepime; ciprofloxacin; metronidazole
## cefepime; levofloxacin
## cefepime; levofloxacin; meropenem
## cefepime; levofloxacin; meropenem; metronidazole
## cefepime; levofloxacin; meropenem; metronidazole; piperacillin-tazobactam
## cefepime; levofloxacin; metronidazole
## cefepime; levofloxacin; metronidazole; piperacillin-tazobactam
## cefepime; meropenem
## cefepime; meropenem; metronidazole
## cefepime; meropenem; metronidazole; piperacillin-tazobactam
## cefepime; metronidazole
## cefepime; metronidazole; piperacillin-tazobactam
## cefepime; piperacillin-tazobactam
## ceftriaxone
## ceftriaxone; cefepime
## ceftriaxone; cefepime; ciprofloxacin; ertapenem; metronidazole
## ceftriaxone; cefepime; ertapenem; meropenem
## ceftriaxone; cefepime; levofloxacin; metronidazole
## ceftriaxone; cefepime; meropenem
## ceftriaxone; cefepime; meropenem; metronidazole
## ceftriaxone; ciprofloxacin
## ceftriaxone; ciprofloxacin; metronidazole
## ceftriaxone; ciprofloxacin; metronidazole; piperacillin-tazobactam
## ceftriaxone; ciprofloxacin; piperacillin-tazobactam
## ceftriaxone; levofloxacin; meropenem; metronidazole; piperacillin-tazobactam
## ceftriaxone; meropenem
## ceftriaxone; metronidazole
## ceftriaxone; piperacillin-tazobactam
## ciprofloxacin
## ciprofloxacin; metronidazole
## ciprofloxacin; metronidazole; piperacillin-tazobactam
## ertapenem; meropenem
## levofloxacin
## levofloxacin; metronidazole
## levofloxacin; piperacillin-tazobactam
## meropenem
## meropenem; metronidazole
## meropenem; metronidazole; piperacillin-tazobactam
## meropenem; piperacillin-tazobactam
## metronidazole
## No
## piperacillin-tazobactam
##
##
## amoxicillin-clavulanate; cefepime; metronidazole

```

Pre-Intervention (

```

## amoxicillin-clavulanate; metronidazole; piperacillin-tazobactam
## amoxicillin-clavulanate; piperacillin-tazobactam
## ampicillin-sulbactam; cefepime; metronidazole
## azithromycin; cefepime
## azithromycin; cefepime; levofloxacin
## azithromycin; cefepime; levofloxacin; meropenem
## azithromycin; cefepime; levofloxacin; metronidazole
## azithromycin; ceftriaxone
## azithromycin; ceftriaxone; cefepime
## azithromycin; ceftriaxone; cefepime; meropenem; metronidazole
## azithromycin; ceftriaxone; metronidazole
## cefepime
## cefepime; ciprofloxacin; ertapenem; metronidazole
## cefepime; ciprofloxacin; meropenem
## cefepime; ciprofloxacin; metronidazole
## cefepime; levofloxacin
## cefepime; levofloxacin; meropenem
## cefepime; levofloxacin; meropenem; metronidazole
## cefepime; levofloxacin; meropenem; metronidazole; piperacillin-tazobactam
## cefepime; levofloxacin; metronidazole
## cefepime; levofloxacin; metronidazole; piperacillin-tazobactam
## cefepime; meropenem
## cefepime; meropenem; metronidazole
## cefepime; meropenem; metronidazole; piperacillin-tazobactam
## cefepime; metronidazole
## cefepime; metronidazole; piperacillin-tazobactam
## cefepime; piperacillin-tazobactam
## ceftriaxone
## ceftriaxone; cefepime
## ceftriaxone; cefepime; ciprofloxacin; ertapenem; metronidazole
## ceftriaxone; cefepime; ertapenem; meropenem
## ceftriaxone; cefepime; levofloxacin; metronidazole
## ceftriaxone; cefepime; meropenem
## ceftriaxone; cefepime; meropenem; metronidazole
## ceftriaxone; ciprofloxacin
## ceftriaxone; ciprofloxacin; metronidazole
## ceftriaxone; ciprofloxacin; metronidazole; piperacillin-tazobactam
## ceftriaxone; ciprofloxacin; piperacillin-tazobactam
## ceftriaxone; levofloxacin; meropenem; metronidazole; piperacillin-tazobactam
## ceftriaxone; meropenem
## ceftriaxone; metronidazole
## ceftriaxone; piperacillin-tazobactam
## ciprofloxacin
## ciprofloxacin; metronidazole
## ciprofloxacin; metronidazole; piperacillin-tazobactam
## ertapenem; meropenem
## levofloxacin
## levofloxacin; metronidazole
## levofloxacin; piperacillin-tazobactam
## meropenem
## meropenem; metronidazole
## meropenem; metronidazole; piperacillin-tazobactam
## meropenem; piperacillin-tazobactam
## metronidazole

```



```
## No
## piperacillin-tazobactam
```

Changing Negative to No for stool culture ordered Remove duplicate from Stool culture result Changing NO GI Performed to No in GI Panel performed Replace outpatient collect in Patient Days Present with NA. Changing it to numeric and obtaining summary

```
GIPCR$`Stool Culture Ordered` <- gsub("Negative", "NO", GIPCR$`Stool Culture Ordered`)
table(GIPCR$`Stool Culture Ordered`)
```

```
##
## NO YES
## 97 91
```

```
GIPCR$`Stool Culture Results` <- gsub("No organism detected; No organism detected", "No organism detected")
table(GIPCR$`Stool Culture Results`)
```

```
##
## Aeromonas caviae Campylobacter jejuni n/a
## 1 2 96
## No organism detected Shigella sonnei
## 87 1
```

```
GIPCR$`GI Panel Ordered` <- gsub("No GI Panel Performed", "NO", GIPCR$`GI Panel Ordered`)
table(GIPCR$`GI Panel Ordered`)
```

```
##
## NO YES
## 76 112
```

```
GIPCR$`Patient Days Present` <- gsub("outpatient collect", "NA", GIPCR$`Patient Days Present`)
GIPCR$`Patient Days Present` <- as.numeric(GIPCR$`Patient Days Present`)
```

```
## Warning: NAs introduced by coercion
```

```
summary(GIPCR$`Patient Days Present`)
```

```
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's
## 1.00 5.00 7.00 10.34 11.75 82.00 10
```

Antibiotic use description

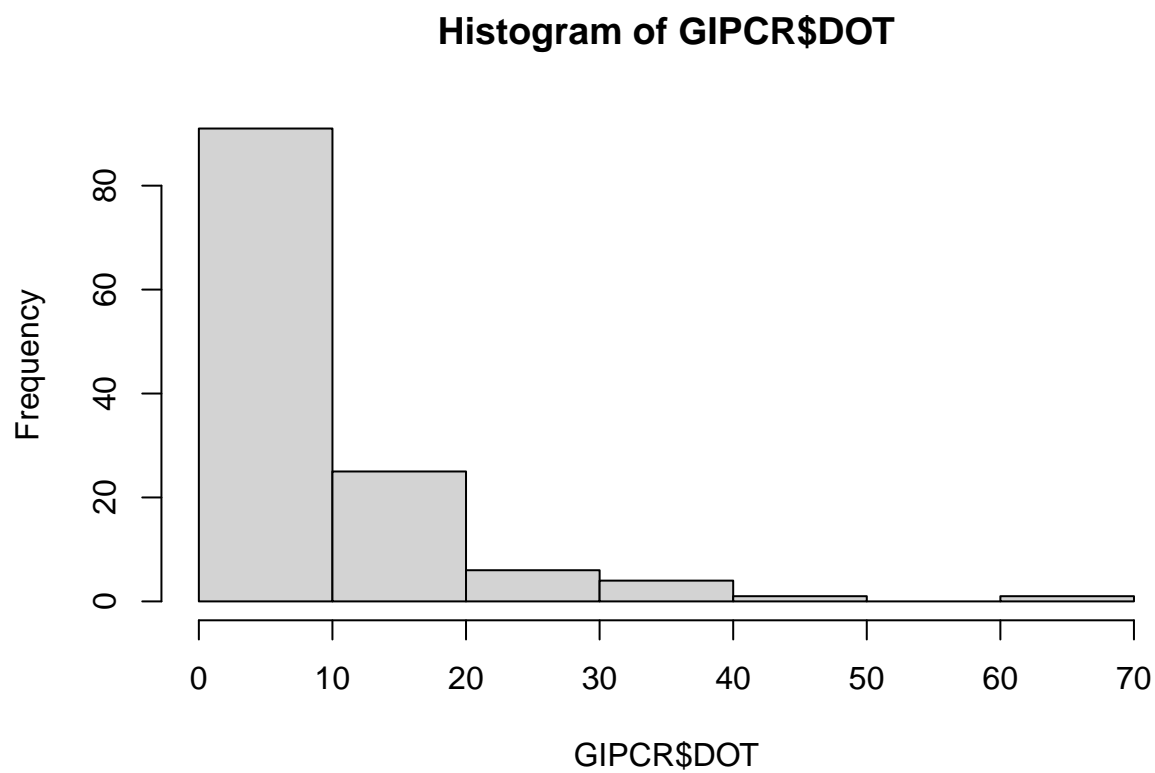
```
summary(GIPCR$DOT)
```

```
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's
## 1.000 4.000 6.000 9.289 12.000 65.000 60
```

```
summary(GIPCR$LOT)
```

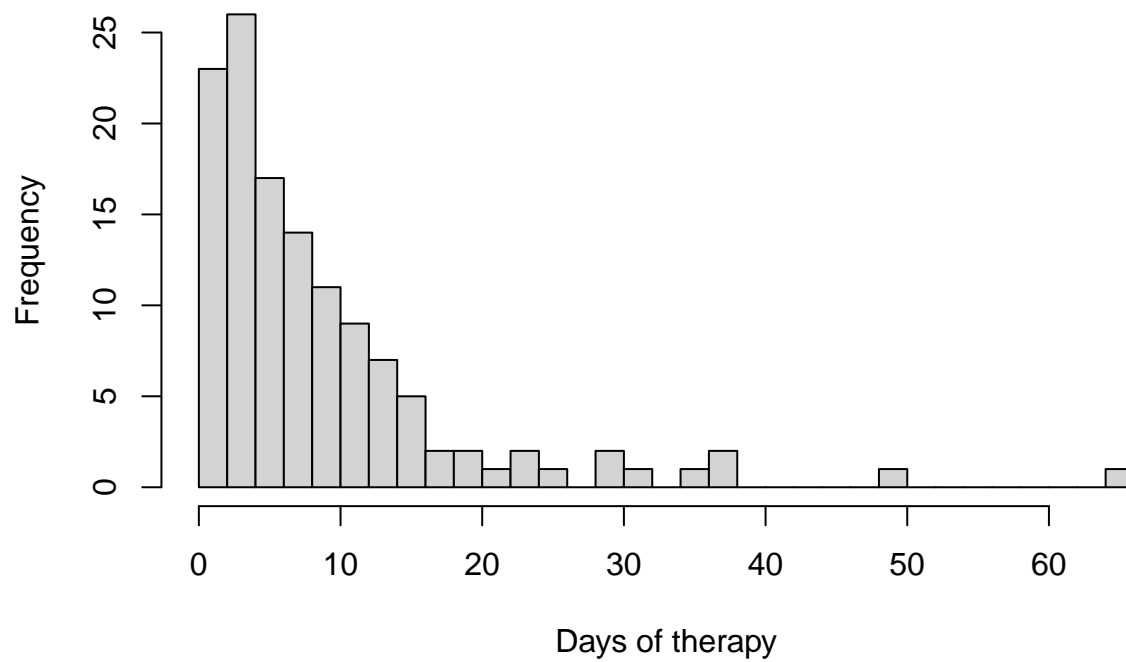
##	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	NA's
##	1.000	3.000	4.000	6.844	8.250	51.000	60

```
hist(GIPCR$DOT)
```

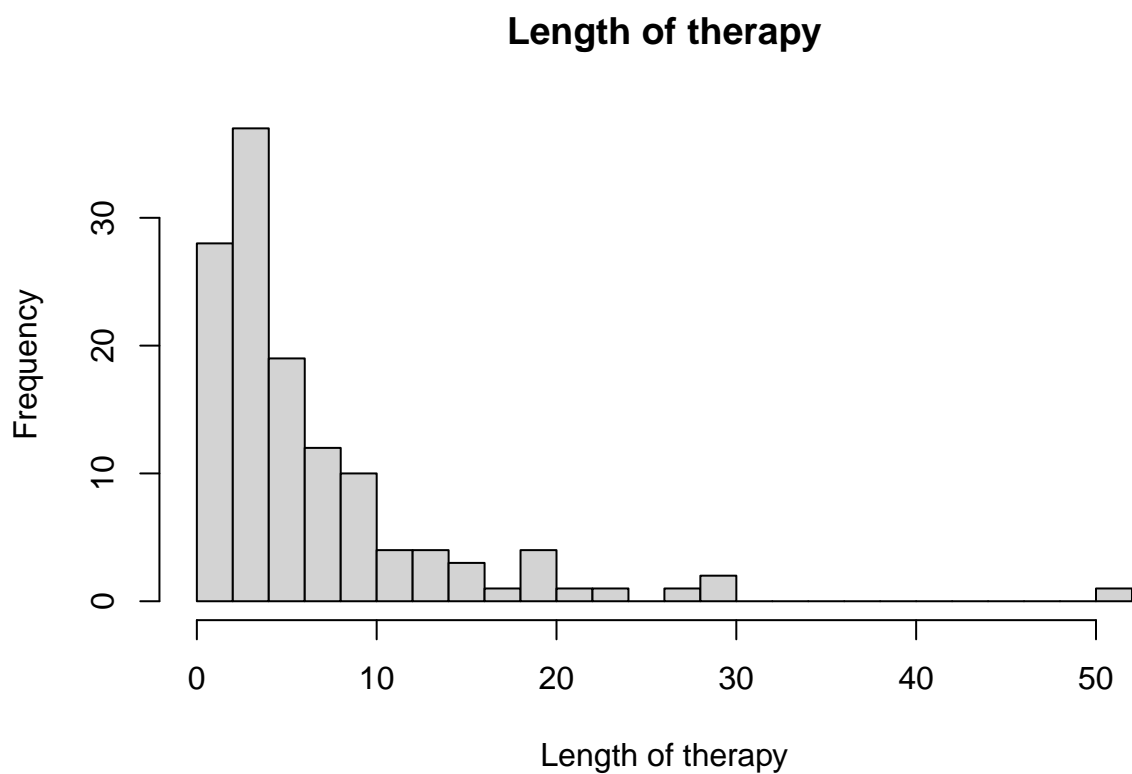


```
hist(GIPCR$DOT,main ="Days of therapy",xlab="Days of therapy",breaks =30)
```

Days of therapy



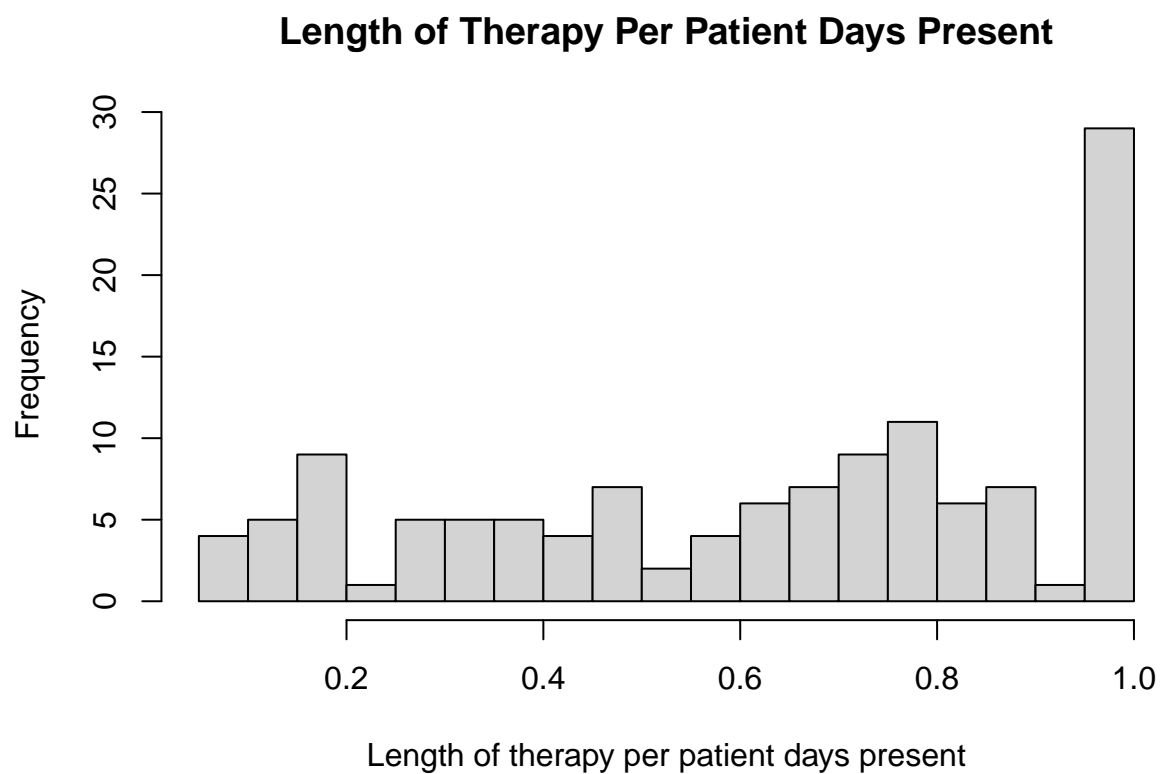
```
hist(GIPCR$LOT,main ="Length of therapy",xlab="Length of therapy",breaks =30)
```



Data not normally distributed (mean different from median, right tail).

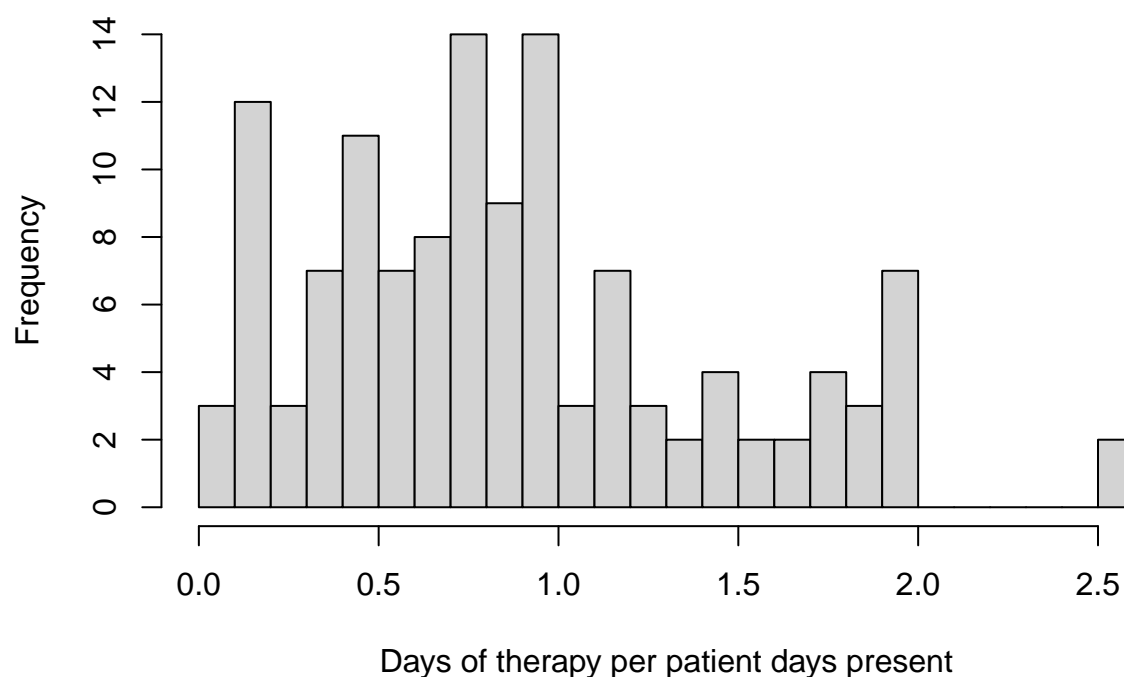
Create new variables for DOT per Patient Days Present and DOT per Patient Days Present

```
GIPCR$DOTperPDP <- round(GIPCR$DOT/GIPCR$`Patient Days Present`,2)
GIPCR$LOTperPDP <- round(GIPCR$LOT/GIPCR$`Patient Days Present`,2)
hist(GIPCR$LOTperPDP,main="Length of Therapy Per Patient Days Present",xlab="Length of therapy per patient days present")
```



```
hist(GIPCR$DOTperPDP,main = "Days of Therapy Per Patient Days Present",xlab="Days of therapy per patient
```

Days of Therapy Per Patient Days Present



Data per Study Period

```
table(GIPCR$`Stool Culture Ordered`,GIPCR$`Study Period`)
```

```
##
##      Post-Intervention Group Pre-Intervention Group
## NO              81              16
## YES              0              91
```

```
table(GIPCR$`Stool Culture Results`,GIPCR$`Study Period`)
```

```
##
##      Post-Intervention Group Pre-Intervention Group
## Aeromonas caviae              0              1
## Campylobacter jejuni          0              2
## n/a                          81             15
## No organism detected          0             87
## Shigella sonnei              0              1
```

```
table(GIPCR$`GI Panel Ordered`,GIPCR$`Study Period`)
```

```
##
##      Post-Intervention Group Pre-Intervention Group
## NO              0              76
## YES             81             31
```

```
tapply(GIPCR$DOT, GIPCR$`Study Period`, mean, na.rm=T)
```

```
## Post-Intervention Group  Pre-Intervention Group
##           10.590164           8.104478
```

```
wilcox.test(GIPCR$DOT~GIPCR$`Study Period`)
```

```
##
## Wilcoxon rank sum test with continuity correction
##
## data:  GIPCR$DOT by GIPCR$`Study Period`
## W = 2279, p-value = 0.2607
## alternative hypothesis: true location shift is not equal to 0
```

No difference in median DOT between the two groups

```
tapply(GIPCR$LOT, GIPCR$`Study Period`, mean, na.rm=T)
```

```
## Post-Intervention Group  Pre-Intervention Group
##           8.081967           5.716418
```

```
wilcox.test(GIPCR$LOT~GIPCR$`Study Period`)
```

```
##
## Wilcoxon rank sum test with continuity correction
##
## data:  GIPCR$LOT by GIPCR$`Study Period`
## W = 2391.5, p-value = 0.09562
## alternative hypothesis: true location shift is not equal to 0
```

No difference in median LOT between the two groups

```
library(incidence)
```

Now compare the rate of DOT and LOT per PDP

```
tapply(GIPCR$DOTperPDP, GIPCR$`Study Period`, mean, na.rm=T)
```

```
## Post-Intervention Group  Pre-Intervention Group
##           0.8545902           0.9384848
```

```
library(incidence)
library(epiR)
```

```
## Warning: package 'epiR' was built under R version 4.1.2
```

```
## Loading required package: survival
```

```
## Package epiR 2.0.43 is loaded

## Type help(eps.about) for summary information

## Type browseVignettes(package = 'epiR') to learn how to use epiR for applied epidemiological analyses

##
```

```
events <- tapply(GIPCR$DOT, GIPCR$`Study Period`, sum,na.rm=T)
events
```

```
## Post-Intervention Group  Pre-Intervention Group
##                        646                        543
```

```
persontime <- tapply(GIPCR$`Patient Days Present`, GIPCR$`Study Period`, sum,na.rm=T)
persontime
```

```
## Post-Intervention Group  Pre-Intervention Group
##                        901                        940
```

```
tab_studyperiod <- cbind(events, persontime)
tab_studyperiod <- tab_studyperiod[c(2,1),]
tab_studyperiod
```

```
##                      events persontime
## Pre-Intervention Group      543      940
## Post-Intervention Group     646      901
```

```
epi.2by2(tab_studyperiod, method = "cohort.time")
```

```
##              Outcome +      Time at risk      Inc rate *
## Exposed +           543           940           57.8
## Exposed -           646           901           71.7
## Total              1189          1841           64.6
##
## Point estimates and 95% CIs:
## -----
## Inc rate ratio              0.81 (0.72, 0.90)
## Attrib rate in the exposed * -13.93 (-21.29, -6.57)
## Attrib fraction in the exposed (%) -24.12 (-39.38, -10.56)
## Attrib rate in the population * -7.11 (-13.75, -0.48)
## Attrib fraction in the population (%) -11.01 (-13.29, -8.71)
## -----
## Wald confidence limits
## CI: confidence interval
## * Outcomes per 100 units of population time at risk
```

Increase in DOT incidence rate after intervention (adjusted per patient days)


```
tapply(GIPCR$LOTperPDP, GIPCR$`Study Period`, mean, na.rm=T)
```

```
## Post-Intervention Group  Pre-Intervention Group
##                0.6321311                0.6506061
```

```
events2 <- tapply(GIPCR$LOT, GIPCR$`Study Period`, sum, na.rm=T)
events2
```

```
## Post-Intervention Group  Pre-Intervention Group
##                493                383
```

```
tab_studyperiod2 <- cbind(events2, persontime)
tab_studyperiod2 <- tab_studyperiod2[c(2,1),]
tab_studyperiod2
```

```
##                events2 persontime
## Pre-Intervention Group      383      940
## Post-Intervention Group     493      901
```

```
epi.2by2(tab_studyperiod2, method = "cohort.time")
```

```
##                Outcome +      Time at risk      Inc rate *
## Exposed +          383            940            40.7
## Exposed -          493            901            54.7
## Total              876           1841            47.6
##
## Point estimates and 95% CIs:
## -----
## Inc rate ratio                0.74 (0.65, 0.85)
## Attrib rate in the exposed *   -13.97 (-20.30, -7.65)
## Attrib fraction in the exposed (%) -34.29 (-53.88, -17.27)
## Attrib rate in the population *  -7.13 (-12.90, -1.37)
## Attrib fraction in the population (%) -14.99 (-17.56, -12.39)
## -----
## Wald confidence limits
## CI: confidence interval
## * Outcomes per 100 units of population time at risk
```

Increase in LOT incidence rate after intervention (adjusted per patient days)

```
library(ggplot2)
```

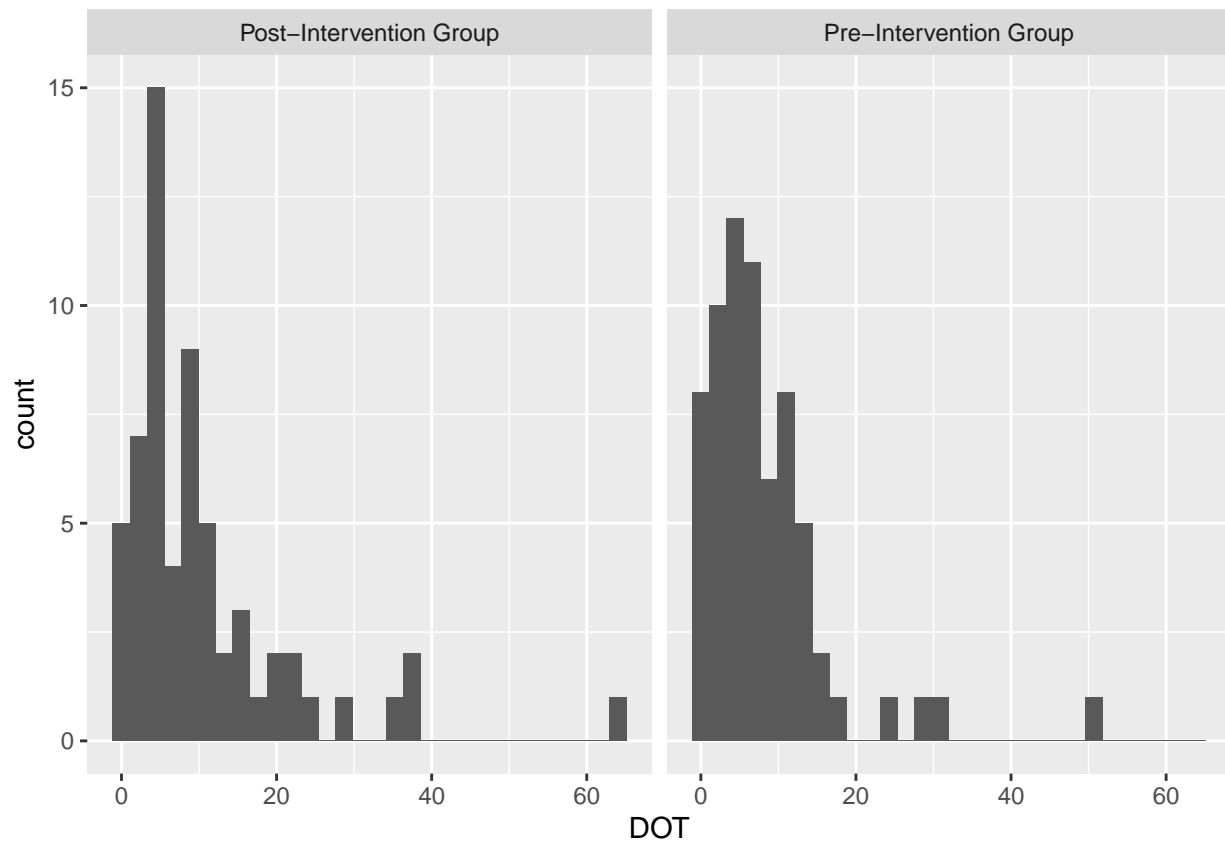
```
##
## Attaching package: 'ggplot2'
```

```
## The following objects are masked from 'package:psych':
##
## %+%, alpha
```

```
p1 <- ggplot(GIPCR,aes(DOT)) + geom_histogram() +facet_wrap(~`Study Period`)
p1
```

```
## 'stat_bin()' using 'bins = 30'. Pick better value with 'binwidth'.
```

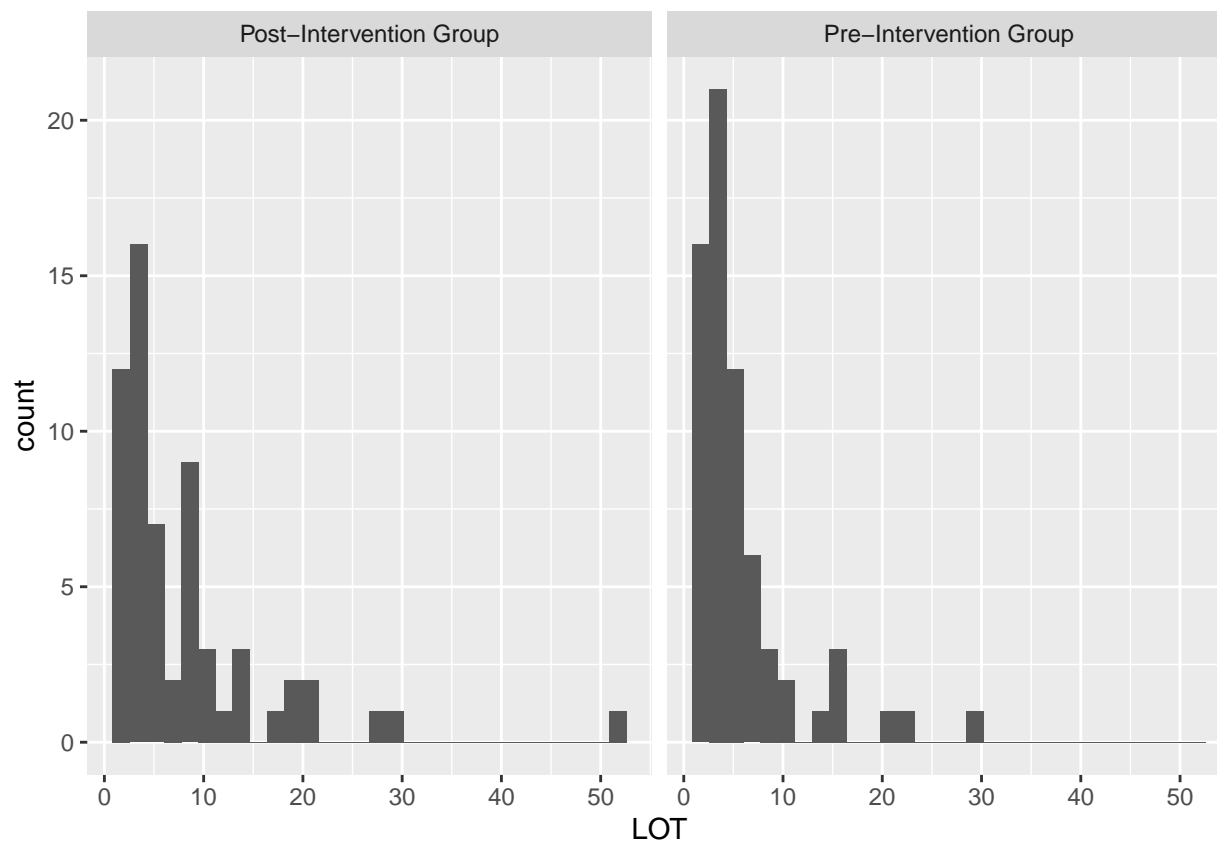
```
## Warning: Removed 60 rows containing non-finite values (stat_bin).
```



```
p2 <- ggplot(GIPCR,aes(LOT)) + geom_histogram() +facet_wrap(~`Study Period`)
p2
```

```
## 'stat_bin()' using 'bins = 30'. Pick better value with 'binwidth'.
```

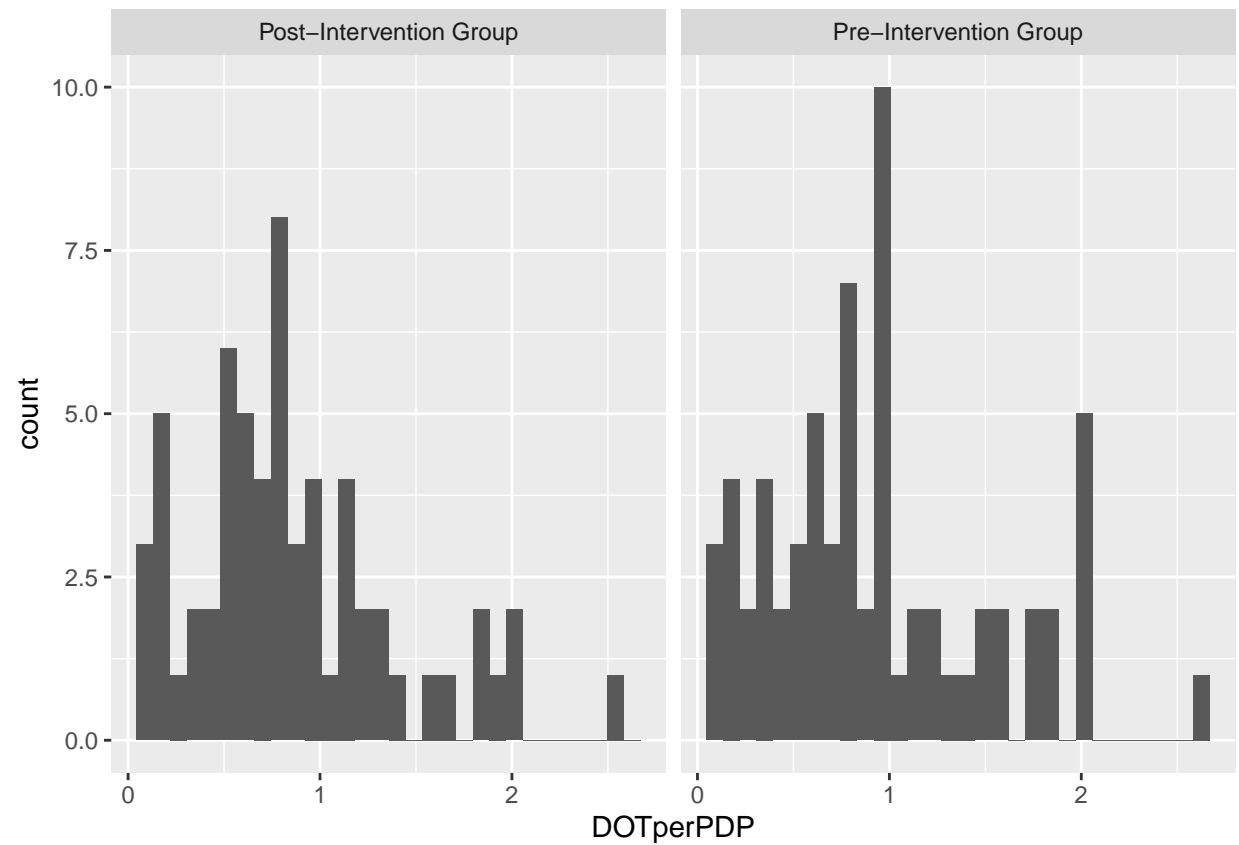
```
## Warning: Removed 60 rows containing non-finite values (stat_bin).
```



```
p3 <- ggplot(GIPCR,aes(DOTperPDP)) + geom_histogram() +facet_wrap(~`Study Period`)
p3
```

```
## 'stat_bin()' using 'bins = 30'. Pick better value with 'binwidth'.
```

```
## Warning: Removed 61 rows containing non-finite values (stat_bin).
```



```
p4 <- ggplot(GIPCR,aes(DOTperPDP)) + geom_histogram() +facet_wrap(~`Study Period`)
p4
```

```
## 'stat_bin()' using 'bins = 30'. Pick better value with 'binwidth'.
```

```
## Warning: Removed 61 rows containing non-finite values (stat_bin).
```

