DOE-report2

資料前處理

```
setwd("C:/Users/user/Desktop/R/DOE/Data")
library(readr)
library(dplyr)
library(ggplot2)
df = as_tibble(read.csv("covid_data_pain.csv", encoding = "CP950"))

df = df[c(1,2,8:10)]

# wash data####
age = c()
for(i in df$AGE_YRS){
  if(15<i & i<=35){
    age = append(age, "15~35")
  }
  else if(35<i & i<=55){
    age = append(age, "35~55")
  }
  else if(55<i & i<=75){
    age = append(age, "55~75")
  }
  else{
    age = append(age, "75~95")
  }
}
df$age = age

df_ijk_trans  = function(df, age, pain, vax){
  df_res = df %>% filter(age == age & Pain_type == pain & VAX_MANU==vax)
  return(df_res)
}

age_iter = c("15~35", "35~55", "55~75", "75~95")
# pain_iter = c("四肢痛", "其他痛", "頭頸痛", "軀幹痛")
pain_iter = c("四肢痛", "頭頸痛", "軀幹痛")
vax_iter = c("MODERNA", "PFIZER\\BIONTECH", "JANSSEN")


df = df %>% filter(Pain_type!="其他痛")
df
```

```
## # A tibble: 919 x 6
##    SEX   DIED  VAX_MANU           AGE_YRS Pain_type age
##    <fct> <fct> <fct>                <dbl> <fct>     <chr>
##  1 F     N     "MODERNA"               22 頭頸痛    15~35
##  2 M     N     "MODERNA"               27 軀幹痛    15~35
##  3 F     N     "MODERNA"               33 四肢痛    15~35
##  4 F     N     "PFIZER\\BIONTECH"      61 頭頸痛    55~75
##  5 F     N     "MODERNA"               26 軀幹痛    15~35
##  6 F     N     "PFIZER\\BIONTECH"      28 軀幹痛    15~35
##  7 F     N     "PFIZER\\BIONTECH"      30 頭頸痛    15~35
##  8 F     N     "MODERNA"               54 頭頸痛    35~55
##  9 F     N     "MODERNA"               39 頭頸痛    35~55
## 10 F     N     "PFIZER\\BIONTECH"      33 頭頸痛    15~35
## # ... with 909 more rows
```

計算cell

```
library(hash)
magic = function(df){
  res = hash()
  p = sum(df$DIED=="Y")/(length(df$DIED))
  n = df %>% nrow()
  q = 1-p
  res[["n_obs"]] = n
  res[["mean"]] = n*p
  res[["std"]] = n*p*q
  return(res)

}

n_obs =  c()
cell_mean = c()
cell_std = c()


for(k in vax_iter){
  for(i in age_iter){
    for(j in pain_iter){
      tmp = magic(df_ijk_trans(df, age = i,pain = j, vax = k))
      n_obs = append(n_obs, tmp$n_obs)
      cell_mean = append(cell_mean, tmp$mean)
      cell_std = append(cell_std, tmp$std)
      }
    }
}
coln = age_iter
rown = pain_iter
```

cell mean/std/replication in matrix (“MODERNA”)

- mean matrix

```
matrix(c(cell_mean[1:12]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛     5     5     9     5
## 頭頸痛     5     9     5     5
## 軀幹痛     9     5     5     9
```

- std matrix

```
matrix(c(cell_std[1:12]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##           15~35    35~55    55~75    75~95
## 四肢痛 4.873096 4.867021 8.228571 4.873096
## 頭頸痛 4.867021 8.228571 4.873096 4.867021
## 軀幹痛 8.228571 4.873096 4.867021 8.228571
```

- replication matrix

```
matrix(c(n_obs[1:12]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛   197   188   105   197
## 頭頸痛   188   105   197   188
## 軀幹痛   105   197   188   105
```

cell mean/std/replication in matrix (“PFIZER\BIONTECH”)

- mean matrix

```
matrix(c(cell_mean[13:24]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛     7     1     2     7
## 頭頸痛     1     2     7     1
## 軀幹痛     2     7     1     2
```

- std matrix

```
matrix(c(cell_std[13:24]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##            15~35     35~55     55~75     75~95
## 四肢痛 6.7117647 0.9917355 1.9629630 6.7117647
## 頭頸痛 0.9917355 1.9629630 6.7117647 0.9917355
## 軀幹痛 1.9629630 6.7117647 0.9917355 1.9629630
```

- replication matrix

```
matrix(c(n_obs[13:24]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛   170   121   108   170
## 頭頸痛   121   108   170   121
## 軀幹痛   108   170   121   108
```

cell mean/std/replication in matrix (“JANSSEN”)

- mean matrix

```
matrix(c(cell_mean[25:36]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛     0     0     0     0
## 頭頸痛     0     0     0     0
## 軀幹痛     0     0     0     0
```

- std matrix

```
matrix(c(cell_std[25:36]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛     0     0     0     0
## 頭頸痛     0     0     0     0
## 軀幹痛     0     0     0     0
```

- replication matrix

```
matrix(c(n_obs[25:36]), nrow  = 3, ncol = 4,byrow = TRUE,dimnames = list(rown, coln))
```

```
##        15~35 35~55 55~75 75~95
## 四肢痛     8    10    12     8
## 頭頸痛    10    12     8    10
## 軀幹痛    12     8    10    12
```