DSC 680 Project 1 R

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```
#Set the working directory
setwd("C:/Users/Christine/Documents/Bellevue/DSC 680/Project 1")
```

Import data from file

```
#Import file
flu <- read.csv(file = "C:/Users/Christine/Documents/Bellevue/DSC 680/Project 1/fluprint_export.
csv", header = TRUE, na.strings = " ")
```

Display first five records of file

```
head(flu)
```

	donor_id <int>	study_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_type_hai <fctr>	visit
1	813	15	Female	Caucasian	2937	2014	0	pre	
2	813	15	Female	Caucasian	2937	2014	0	pre	
3	813	15	Female	Caucasian	2937	2014	0	pre	
4	813	15	Female	Caucasian	2937	2014	0	pre	
5	813	15	Female	Caucasian	2937	2014	0	pre	
6	813	15	Female	Caucasian	2937	2014	0	pre	

6 rows | 1-10 of 39 columns

Run stat.desc() function of file

```
stat.desc(flu)
```

	donor_id <dbl>	study_id <dbl>	gen… <lgl>	r… <lgl>	visit_id <dbl>	visit_year <dbl>	visit
nbr.val	1.561180e+05	1.561180e+05	*NA*	*NA*	1.561180e+05	1.561180e+05	1.561180
nbr.null	0.000000e+00	0.000000e+00	*NA*	*NA*	0.000000e+00	0.000000e+00	1.471340
nbr.na	0.000000e+00	0.000000e+00	*NA*	*NA*	0.000000e+00	0.000000e+00	0.000000
min	1.000000e+00	1.500000e+01	*NA*	*NA*	1.000000e+00	2.007000e+03	0.000000
max	8.130000e+02	3.000000e+01	*NA*	*NA*	2.937000e+03	2.015000e+03	7.000000

	donor_id <dbl>	study_id <dbl>	gen… <lgl>	r… <lgl>	visit_id <dbl>	visit_year <dbl>	visit
range	8.120000e+02	1.500000e+01	*NA*	*NA*	2.936000e+03	8.000000e+00	7.000000
sum	6.129445e+07	3.022399e+06	*NA*	*NA*	1.399764e+08	3.140742e+08	9.902000
median	4.020000e+02	1.800000e+01	*NA*	*NA*	8.710000e+02	2.013000e+03	0.000000
mean	3.926162e+02	1.935971e+01	*NA*	*NA*	8.966065e+02	2.011774e+03	6.342638
SE.mean	4.821530e-01	8.187006e-03	*NA*	*NA*	1.720132e+00	4.456957e-03	8.025971

1-10 of 14 rows | 1-8 of 39 columns Previous **1** 2 Next

Run str() function of file

```
str(flu)
```

```
## 'data.frame':    156118 obs. of  38 variables:
##  $ donor_id                  : int  813 813 813 813 813 813 813 813 813 813 ...
##  $ study_id                  : int  15 15 15 15 15 15 15 15 15 15 ...
##  $ gender                    : Factor w/ 2 levels "Female","Male": 1 1 1 1 1 1 1 1 1 1 ...
##  $ race                      : Factor w/ 7 levels "American Indian or Alaska Native",..: 4 4
4 4 4 4 4 4 4 4 ...
##  $ visit_id                  : int  2937 2937 2937 2937 2937 2937 2937 2937 2937 2937 ...
##  $ visit_year                : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ visit_day                 : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ visit_type_hai            : Factor w/ 2 levels "pre","single": 1 1 1 1 1 1 1 1 1 1 ...
##  $ visit_age                 : num  23 23 23 23 23 23 23 23 23 23 ...
##  $ cmv_status                : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ ebv_status                : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ bmi                       : Factor w/ 401 levels "13.12","13.59",..: 401 401 401 401 401
401 401 401 401 401 ...
##  $ vaccine                   : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ geo_mean                  : num  381 381 381 381 381 ...
##  $ d_geo_mean                : Factor w/ 40 levels "0","1","10","101",..: 2 2 2 2 2 2 2 2 2
2 ...
##  $ vaccine_response          : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ mesurment_id              : int  371121 371122 371123 371124 371125 371126 371127 371128
371129 371130 ...
##  $ assay                     : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ name                      : Factor w/ 3283 levels "B cells","BASO %",..: 1 4 7 9 8 6 11 1
2 13 15 ...
##  $ name_formatted            : Factor w/ 3283 levels "B_cells","BASO_",..: 1 4 9 8 7 6 15 16
11 13 ...
##  $ subset                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 36 30 103
102 101 45 32 98 62 66 ...
##  $ units                     : Factor w/ 8 levels "% of Parent",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ data                      : num  34.4 1.45 5.85 1.55 4.46 3.79 65.6 62.6 11.4 1.66 ...
##  $ statin_use                : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ flu_vaccination_history   : Factor w/ 3 levels "0","1","NULL": 2 2 2 2 2 2 2 2 2 2 ...
##  $ total_vaccines_received   : Factor w/ 25 levels "0","1","10","11",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ vaccinated_1yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_1yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_2yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_2yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_3yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_3yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_4yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_4yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_5yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
```

```
...
##  $ vaccine_type_5yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ influenza_infection_history: int  0 0 0 0 0 0 0 0 0 0 ...
##  $ influenza_hospitalization  : int  0 0 0 0 0 0 0 0 0 0 ...
```

Count each variable

```
sapply(flu, function(x) length(unique(x)))
```

```
##                     donor_id                     study_id
##                          740                            8
##                       gender                         race
##                            2                            7
##                     visit_id                   visit_year
##                          740                            9
##                    visit_day               visit_type_hai
##                            3                            2
##                    visit_age                   cmv_status
##                          475                            3
##                   ebv_status                          bmi
##                            3                          401
##                      vaccine                     geo_mean
##                            7                           76
##                   d_geo_mean              vaccine_response
##                           40                            3
##                 mesurment_id                        assay
##                       156118                           13
##                         name                name_formatted
##                         3283                         3283
##                       subset                        units
##                          632                            8
##                         data                   statin_use
##                         5086                            3
##      flu_vaccination_history      total_vaccines_received
##                            3                           25
##         vaccinated_1yr_prior       vaccine_type_1yr_prior
##                            4                            4
##         vaccinated_2yr_prior       vaccine_type_2yr_prior
##                            4                            4
##         vaccinated_3yr_prior       vaccine_type_3yr_prior
##                            4                            4
##         vaccinated_4yr_prior       vaccine_type_4yr_prior
##                            4                            4
##         vaccinated_5yr_prior       vaccine_type_5yr_prior
##                            4                            4
## influenza_infection_history    influenza_hospitalization
##                            2                            2
```

Unique values of variable “subset”

```
table(flu$subset)
```

```
##
##
Activated T: Lymph/CD3+
##
26
##                                                                                Activ
ated T: Lymph/CD3+/CD4+
##
26
##                                                                          Activated
T: Lymph/CD3+/CD4+/PD1+
##
26
##                                                                 Activated T: Lymph/CD
3+/CD4+/Q1: HLADR-CD38+
##
26
##                                                                 Activated T: Lymph/CD
3+/CD4+/Q2: HLADR+CD38+
##
26
##                                                                 Activated T: Lymph/CD
3+/CD4+/Q3: HLADR+CD38-
##
26
##                                                                       Activ
ated T: Lymph/CD3+/CD8+
##
26
##                                                                    Activated
T: Lymph/CD3+/CD8+/PD1+
##
26
##                                                                 Activated T: Lymph/CD
3+/CD8+/Q1: HLADR-CD38+
##
26
##                                                                 Activated T: Lymph/CD
3+/CD8+/Q2: HLADR+CD38+
##
26
##                                                                 Activated T: Lymph/CD
3+/CD8+/Q3: HLADR+CD38-
##
26
##                                                                             Ac
tivated T: Lymph/TCRgd+
##
26
##
B cell: Lymph/CD3-
##
26
```

```
##                                                                                    B cel
l: Lymph/CD3-/CD19+CD20+
##
26
##                                                                          B cell: Lymph/CD3
-/CD19+CD20+/CD24-/CD38+
##
26
##                                                                          B cell: Lymph/CD3
-/CD19+CD20+/CD24+/CD38-
##
26
##                                                                          B cell: Lymph/CD3
-/CD19+CD20+/CD24+/CD38+
##
26
##                                                                        B cell: Lymph/CD3-/C
D19+CD20+/Q1: IgD-CD27+
##
26
##                                                                        B cell: Lymph/CD3-/C
D19+CD20+/Q2: IgD+CD27+
##
26
##                                                                        B cell: Lymph/CD3-/C
D19+CD20+/Q3: IgD+CD27-
##
26
##                                                                        B cell: Lymph/CD3-/C
D19+CD20+/Q4: IgD-CD27-
##
26
##                                                                                           B
cell: Lymph/CD3-/CD20-
##
26
##                                                                               B cell: Lymp
h/CD3-/CD20-/CD27+/CD38+
##
26
##
B cell: pSTAT1
##
1288
##
B cell: pSTAT3
##
1288
##
B cell: pSTAT5
##
1288
##
Basophil-%
```

```
##
50
##                                                                  Basop
hil Absolute Count-K/uL
##
50
##
BDNF
##
162
##
CD123+HLADR-
##
186
##                                                                    CD1
4-CD33-/CD3-/CD16+CD56+
##
308
##                                                               CD14-CD33
-/CD3-/CD16+CD56+/CD161+
##
308
##                                                                CD14-CD33
-/CD3-/CD16+CD56+/CD57+
##
186
##                                                                CD14-CD33
-/CD3-/CD16+CD56+/CD94+
##
308
##                                                               CD14-CD33
-/CD3-/CD16+CD56+/HLADR+
##
308
##                                                                    CD1
4-CD33-/CD3-/CD19+CD20+
##
308
##                                                          CD14-CD33-/CD3
-/CD19+CD20+/CD24-CD38+
##
308
##                                                          CD14-CD33-/CD3
-/CD19+CD20+/CD24+CD38-
##
308
##                                                          CD14-CD33-/CD3
-/CD19+CD20+/CD24+CD38+
##
308
##                                                           CD14-CD33-/CD
3-/CD19+CD20+/IgD-CD27-
##
308
```

```
##                                                                 CD14-CD33-/CD
3-/CD19+CD20+/IgD-CD27+
##
308
##                                                                 CD14-CD33-/CD
3-/CD19+CD20+/IgD+CD27-
##
308
##                                                                 CD14-CD33-/CD
3-/CD19+CD20+/IgD+CD27+
##
308
##                                                                     CD14-CD33
-/CD3-/CD20-/CD27+CD38+
##
308
##                                                                     CD14-CD33
-/CD3-/CD56bright CD16-
##
186
##
CD14-CD33-/CD3+
##
308
##                                                                       CD14-CD
33-/CD3+/CD4-CD8+/CD57+
##
186
##                                                                       CD14-CD
33-/CD3+/CD4-CD8+/ICOS+
##
186
##                                                 CD14-CD33-/CD3+/CD4-CD8+/Non-naive
CD8+/CXCR5-/CXCR3-CCR6-
##
186
##                                                 CD14-CD33-/CD3+/CD4-CD8+/Non-naive
CD8+/CXCR5-/CXCR3-CCR6+
##
186
##                                                 CD14-CD33-/CD3+/CD4-CD8+/Non-naive
CD8+/CXCR5-/CXCR3+CCR6-
##
186
##                                                             CD14-CD33-/CD3+/CD4-CD8
+/Non-naive CD8+/CXCR5+
##
186
##                                                 CD14-CD33-/CD3+/CD4-CD8+/Non-naive
CD8+/CXCR5+/CXCR3-CCR6-
##
186
##                                                 CD14-CD33-/CD3+/CD4-CD8+/Non-naive
CD8+/CXCR5+/CXCR3-CCR6+
```

```
##
186
##                                                    CD14-CD33-/CD3+/CD4-CD8+/Non-naive
CD8+/CXCR5+/CXCR3+CCR6-
##
186
##                                                                          CD14-C
D33-/CD3+/CD4-CD8+/PD1+
##
186
##
CD14-CD33-/CD3+/CD4+
##
308
##                                                                    CD14-CD33
-/CD3+/CD4+/CCR7-CD45RA-
##
308
##                                                                    CD14-CD33
-/CD3+/CD4+/CCR7-CD45RA+
##
308
##                                                                    CD14-CD33
-/CD3+/CD4+/CCR7+CD45RA-
##
308
##                                                                    CD14-CD33
-/CD3+/CD4+/CCR7+CD45RA+
##
308
##                                                                          CD14
-CD33-/CD3+/CD4+/CD161+
##
308
##                                                                 CD14-CD33-/C
D3+/CD4+/CD25hiCD127low
##
308
##                                                  CD14-CD33-/CD3+/CD4+/CD25h
iCD127low/CD161-CD45RA+
##
308
##                                                  CD14-CD33-/CD3+/CD4+/CD25h
iCD127low/CD161+CD45RA-
##
308
##                                                  CD14-CD33-/CD3+/CD4+/CD25h
iCD127low/CD161+CD45RA+
##
308
##                                                                       CD1
4-CD33-/CD3+/CD4+/CD27+
##
308
```

```
##                                                                    CD1
4-CD33-/CD3+/CD4+/CD28+
##
308
##                                                                   CD14
-CD33-/CD3+/CD4+/CD85j+
##
308
##                                                                    CD1
4-CD33-/CD3+/CD4+/CD94+
##
308
##                                                              CD14-CD33
-/CD3+/CD4+/HLADR-CD38+
##
308
##                                                              CD14-CD33
-/CD3+/CD4+/HLADR+CD38-
##
308
##                                                              CD14-CD33
-/CD3+/CD4+/HLADR+CD38+
##
308
##                                                                 CD14-CD
33-/CD3+/CD4+CD8-/CD57+
##
186
##                                                                 CD14-CD
33-/CD3+/CD4+CD8-/ICOS+
##
186
##                                    CD14-CD33-/CD3+/CD4+CD8-/Non-naive
CD4+/CXCR5-/CXCR3-CCR6-
##
186
##                                    CD14-CD33-/CD3+/CD4+CD8-/Non-naive
CD4+/CXCR5-/CXCR3-CCR6+
##
186
##                                    CD14-CD33-/CD3+/CD4+CD8-/Non-naive
CD4+/CXCR5-/CXCR3+CCR6-
##
186
##                                            CD14-CD33-/CD3+/CD4+CD8
-/Non-naive CD4+/CXCR5+
##
186
##                                    CD14-CD33-/CD3+/CD4+CD8-/Non-naive
CD4+/CXCR5+/CXCR3-CCR6-
##
186
##                                    CD14-CD33-/CD3+/CD4+CD8-/Non-naive
CD4+/CXCR5+/CXCR3-CCR6+
```

```
##
186
##                                                    CD14-CD33-/CD3+/CD4+CD8-/Non-naive
CD4+/CXCR5+/CXCR3+CCR6-
##
186
##                                                                          CD14-C
D33-/CD3+/CD4+CD8-/PD1+
##
186
##
CD14-CD33-/CD3+/CD56+
##
308
##
CD14-CD33-/CD3+/CD8+
##
308
##                                                                  CD14-CD33
-/CD3+/CD8+/CCR7-CD45RA-
##
308
##                                                                  CD14-CD33
-/CD3+/CD8+/CCR7-CD45RA+
##
308
##                                                                  CD14-CD33
-/CD3+/CD8+/CCR7+CD45RA-
##
308
##                                                                  CD14-CD33
-/CD3+/CD8+/CCR7+CD45RA+
##
308
##                                                                        CD14
-CD33-/CD3+/CD8+/CD161+
##
308
##                                                                         CD1
4-CD33-/CD3+/CD8+/CD27+
##
308
##                                                                         CD1
4-CD33-/CD3+/CD8+/CD28+
##
308
##                                                                        CD14
-CD33-/CD3+/CD8+/CD85j+
##
308
##                                                                         CD1
4-CD33-/CD3+/CD8+/CD94+
##
308
```

```
##                                                                 CD14-CD33
-/CD3+/CD8+/HLADR-CD38+
##
308
##                                                                 CD14-CD33
-/CD3+/CD8+/HLADR+CD38-
##
308
##                                                                 CD14-CD33
-/CD3+/CD8+/HLADR+CD38+
##
308
##                                                                      CD14
-CD33-/CD3+CD56+/CD161+
##
186
##
CD14-CD33-/TCRgd+
##
308
##
CD14+CD33+
##
308
##
CD14+CD33+/CD14-CD16+
##
186
##
CD14+CD33+/CD14+CD16+
##
186
##
CD14+CD33+/CD16+
##
308
##
CD4+: pSTAT1
##
1288
##
CD4+: pSTAT3
##
1288
##
CD4+: pSTAT5
##
1288
##
CD4+CD45RA-: pSTAT1
##
1050
##
CD4+CD45RA-: pSTAT3
```

```
##
1050
##
CD4+CD45RA-: pSTAT5
##
1050
##
CD4+CD45RA+: pSTAT1
##
1050
##
CD4+CD45RA+: pSTAT3
##
1050
##
CD4+CD45RA+: pSTAT5
##
1050
##
CD40L
##
650
##
CD45+ CD66+
##
192
##
CD45+ CD66+: IkBtot
##
192
##
CD45+ CD66+: Ki67
##
192
##
CD45+ CD66+: pCREB
##
192
##
CD45+ CD66+: pErk1_2
##
192
##
CD45+ CD66+: pp38
##
192
##
CD45+ CD66+: pPLCg2
##
192
##
CD45+ CD66+: pSTAT1
##
192
```

```
##
CD45+ CD66+: pSTAT3
##
192
##
CD45+ CD66+: pSTAT5
##
192
##                                                                  CD45++ CD66low/CD3-/CD123
-/BDCA-3 -/CD27++CD38++
##
192
##                                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/CD27++
CD38++/Q1: IgA- , Ki67+
##
192
##                                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/CD27++
CD38++/Q2: IgA+ , Ki67+
##
192
##                                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/CD27++
CD38++/Q3: IgA+ , Ki67-
##
192
##                                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/CD27++
CD38++/Q4: IgA- , Ki67-
##
192
##                                                    CD45++ CD66low/CD3-/CD123-/BDCA-3
-/CD27++CD38++: IkBtot
##
187
##                                                      CD45++ CD66low/CD3-/CD123-/BDCA
-3 -/CD27++CD38++: Ki67
##
187
##                                                     CD45++ CD66low/CD3-/CD123-/BDCA-
3 -/CD27++CD38++: pCREB
##
187
##                                                   CD45++ CD66low/CD3-/CD123-/BDCA-3
-/CD27++CD38++: pErk1_2
##
187
##                                                      CD45++ CD66low/CD3-/CD123-/BDCA
-3 -/CD27++CD38++: pp38
##
187
##                                                    CD45++ CD66low/CD3-/CD123-/BDCA-3
-/CD27++CD38++: pPLCg2
##
187
##                                                    CD45++ CD66low/CD3-/CD123-/BDCA-3
-/CD27++CD38++: pSTAT1
```

```
##
187
##                                                                CD45++ CD66low/CD3-/CD123-/BDCA-3
-/CD27++CD38++: pSTAT3
##
187
##                                                                CD45++ CD66low/CD3-/CD123-/BDCA-3
-/CD27++CD38++: pSTAT5
##
187
##                                                          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not C
D27++CD38++/CD7+ HLADR-
##
192
##                                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/
CD7+ HLADR-/CD56- CD16+
##
192
##                                      CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56- CD16+: IkBtot
##
187
##                                        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ H
LADR-/CD56- CD16+: Ki67
##
187
##                                       CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HL
ADR-/CD56- CD16+: pCREB
##
187
##                                     CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLAD
R-/CD56- CD16+: pErk1_2
##
187
##                                        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ H
LADR-/CD56- CD16+: pp38
##
187
##                                      CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56- CD16+: pPLCg2
##
187
##                                      CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56- CD16+: pSTAT1
##
187
##                                      CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56- CD16+: pSTAT3
##
187
##                                      CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56- CD16+: pSTAT5
##
187
```

```
##                                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+
HLADR-/CD56bright CD16+
##
192
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/C
D56bright CD16+: IkBtot
##
187
##                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56bright CD16+: Ki67
##
187
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/
CD56bright CD16+: pCREB
##
187
##                             CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/CD
56bright CD16+: pErk1_2
##
187
##                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56bright CD16+: pp38
##
187
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/C
D56bright CD16+: pPLCg2
##
187
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/C
D56bright CD16+: pSTAT1
##
187
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/C
D56bright CD16+: pSTAT3
##
187
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR-/C
D56bright CD16+: pSTAT5
##
187
##                                        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD
7+ HLADR-/CD56int CD16-
##
192
##                                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16-: IkBtot
##
187
##                                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56int CD16-: Ki67
##
187
##                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLAD
R-/CD56int CD16-: pCREB
```

```
##
187
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16-: pErk1_2
##
187
##                                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56int CD16-: pp38
##
187
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16-: pPLCg2
##
187
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16-: pSTAT1
##
187
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16-: pSTAT3
##
187
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16-: pSTAT5
##
187
##                                       CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD
7+ HLADR-/CD56int CD16+
##
192
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16+: IkBtot
##
187
##                                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56int CD16+: Ki67
##
187
##                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLAD
R-/CD56int CD16+: pCREB
##
187
##                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16+: pErk1_2
##
187
##                                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLA
DR-/CD56int CD16+: pp38
##
187
##                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16+: pPLCg2
##
187
```

```
##                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16+: pSTAT1
##
187
##                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16+: pSTAT3
##
187
##                                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/CD7+ HLADR
-/CD56int CD16+: pSTAT5
##
187
##                                             CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD3
8++/CD7+ HLADR-: IkBtot
##
187
##                                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++C
D38++/CD7+ HLADR-: Ki67
##
187
##                                              CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD
38++/CD7+ HLADR-: pCREB
##
187
##                                            CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38
++/CD7+ HLADR-: pErk1_2
##
187
##                                               CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++C
D38++/CD7+ HLADR-: pp38
##
187
##                                             CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD3
8++/CD7+ HLADR-: pPLCg2
##
187
##                                             CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD3
8++/CD7+ HLADR-: pSTAT1
##
187
##                                             CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD3
8++/CD7+ HLADR-: pSTAT3
##
187
##                                             CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD3
8++/CD7+ HLADR-: pSTAT5
##
187
##                                           CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38+
+/HLADR+ CD7-/CD19+CD20+
##
192
##                          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+
CD20+/CD24high CD38high
```

```
##
192
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/CD
24high CD38high: IkBtot
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
CD24high CD38high: Ki67
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/C
D24high CD38high: pCREB
##
187
##                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/CD2
4high CD38high: pErk1_2
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
CD24high CD38high: pp38
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/CD
24high CD38high: pPLCg2
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/CD
24high CD38high: pSTAT1
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/CD
24high CD38high: pSTAT3
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/CD
24high CD38high: pSTAT5
##
187
##                            CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD1
9+CD20+/IgA+ CD19+CD20+
##
192
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
IgA+ CD19+CD20+: IkBtot
##
187
##                     CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/IgA+ CD19+CD20+: Ki67
##
187
##                    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/IgA+ CD19+CD20+: pCREB
##
187
```

```
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/I
gA+ CD19+CD20+: pErk1_2
##
187
##                    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/IgA+ CD19+CD20+: pp38
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
IgA+ CD19+CD20+: pPLCg2
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
IgA+ CD19+CD20+: pSTAT1
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
IgA+ CD19+CD20+: pSTAT3
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
IgA+ CD19+CD20+: pSTAT5
##
187
##                         CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19
+CD20+/Q1: IgD- , CD27+
##
192
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
1: IgD- , CD27+: IkBtot
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q1: IgD- , CD27+: Ki67
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
Q1: IgD- , CD27+: pCREB
##
187
##                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
1: IgD- , CD27+: pErk1_2
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q1: IgD- , CD27+: pp38
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
1: IgD- , CD27+: pPLCg2
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
1: IgD- , CD27+: pSTAT1
```

```
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
1: IgD- , CD27+: pSTAT3
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
1: IgD- , CD27+: pSTAT5
##
187
##                          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19
+CD20+/Q2: IgD+ , CD27+
##
192
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
2: IgD+ , CD27+: IkBtot
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q2: IgD+ , CD27+: Ki67
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
Q2: IgD+ , CD27+: pCREB
##
187
##                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
2: IgD+ , CD27+: pErk1_2
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q2: IgD+ , CD27+: pp38
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
2: IgD+ , CD27+: pPLCg2
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
2: IgD+ , CD27+: pSTAT1
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
2: IgD+ , CD27+: pSTAT3
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
2: IgD+ , CD27+: pSTAT5
##
187
##                          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19
+CD20+/Q3: IgD+ , CD27-
##
192
```

```
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
3: IgD+ , CD27-: IkBtot
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q3: IgD+ , CD27-: Ki67
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
Q3: IgD+ , CD27-: pCREB
##
187
##                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
3: IgD+ , CD27-: pErk1_2
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q3: IgD+ , CD27-: pp38
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
3: IgD+ , CD27-: pPLCg2
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
3: IgD+ , CD27-: pSTAT1
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
3: IgD+ , CD27-: pSTAT3
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
3: IgD+ , CD27-: pSTAT5
##
187
##                          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19
+CD20+/Q4: IgD- , CD27-
##
192
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
4: IgD- , CD27-: IkBtot
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q4: IgD- , CD27-: Ki67
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/
Q4: IgD- , CD27-: pCREB
##
187
##                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
4: IgD- , CD27-: pErk1_2
```

```
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20
+/Q4: IgD- , CD27-: pp38
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
4: IgD- , CD27-: pPLCg2
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
4: IgD- , CD27-: pSTAT1
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
4: IgD- , CD27-: pSTAT3
##
187
##                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/CD19+CD20+/Q
4: IgD- , CD27-: pSTAT5
##
187
##                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+
CD7-/CD19+CD20+: IkBtot
##
187
##                                    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR
+ CD7-/CD19+CD20+: Ki67
##
187
##                                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+
CD7-/CD19+CD20+: pCREB
##
187
##                                 CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ C
D7-/CD19+CD20+: pErk1_2
##
187
##                                    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR
+ CD7-/CD19+CD20+: pp38
##
187
##                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+
CD7-/CD19+CD20+: pPLCg2
##
187
##                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+
CD7-/CD19+CD20+: pSTAT1
##
187
##                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+
CD7-/CD19+CD20+: pSTAT3
##
187
```

```
##                                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+
CD7-/CD19+CD20+: pSTAT5
##
187
##                            CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non
CD19+CD20+/CD14+ Monos
##
192
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD14+ Monos: IkBtot
##
187
##                     CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+
CD20+/CD14+ Monos: Ki67
##
187
##                    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+C
D20+/CD14+ Monos: pCREB
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD2
0+/CD14+ Monos: pErk1_2
##
187
##                     CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+
CD20+/CD14+ Monos: pp38
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD14+ Monos: pPLCg2
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD14+ Monos: pSTAT1
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD14+ Monos: pSTAT3
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD14+ Monos: pSTAT5
##
187
##                            CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non
CD19+CD20+/CD16+ Monos
##
192
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD16+ Monos: IkBtot
##
187
##                     CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+
CD20+/CD16+ Monos: Ki67
```

```
##
187
##                    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+C
D20+/CD16+ Monos: pCREB
##
187
##                  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD2
0+/CD16+ Monos: pErk1_2
##
187
##                     CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+
CD20+/CD16+ Monos: pp38
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD16+ Monos: pPLCg2
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD16+ Monos: pSTAT1
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD16+ Monos: pSTAT3
##
187
##                   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD
20+/CD16+ Monos: pSTAT5
##
187
##           CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non
 Monos/CD11c+ HLA-DRhigh
##
192
##  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/CD
11c+ HLA-DRhigh: IkBtot
##
187
##    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/
CD11c+ HLA-DRhigh: Ki67
##
187
##   CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/C
D11c+ HLA-DRhigh: pCREB
##
187
## CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/CD1
1c+ HLA-DRhigh: pErk1_2
##
187
##    CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/
CD11c+ HLA-DRhigh: pp38
##
187
```

```
##  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/CD
11c+ HLA-DRhigh: pPLCg2
##
187
##  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/CD
11c+ HLA-DRhigh: pSTAT1
##
187
##  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/CD
11c+ HLA-DRhigh: pSTAT3
##
187
##  CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Monos/CD
11c+ HLA-DRhigh: pSTAT5
##
187
##                CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20
+/non Monos/Syk+ CD11c+
##
192
##        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Mo
nos/Syk+ CD11c+: IkBtot
##
187
##          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non
 Monos/Syk+ CD11c+: Ki67
##
187
##         CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non M
onos/Syk+ CD11c+: pCREB
##
187
##       CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Mon
os/Syk+ CD11c+: pErk1_2
##
187
##          CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non
 Monos/Syk+ CD11c+: pp38
##
187
##        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Mo
nos/Syk+ CD11c+: pPLCg2
##
187
##        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Mo
nos/Syk+ CD11c+: pSTAT1
##
187
##        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Mo
nos/Syk+ CD11c+: pSTAT3
##
187
##        CD45++ CD66low/CD3-/CD123-/BDCA-3 -/Not CD27++CD38++/HLADR+ CD7-/non CD19+CD20+/non Mo
nos/Syk+ CD11c+: pSTAT5
```

```
##
187
##                                                                  CD45++ CD66lo
w/CD3-/CD123-/type 2 mDC
##
192
##                                                          CD45++ CD66low/CD3-/CD
123-/type 2 mDC: IkBtot
##
178
##                                                           CD45++ CD66low/CD3-/
CD123-/type 2 mDC: Ki67
##
178
##                                                          CD45++ CD66low/CD3-/C
D123-/type 2 mDC: pCREB
##
178
##                                                       CD45++ CD66low/CD3-/CD1
23-/type 2 mDC: pErk1_2
##
178
##                                                           CD45++ CD66low/CD3-/
CD123-/type 2 mDC: pp38
##
178
##                                                        CD45++ CD66low/CD3-/CD
123-/type 2 mDC: pPLCg2
##
178
##                                                        CD45++ CD66low/CD3-/CD
123-/type 2 mDC: pSTAT1
##
178
##                                                        CD45++ CD66low/CD3-/CD
123-/type 2 mDC: pSTAT3
##
178
##                                                        CD45++ CD66low/CD3-/CD
123-/type 2 mDC: pSTAT5
##
178
##                                                                      CD45++ CD
66low/CD3-/CD123+HLADR-
##
192
##                                                            CD45++ CD66low/C
D3-/CD123+HLADR- IkBtot
##
187
##                                                             CD45++ CD66low/
CD3-/CD123+HLADR-: Ki67
##
187
```

```
##                                                                  CD45++ CD66low/C
D3-/CD123+HLADR-: pCREB
##
187
##                                                               CD45++ CD66low/CD3
-/CD123+HLADR-: pErk1_2
##
187
##                                                                 CD45++ CD66low/
CD3-/CD123+HLADR-: pp38
##
187
##                                                              CD45++ CD66low/CD
3-/CD123+HLADR-: pPLCg2
##
187
##                                                              CD45++ CD66low/CD
3-/CD123+HLADR-: pSTAT1
##
187
##                                                              CD45++ CD66low/CD
3-/CD123+HLADR-: pSTAT3
##
187
##                                                              CD45++ CD66low/CD
3-/CD123+HLADR-: pSTAT5
##
187
##
 CD45++ CD66low/CD3-/pDC
##
192
##                                                                       CD45++ C
D66low/CD3-/pDC: IkBtot
##
187
##                                                                         CD45++
CD66low/CD3-/pDC: Ki67
##
187
##                                                                         CD45++
 CD66low/CD3-/pDC: pCREB
##
187
##                                                                    CD45++ CD
66low/CD3-/pDC: pErk1_2
##
187
##                                                                         CD45++
CD66low/CD3-/pDC: pp38
##
187
##                                                                       CD45++ C
D66low/CD3-/pDC: pPLCg2
```

```
##
187
##                                                                                    CD45++ C
D66low/CD3-/pDC: pSTAT1
##
187
##                                                                                    CD45++ C
D66low/CD3-/pDC: pSTAT3
##
187
##                                                                                    CD45++ C
D66low/CD3-/pDC: pSTAT5
##
187
##
CD45++ CD66low/CD3+
##
192
##                                                                                           C
D45++ CD66low/CD3+/CD4+
##
192
##                                                                                     CD45++
 CD66low/CD3+/CD4+/CD25+
##
192
##                                                                              CD45++ CD66low/
CD3+/CD4+/CD25+: IkBtot
##
187
##                                                                                CD45++ CD66lo
w/CD3+/CD4+/CD25+: Ki67
##
187
##                                                                               CD45++ CD66lo
w/CD3+/CD4+/CD25+: pCREB
##
187
##                                                                             CD45++ CD66low/C
D3+/CD4+/CD25+: pErk1_2
##
187
##                                                                                CD45++ CD66lo
w/CD3+/CD4+/CD25+: pp38
##
187
##                                                                              CD45++ CD66low/
CD3+/CD4+/CD25+: pPLCg2
##
187
##                                                                              CD45++ CD66low/
CD3+/CD4+/CD25+: pSTAT1
##
187
```

```
##                                                                  CD45++ CD66low/
CD3+/CD4+/CD25+: pSTAT3
##
187
##                                                                  CD45++ CD66low/
CD3+/CD4+/CD25+: pSTAT5
##
187
##                                                                   CD45++ CD66lo
w/CD3+/CD4+/CD38+ HLADR+
##
192
##                                                          CD45++ CD66low/CD3+/CD
4+/CD38+ HLADR+: IkBtot
##
186
##                                                            CD45++ CD66low/CD3+/
CD4+/CD38+ HLADR+: Ki67
##
186
##                                                          CD45++ CD66low/CD3+/C
D4+/CD38+ HLADR+: pCREB
##
186
##                                                       CD45++ CD66low/CD3+/CD4
+/CD38+ HLADR+: pErk1_2
##
186
##                                                            CD45++ CD66low/CD3+/
CD4+/CD38+ HLADR+: pp38
##
186
##                                                          CD45++ CD66low/CD3+/CD
4+/CD38+ HLADR+: pPLCg2
##
186
##                                                          CD45++ CD66low/CD3+/CD
4+/CD38+ HLADR+: pSTAT1
##
186
##                                                          CD45++ CD66low/CD3+/CD
4+/CD38+ HLADR+: pSTAT3
##
186
##                                                          CD45++ CD66low/CD3+/CD
4+/CD38+ HLADR+: pSTAT5
##
186
##                                                           CD45++ CD66low/CD3+/C
D4+/Q1: CD45RA- , CD27+
##
192
##                                                      CD45++ CD66low/CD3+/CD4+/Q1:
 CD45RA- , CD27+: IkBtot
```

```
##
187
##                                                                  CD45++ CD66low/CD3+/CD4+/Q
1: CD45RA- , CD27+: Ki67
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q1:
CD45RA- , CD27+: pCREB
##
187
##                                                               CD45++ CD66low/CD3+/CD4+/Q1: C
D45RA- , CD27+: pErk1_2
##
187
##                                                                  CD45++ CD66low/CD3+/CD4+/Q
1: CD45RA- , CD27+: pp38
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q1:
 CD45RA- , CD27+: pPLCg2
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q1:
 CD45RA- , CD27+: pSTAT1
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q1:
 CD45RA- , CD27+: pSTAT3
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q1:
 CD45RA- , CD27+: pSTAT5
##
187
##                                                                         CD45++ CD66low/CD3+/C
D4+/Q2: CD45RA+ , CD27+
##
192
##                                                                 CD45++ CD66low/CD3+/CD4+/Q2:
 CD45RA+ , CD27+: IkBtot
##
187
##                                                                  CD45++ CD66low/CD3+/CD4+/Q
2: CD45RA+ , CD27+: Ki67
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q2:
CD45RA+ , CD27+: pCREB
##
187
##                                                               CD45++ CD66low/CD3+/CD4+/Q2: C
D45RA+ , CD27+: pErk1_2
##
187
```

```
##                                                                 CD45++ CD66low/CD3+/CD4+/Q
2: CD45RA+ , CD27+: pp38
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q2:
 CD45RA+ , CD27+: pPLCg2
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q2:
 CD45RA+ , CD27+: pSTAT1
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q2:
 CD45RA+ , CD27+: pSTAT3
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q2:
 CD45RA+ , CD27+: pSTAT5
##
187
##                                                                      CD45++ CD66low/CD3+/C
D4+/Q3: CD45RA+ , CD27-
##
192
##                                                              CD45++ CD66low/CD3+/CD4+/Q3:
 CD45RA+ , CD27-: IkBtot
##
187
##                                                                CD45++ CD66low/CD3+/CD4+/Q
3: CD45RA+ , CD27-: Ki67
##
187
##                                                               CD45++ CD66low/CD3+/CD4+/Q3:
CD45RA+ , CD27-: pCREB
##
187
##                                                            CD45++ CD66low/CD3+/CD4+/Q3: C
D45RA+ , CD27-: pErk1_2
##
187
##                                                                 CD45++ CD66low/CD3+/CD4+/Q
3: CD45RA+ , CD27-: pp38
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q3:
 CD45RA+ , CD27-: pPLCg2
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q3:
 CD45RA+ , CD27-: pSTAT1
##
187
##                                                              CD45++ CD66low/CD3+/CD4+/Q3:
 CD45RA+ , CD27-: pSTAT3
```

```
##
187
##                                                                  CD45++ CD66low/CD3+/CD4+/Q3:
 CD45RA+ , CD27-: pSTAT5
##
187
##                                                                          CD45++ CD66low/CD3+/C
D4+/Q4: CD45RA- , CD27-
##
192
##                                                                  CD45++ CD66low/CD3+/CD4+/Q4:
 CD45RA- , CD27-: IkBtot
##
182
##                                                                    CD45++ CD66low/CD3+/CD4+/Q
4: CD45RA- , CD27-: Ki67
##
182
##                                                                   CD45++ CD66low/CD3+/CD4+/Q4:
CD45RA- , CD27-: pCREB
##
182
##                                                                CD45++ CD66low/CD3+/CD4+/Q4: C
D45RA- , CD27-: pErk1_2
##
182
##                                                                    CD45++ CD66low/CD3+/CD4+/Q
4: CD45RA- , CD27-: pp38
##
182
##                                                                  CD45++ CD66low/CD3+/CD4+/Q4:
 CD45RA- , CD27-: pPLCg2
##
182
##                                                                  CD45++ CD66low/CD3+/CD4+/Q4:
 CD45RA- , CD27-: pSTAT1
##
182
##                                                                  CD45++ CD66low/CD3+/CD4+/Q4:
 CD45RA- , CD27-: pSTAT3
##
182
##                                                                  CD45++ CD66low/CD3+/CD4+/Q4:
 CD45RA- , CD27-: pSTAT5
##
182
##                                                                                  CD45++ CD
66low/CD3+/CD4+: IkBtot
##
192
##                                                                                    CD45++
 CD66low/CD3+/CD4+: Ki67
##
192
```

```
##                                                                                    CD45++ C
D66low/CD3+/CD4+: pCREB
##
192
##                                                                                  CD45++ CD6
6low/CD3+/CD4+: pErk1_2
##
192
##                                                                                    CD45++
 CD66low/CD3+/CD4+: pp38
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD4+: pPLCg2
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD4+: pSTAT1
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD4+: pSTAT3
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD4+: pSTAT5
##
192
##                                                                                           C
D45++ CD66low/CD3+/CD8+
##
192
##                                                                              CD45++ CD66lo
w/CD3+/CD8+/CD38+ HLADR+
##
192
##                                                                       CD45++ CD66low/CD3+/CD
8+/CD38+ HLADR+: IkBtot
##
187
##                                                                         CD45++ CD66low/CD3+/
CD8+/CD38+ HLADR+: Ki67
##
187
##                                                                        CD45++ CD66low/CD3+/C
D8+/CD38+ HLADR+: pCREB
##
187
##                                                                      CD45++ CD66low/CD3+/CD8
+/CD38+ HLADR+: pErk1_2
##
187
##                                                                         CD45++ CD66low/CD3+/
CD8+/CD38+ HLADR+: pp38
```

```
##
187
##                                                                  CD45++ CD66low/CD3+/CD
8+/CD38+ HLADR+: pPLCg2
##
187
##                                                                  CD45++ CD66low/CD3+/CD
8+/CD38+ HLADR+: pSTAT1
##
187
##                                                                  CD45++ CD66low/CD3+/CD
8+/CD38+ HLADR+: pSTAT3
##
187
##                                                                  CD45++ CD66low/CD3+/CD
8+/CD38+ HLADR+: pSTAT5
##
187
##                                                                   CD45++ CD66low/CD3+/C
D8+/Q1: CD45RA- , CD27+
##
192
##                                                               CD45++ CD66low/CD3+/CD8+/Q1:
 CD45RA- , CD27+: IkBtot
##
178
##                                                                 CD45++ CD66low/CD3+/CD8+/Q
1: CD45RA- , CD27+: Ki67
##
178
##                                                                CD45++ CD66low/CD3+/CD8+/Q1:
CD45RA- , CD27+: pCREB
##
178
##                                                              CD45++ CD66low/CD3+/CD8+/Q1: C
D45RA- , CD27+: pErk1_2
##
178
##                                                                 CD45++ CD66low/CD3+/CD8+/Q
1: CD45RA- , CD27+: pp38
##
178
##                                                               CD45++ CD66low/CD3+/CD8+/Q1:
 CD45RA- , CD27+: pPLCg2
##
178
##                                                               CD45++ CD66low/CD3+/CD8+/Q1:
 CD45RA- , CD27+: pSTAT1
##
178
##                                                               CD45++ CD66low/CD3+/CD8+/Q1:
 CD45RA- , CD27+: pSTAT3
##
178
```

```
##                                                                 CD45++ CD66low/CD3+/CD8+/Q1:
 CD45RA- , CD27+: pSTAT5
##
178
##                                                                         CD45++ CD66low/CD3+/C
D8+/Q2: CD45RA+ , CD27+
##
192
##                                                                 CD45++ CD66low/CD3+/CD8+/Q2:
 CD45RA+ , CD27+: IkBtot
##
187
##                                                                   CD45++ CD66low/CD3+/CD8+/Q
2: CD45RA+ , CD27+: Ki67
##
187
##                                                                  CD45++ CD66low/CD3+/CD8+/Q2:
CD45RA+ , CD27+: pCREB
##
187
##                                                               CD45++ CD66low/CD3+/CD8+/Q2: C
D45RA+ , CD27+: pErk1_2
##
187
##                                                                   CD45++ CD66low/CD3+/CD8+/Q
2: CD45RA+ , CD27+: pp38
##
187
##                                                                 CD45++ CD66low/CD3+/CD8+/Q2:
 CD45RA+ , CD27+: pPLCg2
##
187
##                                                                 CD45++ CD66low/CD3+/CD8+/Q2:
 CD45RA+ , CD27+: pSTAT1
##
187
##                                                                 CD45++ CD66low/CD3+/CD8+/Q2:
 CD45RA+ , CD27+: pSTAT3
##
187
##                                                                 CD45++ CD66low/CD3+/CD8+/Q2:
 CD45RA+ , CD27+: pSTAT5
##
187
##                                                                         CD45++ CD66low/CD3+/C
D8+/Q3: CD45RA+ , CD27-
##
192
##                                                                 CD45++ CD66low/CD3+/CD8+/Q3:
 CD45RA+ , CD27-: IkBtot
##
187
##                                                                   CD45++ CD66low/CD3+/CD8+/Q
3: CD45RA+ , CD27-: Ki67
```

```
##
187
##                                                                  CD45++ CD66low/CD3+/CD8+/Q3:
CD45RA+ , CD27-: pCREB
##
187
##                                                               CD45++ CD66low/CD3+/CD8+/Q3: C
D45RA+ , CD27-: pErk1_2
##
187
##                                                                 CD45++ CD66low/CD3+/CD8+/Q
3: CD45RA+ , CD27-: pp38
##
187
##                                                                CD45++ CD66low/CD3+/CD8+/Q3:
 CD45RA+ , CD27-: pPLCg2
##
187
##                                                                CD45++ CD66low/CD3+/CD8+/Q3:
 CD45RA+ , CD27-: pSTAT1
##
187
##                                                                CD45++ CD66low/CD3+/CD8+/Q3:
 CD45RA+ , CD27-: pSTAT3
##
187
##                                                                CD45++ CD66low/CD3+/CD8+/Q3:
 CD45RA+ , CD27-: pSTAT5
##
187
##                                                                        CD45++ CD66low/CD3+/C
D8+/Q4: CD45RA- , CD27-
##
192
##                                                                CD45++ CD66low/CD3+/CD8+/Q4:
 CD45RA- , CD27-: IkBtot
##
164
##                                                                  CD45++ CD66low/CD3+/CD8+/Q
4: CD45RA- , CD27-: Ki67
##
164
##                                                                 CD45++ CD66low/CD3+/CD8+/Q4:
CD45RA- , CD27-: pCREB
##
164
##                                                               CD45++ CD66low/CD3+/CD8+/Q4: C
D45RA- , CD27-: pErk1_2
##
164
##                                                                 CD45++ CD66low/CD3+/CD8+/Q
4: CD45RA- , CD27-: pp38
##
164
```

```
##                                                                 CD45++ CD66low/CD3+/CD8+/Q4:
 CD45RA- , CD27-: pPLCg2
##
164
##                                                                 CD45++ CD66low/CD3+/CD8+/Q4:
 CD45RA- , CD27-: pSTAT1
##
164
##                                                                 CD45++ CD66low/CD3+/CD8+/Q4:
 CD45RA- , CD27-: pSTAT3
##
164
##                                                                 CD45++ CD66low/CD3+/CD8+/Q4:
 CD45RA- , CD27-: pSTAT5
##
164
##                                                                                   CD45++ CD
66low/CD3+/CD8+: IkBtot
##
192
##                                                                                     CD45++
 CD66low/CD3+/CD8+: Ki67
##
192
##                                                                                   CD45++ C
D66low/CD3+/CD8+: pCREB
##
192
##                                                                                 CD45++ CD6
6low/CD3+/CD8+: pErk1_2
##
192
##                                                                                     CD45++
 CD66low/CD3+/CD8+: pp38
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD8+: pPLCg2
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD8+: pSTAT1
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD8+: pSTAT3
##
192
##                                                                                   CD45++ CD
66low/CD3+/CD8+: pSTAT5
##
192
##
CD8+: pSTAT1
```

```
##
1288
##
CD8+: pSTAT3
##
1288
##
CD8+: pSTAT5
##
1288
##
CD8+CD45RA-: pSTAT1
##
1050
##
CD8+CD45RA-: pSTAT3
##
1050
##
CD8+CD45RA-: pSTAT5
##
1050
##
CD8+CD45RA+: pSTAT1
##
1050
##
CD8+CD45RA+: pSTAT3
##
1050
##
CD8+CD45RA+: pSTAT5
##
1050
##                                                                                CXCR3
FMO: Lymph/CD16+/CD56+
##
26
##
CXCR3 FMO: Lymph/CD3-
##
26
##                                                                            CXCR3 FM
O: Lymph/CD3-/CD19+CD20+
##
26
##
CXCR3 FMO: Lymph/CD3+
##
26
##                                                                              CXC
R3 FMO: Lymph/CD3+/CD4+
##
26
```

```
##                                                                                              CXC
R3 FMO: Lymph/CD3+/CD8+
##
26
##
CXCR3 FMO: Mono
##
26
##
CXCR3 FMO: Mono/CD33+
##
26
##                                                                                                C
XCR3: Lymph/CD16+/CD56+
##
26
##                                                                                        CXCR3: L
ymph/CD16+/CD56+/CXCR3+
##
26
##
CXCR3: Lymph/CD3-
##
26
##                                                                                             CXCR
3: Lymph/CD3-/CD19+CD20+
##
26
##                                                                                      CXCR3: Lymp
h/CD3-/CD19+CD20+/CXCR3+
##
26
##
CXCR3: Lymph/CD3+
##
26
##
CXCR3: Lymph/CD3+/CD4+
##
26
##                                                                                           CXCR3:
Lymph/CD3+/CD4+/CXCR3+
##
26
##
CXCR3: Lymph/CD3+/CD8+
##
26
##                                                                                           CXCR3:
Lymph/CD3+/CD8+/CXCR3+
##
26
##
CXCR3: Mono
```

```
##
26
##
CXCR3: Mono/CD33+
##
26
##                                                                                              C
XCR3: Mono/CD33+/CXCR3+
##
26
##
DHEA
##
26
##
EGF
##
191
##
ENA78
##
687
##                                                                                        Eosinop
hil Absolute Count-K/uL
##
50
##
EOTAXIN
##
716
##
Erythrocyte-%
##
50
##
ESTRADIOL
##
26
##
FASL
##
375
##
FGFB
##
716
##
FLT3L
##
29
##
FRACTALKINE
##
29
```

```
##
GCSF
##
716
##
GMCSF
##
734
##
GRO
##
29
##
GROA
##
687
##
Hematocrit-%
##
50
##
Hemoglobin-g/dL
##
50
##
HGF
##
687
##
ICAM1
##
687
##
IFNA
##
687
##
IFNA2
##
29
##
IFNB
##
687
##
IFNG
##
734
##
IL10
##
734
##
IL12P40
```

```
##
716
##
IL12P70
##
734
##
IL13
##
716
##
IL15
##
716
##
IL17
##
554
##
IL17A
##
162
##
IL17F
##
687
##
IL18
##
228
##
IL1A
##
716
##
IL1B
##
800
##
IL1RA
##
716
##
IL2
##
734
##
IL21
##
162
##
IL22
##
162
```

```
##
IL23
##
162
##
IL27
##
162
##
IL3
##
29
##
IL31
##
162
##
IL4
##
716
##
IL5
##
716
##
IL6
##
800
##
IL7
##
716
##
IL8
##
800
##
IL9
##
191
##
IP10
##
716
##
LEPTIN
##
716
##
LIF
##
687
##
Lymphocyte-%
```

```
##
50
##                                                                      Lymphoc
yte Absolute Count-K/uL
##
50
##
MCP1
##
716
##
MCP3
##
716
##
MCSF
##
687
##
MDC
##
29
##                                                                    Mean
 Cell Hemoglobin-pg/cell
##
50
##                                                            Mean Cell Hemogl
obin Concentration-g/dL
##
50
##                                                                    Mean
Cell Volume-femtoliter
##
50
##
MIG
##
687
##
MIP1A
##
716
##
MIP1B
##
716
##
Mono: pSTAT1
##
1288
##
Mono: pSTAT3
##
1288
```

```
##
Mono: pSTAT5
##
1288
##
Monocyte-%
##
50
##                                                                                  Monoc
yte Absolute Count-K/uL
##
50
##
Neutrophil-%
##
50
##                                                                               Neutrop
hil Absolute Count-K/uL
##
50
##
NGF
##
716
##
NK-NKT: Lymph/CD3-
##
26
##                                                                               NK-NKT:
Lymph/CD3-/CD16+/CD56+
##
26
##                                                                        NK-NKT: Lymph/
CD3-/CD16+/CD56+/HLADR+
##
26
##                                                                 NK-NKT: Lymph/CD3-/CD16
+/CD56+/Q1: CD314-CD94+
##
26
##                                                                 NK-NKT: Lymph/CD3-/CD16
+/CD56+/Q2: CD314+CD94+
##
26
##                                                                 NK-NKT: Lymph/CD3-/CD16
+/CD56+/Q3: CD314+CD94-
##
26
##                                                                 NK-NKT: Lymph/CD3-/CD16
+/CD56+/Q4: CD314-CD94-
##
26
##
NK-NKT: Lymph/CD3+
```

```
##
26
##
 NK-NKT: Lymph/CD3+/CD8-
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8-/Q1: CD314-CD94+
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8-/Q2: CD314+CD94+
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8-/Q3: CD314+CD94-
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8-/Q4: CD314-CD94-
##
26
##
 NK-NKT: Lymph/CD3+/CD8+
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8+/Q1: CD314-CD94+
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8+/Q2: CD314+CD94+
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8+/Q3: CD314+CD94-
##
26
##                                                                                NK-NKT: Lymph/CD
3+/CD8+/Q4: CD314-CD94-
##
26
##
 NK-NKT: Lymph/CD3+CD56+
##
26
##
Non BT: pSTAT1
##
526
##
Non BT: pSTAT3
##
526
```

```
##
Non BT: pSTAT5
##
526
##                                Nonbasophils/Nonbasophil CD14-CD33-/Nonbasophil CD3-CD20-/Nonb
asophil CD56-CD16-/mDCs
##
186
##                                Nonbasophils/Nonbasophil CD14-CD33-/Nonbasophil CD3-CD20-/Nonb
asophil CD56-CD16-/pDCs
##
186
##
PAI1
##
687
##
PDGFAA
##
29
##
PDGFABBB
##
29
##
PDGFBB
##
716
##
PIGF1
##
119
##
Platelets-K/uL
##
50
##
PROGESTERONE
##
26
##
RANTES
##
716
##
RBC-MIL/uL
##
50
##                                                                                          R
BC Distribution Width-%
##
50
##
RESISTIN
```

```
##
687
##
SCF
##
687
##
SDF1A
##
162
##
SFASL
##
342
##
SIL2RA
##
29
##
T cell: Lymph/CD3+
##
26
##
 T cell: Lymph/CD3+/CD4+
##
26
##                                                                                 T cel
l: Lymph/CD3+/CD4+/CD28+
##
26
##                                                                               T cell:
Lymph/CD3+/CD4+/CD85j+
##
26
##                                                                    T cell: Lymph/CD3
+/CD4+/Q1: CD45RA-CD27+
##
26
##                                                                    T cell: Lymph/CD3
+/CD4+/Q2: CD45RA+CD27+
##
26
##                                                                    T cell: Lymph/CD3
+/CD4+/Q3: CD45RA+CD27-
##
26
##                                                                    T cell: Lymph/CD3
+/CD4+/Q4: CD45RA-CD27-
##
26
##
 T cell: Lymph/CD3+/CD8+
##
26
```

```
##                                                                                   T cel
l: Lymph/CD3+/CD8+/CD28+
##
26
##                                                                                  T cell:
Lymph/CD3+/CD8+/CD85j+
##
26
##                                                                          T cell: Lymph/CD3
+/CD8+/Q1: CD45RA-CD27+
##
26
##                                                                          T cell: Lymph/CD3
+/CD8+/Q2: CD45RA+CD27+
##
26
##                                                                          T cell: Lymph/CD3
+/CD8+/Q3: CD45RA+CD27-
##
26
##                                                                          T cell: Lymph/CD3
+/CD8+/Q4: CD45RA-CD27-
##
26
##
TESTOSTERONE
##
147
##
TGFA
##
716
##
TGFB
##
687
##
TNFA
##
800
##
TNFB
##
716
##
TRAIL
##
621
##
Treg: Lymph/CD3+
##
26
##
Treg: Lymph/CD3+/CD4+
```

```
##
26
##                                                                                    Treg:
Lymph/CD3+/CD4+/CD161+
##
26
##                                                                            Treg: Lymph/C
D3+/CD4+/CD25hiCD127low
##
26
##                                                        Treg: Lymph/CD3+/CD4+/CD25hiCD1
27low/Q1: CD161-CD45RA+
##
26
##                                                        Treg: Lymph/CD3+/CD4+/CD25hiCD1
27low/Q2: CD161+CD45RA+
##
26
##                                                        Treg: Lymph/CD3+/CD4+/CD25hiCD1
27low/Q3: CD161+CD45RA-
##
26
##
Treg: Lymph/CD3+/CD8+
##
26
##                                                                                    Treg:
Lymph/CD3+/CD8+/CD161+
##
26
##
VCAM1
##
687
##
VEGF
##
716
##
VEGFD
##
162
##
WBC-K/uL
##
50
```

Unique values of variable "data"

```
table(flu$data)
```

```
##
##   -4.19   -4.16   -4.15   -3.98   -3.92   -3.75   -3.69   -3.64   -3.63    -3.6
##       1       1       2       1       1       1       1       1       1       1
##   -3.58   -3.48   -3.47   -3.45   -3.43   -3.41   -3.39   -3.37   -3.35   -3.33
##       1       1       3       2       2       1       1       1       1       1
##   -3.28   -3.26   -3.25   -3.24   -3.22   -3.21    -3.2   -3.15   -3.14   -3.13
##       2       1       1       1       1       1       2       1       1       2
##   -3.11    -3.1   -3.09   -3.07   -3.06   -3.05   -3.04   -2.99   -2.98   -2.97
##       2       1       1       1       2       1       1       1       2       2
##   -2.95   -2.94   -2.93   -2.92   -2.89   -2.88   -2.85   -2.84   -2.83   -2.82
##       5       1       2       4       2       1       4       1       1       1
##   -2.81    -2.8   -2.79   -2.78   -2.77   -2.76   -2.75   -2.74   -2.71    -2.7
##       1       1       4       2       1       1       4       1       1       2
##   -2.69   -2.68   -2.67   -2.66   -2.65   -2.64   -2.63   -2.62   -2.61    -2.6
##       3       2       1       2       4       2       3       1       2       3
##   -2.59   -2.58   -2.57   -2.56   -2.55   -2.54   -2.53   -2.52   -2.51    -2.5
##       2       4       3       1       2       3       3       4       2       4
##   -2.49   -2.48   -2.47   -2.46   -2.45   -2.44   -2.43   -2.42   -2.41    -2.4
##       5       6       4       5      10       5       8       4       4       4
##   -2.39   -2.38   -2.37   -2.36   -2.35   -2.34   -2.33   -2.32   -2.31    -2.3
##       6       3       5       6       3       6       4       8       9       4
##   -2.29   -2.28   -2.27   -2.26   -2.25   -2.24   -2.23   -2.22   -2.21    -2.2
##       5       5       9       5       4       5       6      10       7       8
##   -2.19   -2.18   -2.17   -2.16   -2.15   -2.14   -2.13   -2.12   -2.11    -2.1
##       6       9       6       8       6       2       7       7      10      10
##   -2.09   -2.08   -2.07   -2.06   -2.05   -2.04   -2.03   -2.02   -2.01      -2
##       6       8       3      14      11       7      11       6       7      12
##   -1.99   -1.98   -1.97   -1.96   -1.95   -1.94   -1.93   -1.92   -1.91    -1.9
##       5      10      12       8      11       9       8      17      14      12
##   -1.89   -1.88   -1.87   -1.86   -1.85   -1.84   -1.83   -1.82   -1.81    -1.8
##       8      14      16      15      20      10      10      14      11      16
##   -1.79   -1.78   -1.77   -1.76   -1.75   -1.74   -1.73   -1.72   -1.71    -1.7
##      11      16      11      15      17      19      20      16      16      11
##   -1.69   -1.68   -1.67   -1.66   -1.65   -1.64   -1.63   -1.62   -1.61    -1.6
##      24      15      19      23      14      18      24      31      18      30
##   -1.59   -1.58   -1.57   -1.56   -1.55   -1.54   -1.53   -1.52   -1.51    -1.5
##      30      31      27      37      26      24      30      30      24      36
##   -1.49   -1.48   -1.47   -1.46   -1.45   -1.44   -1.43   -1.42   -1.41    -1.4
##      31      33      25      38      27      31      37      30      41      43
##   -1.39   -1.38   -1.37   -1.36   -1.35   -1.34   -1.33   -1.32   -1.31    -1.3
##      30      35      38      43      40      42      43      45      43      39
##   -1.29   -1.28   -1.27   -1.26   -1.25   -1.24   -1.23   -1.22   -1.21    -1.2
##      52      48      27      41      56      46      50      48      62      51
##   -1.19   -1.18   -1.17   -1.16   -1.15   -1.14   -1.13   -1.12   -1.11    -1.1
##      57      72      70      68      63      61      78      71      74      62
##   -1.09   -1.08   -1.07   -1.06   -1.05   -1.04   -1.03   -1.02   -1.01      -1
##      72      82      80      89      76      81      82      91      83     108
##   -0.99   -0.98   -0.97   -0.96   -0.95   -0.94   -0.93   -0.92   -0.91    -0.9
##     101      84      73      87     107      93      98     106     124     115
##   -0.89   -0.88   -0.87   -0.86   -0.85   -0.84   -0.83   -0.82   -0.81    -0.8
##     110     102      97     111     105     110     134     124     117     137
##   -0.79   -0.78   -0.77   -0.76   -0.75   -0.74   -0.73   -0.72   -0.71    -0.7
##     120     143     123     132     120     114     150     149     137     152
```

```
##   -0.69   -0.68   -0.67   -0.66   -0.65   -0.64   -0.63   -0.62   -0.61    -0.6
##     158     149     158     153     138     132     134     142     189     159
##   -0.59   -0.58   -0.57   -0.56   -0.55   -0.54   -0.53   -0.52   -0.51    -0.5
##     156     155     152     171     146     177     146     136     169     163
##   -0.49   -0.48   -0.47   -0.46   -0.45   -0.44   -0.43   -0.42   -0.41    -0.4
##     187     160     168     174     164     170     200     180     168     186
##   -0.39   -0.38   -0.37   -0.36   -0.35   -0.34   -0.33   -0.32   -0.31    -0.3
##     161     173     166     187     179     194     176     178     181     170
##   -0.29   -0.28   -0.27   -0.26   -0.25   -0.24   -0.23   -0.22   -0.21    -0.2
##     172     193     165     169     201     149     167     172     215     186
##   -0.19   -0.18   -0.17   -0.16   -0.15   -0.14   -0.13   -0.12   -0.11    -0.1
##     169     182     214     227     223     226     216     221     280     324
##   -0.09   -0.08   -0.07   -0.06   -0.05   -0.04   -0.03   -0.02   -0.01       0
##     479    1037    2454    3306    3310    3147    3257    2625    2235    1525
##    0.01    0.02    0.03    0.04    0.05    0.06    0.07    0.08    0.09     0.1
##     654     593     646     652     652     659     650     602     674     657
##    0.11    0.12    0.13    0.14    0.15    0.16    0.17    0.18    0.19     0.2
##     616     601     605     614     680     604     644     724     629     672
##    0.21    0.22    0.23    0.24    0.25    0.26    0.27    0.28    0.29     0.3
##     746     693     645     758     679     711     639     606     680     685
##    0.31    0.32    0.33    0.34    0.35    0.36    0.37    0.38    0.39     0.4
##     635     606     647     601     576     653     556     505     513     538
##    0.41    0.42    0.43    0.44    0.45    0.46    0.47    0.48    0.49     0.5
##     487     468     431     373     447     417     361     397     382     393
##    0.51    0.52    0.53    0.54    0.55    0.56    0.57    0.58    0.59     0.6
##     358     381     400     340     387     343     338     346     316     321
##    0.61    0.62    0.63    0.64    0.65    0.66    0.67    0.68    0.69     0.7
##     318     308     340     346     328     293     316     348     311     285
##    0.71    0.72    0.73    0.74    0.75    0.76    0.77    0.78    0.79     0.8
##     307     266     269     334     265     283     256     273     237     271
##    0.81    0.82    0.83    0.84    0.85    0.86    0.87    0.88    0.89     0.9
##     256     277     263     238     244     257     237     255     224     273
##    0.91    0.92    0.93    0.94    0.95    0.96    0.97    0.98    0.99       1
##     246     239     254     219     211     231     216     229     218     189
##    1.01    1.02    1.03    1.04    1.05    1.06    1.07    1.08    1.09     1.1
##     231     207     219     197     208     185     188     198     179     188
##    1.11    1.12    1.13    1.14    1.15    1.16    1.17    1.18    1.19     1.2
##     193     156     190     178     162     199     174     167     204     151
##    1.21    1.22    1.23    1.24    1.25    1.26    1.27    1.28    1.29     1.3
##     157     165     151     133     163     172     141     176     150     164
##    1.31    1.32    1.33    1.34    1.35    1.36    1.37    1.38    1.39     1.4
##     182     159     153     151     156     150     142     167     150     134
##    1.41    1.42    1.43    1.44    1.45    1.46    1.47    1.48    1.49     1.5
##     138     132     135     125     139     123     153     102     135     133
##    1.51    1.52    1.53    1.54    1.55    1.56    1.57    1.58    1.59     1.6
##     134     135     134     113     122     102     106     133      95     113
##    1.61    1.62    1.63    1.64    1.65    1.66    1.67    1.68    1.69     1.7
##     131     113     111     109     114     105      91     118     111      98
##    1.71    1.72    1.73    1.74    1.75    1.76    1.77    1.78    1.79     1.8
##      88      92     117      84      90      89      85      95      91      93
##    1.81    1.82    1.83    1.84    1.85    1.86    1.87    1.88    1.89     1.9
##      75      77      79      83      84      99     111      87      90      68
##    1.91    1.92    1.93    1.94    1.95    1.96    1.97    1.98    1.99       2
##      73      82      82      79      81      69      65      61      79      65
```

```
##    2.01    2.02    2.03    2.04    2.05    2.06    2.07    2.08    2.09     2.1
##      72      57      71      46      60      73      70      57      53      58
##    2.11    2.12    2.13    2.14    2.15    2.16    2.17    2.18    2.19     2.2
##      63      57      58      59      59      67      63      54      58      51
##    2.21    2.22    2.23    2.24    2.25    2.26    2.27    2.28    2.29     2.3
##      60      53      72      67      63      38      39      56      51      50
##    2.31    2.32    2.33    2.34    2.35    2.36    2.37    2.38    2.39     2.4
##      51      41      53      58      46      34      62      47      57      42
##    2.41    2.42    2.43    2.44    2.45    2.46    2.47    2.48    2.49     2.5
##      51      46      49      51      48      49      40      32      35      31
##    2.51    2.52    2.53    2.54    2.55    2.56    2.57    2.58    2.59     2.6
##      26      33      32      41      45      34      37      36      24      43
##    2.61    2.62    2.63    2.64    2.65    2.66    2.67    2.68    2.69     2.7
##      31      34      33      22      29      39      39      32      24      39
##    2.71    2.72    2.73    2.74    2.75    2.76    2.77    2.78    2.79     2.8
##      26      21      28      35      24      27      35      21      25      31
##    2.81    2.82    2.83    2.84    2.85    2.86    2.87    2.88    2.89     2.9
##      30      26      18      26      35      26      23      26      33      21
##    2.91    2.92    2.93    2.94    2.95    2.96    2.97    2.98    2.99       3
##      23      25      33      26      24      29      27      32      17      20
##    3.01    3.02    3.03    3.04    3.05    3.06    3.07    3.08    3.09     3.1
##      23      28      23      24      21      26      22      20      21      24
##    3.11    3.12    3.13    3.14    3.15    3.16    3.17    3.18    3.19     3.2
##      15      22      20      23      23      22      19      21      27      22
##    3.21    3.22    3.23    3.24    3.25    3.26    3.27    3.28    3.29     3.3
##      21      21      20      21      20      20      19      24      26      19
##    3.31    3.32    3.33    3.34    3.35    3.36    3.37    3.38    3.39     3.4
##      24      21      16       9      25      22      19      19      22      14
##    3.41    3.42    3.43    3.44    3.45    3.46    3.47    3.48    3.49     3.5
##      18      27      24      17      27      13      14      22      14      11
##    3.51    3.52    3.53    3.54    3.55    3.56    3.57    3.58    3.59     3.6
##      15      14      15      17      14      14      18      26      14      15
##    3.61    3.62    3.63    3.64    3.65    3.66    3.67    3.68    3.69     3.7
##      18      15      16      12      12      26      12       8      10      24
##    3.71    3.72    3.73    3.74    3.75    3.76    3.77    3.78    3.79     3.8
##      15      14      10      16       8      15      12      14      17      13
##    3.81    3.82    3.83    3.84    3.85    3.86    3.87    3.88    3.89     3.9
##       7      12      12      13      14      14      13      15      15      10
##    3.91    3.92    3.93    3.94    3.95    3.96    3.97    3.98    3.99       4
##      11      11      15      19      13      14      10      13      17      12
##    4.01    4.02    4.03    4.04    4.05    4.06    4.07    4.08    4.09     4.1
##       7      12      17       8      11       7       8       9      15      14
##    4.11    4.12    4.13    4.14    4.15    4.16    4.17    4.18    4.19     4.2
##       9      13      12      11      11      10      18      14      13      15
##    4.21    4.22    4.23    4.24    4.25    4.26    4.27    4.28    4.29     4.3
##       9       8      14      13      10      17      12      13       8      12
##    4.31    4.32    4.33    4.34    4.35    4.36    4.37    4.38    4.39     4.4
##      13      18      11      12      17      13      19      15       9      12
##    4.41    4.42    4.43    4.44    4.45    4.46    4.47    4.48    4.49     4.5
##      14      13       9      14       9      19      14      10      20      17
##    4.51    4.52    4.53    4.54    4.55    4.56    4.57    4.58    4.59     4.6
##      15      13      17      15      13      10      17       9      15      11
##    4.61    4.62    4.63    4.64    4.65    4.66    4.67    4.68    4.69     4.7
##       6      18       6       7      13      14      12      10       8      13
```

```
##    4.71    4.72    4.73    4.74    4.75    4.76    4.77    4.78    4.79     4.8
##      11      10      12      15       6      11      10      14      12      15
##    4.81    4.82    4.83    4.84    4.85    4.86    4.87    4.88    4.89     4.9
##       7       6       5      14       5       9      10      11      10      14
##    4.91    4.92    4.93    4.94    4.95    4.96    4.97    4.98    4.99        5
##      13       6      10      14      12      13      14       9      17      11
##    5.01    5.02    5.03    5.04    5.05    5.06    5.07    5.08    5.09      5.1
##       8      13      10       8       8      14      11       9       9      14
##    5.11    5.12    5.13    5.14    5.15    5.16    5.17    5.18    5.19      5.2
##       8      13       9       8      13       9      13      10       7       6
##    5.21    5.22    5.23    5.24    5.25    5.26    5.27    5.28    5.29      5.3
##       4       6       9       8       7      11       9       8       6      11
##    5.31    5.32    5.33    5.34    5.35    5.36    5.37    5.38    5.39      5.4
##       8       5       8      10      14      12       9       9       9      11
##    5.41    5.42    5.43    5.44    5.45    5.46    5.47    5.48    5.49      5.5
##      11      11       8       8       7      17       8       4      10       8
##    5.51    5.52    5.53    5.54    5.55    5.56    5.57    5.58    5.59      5.6
##       8       7      12       7      13      11      12       6      11      17
##    5.61    5.62    5.63    5.64    5.65    5.66    5.67    5.68    5.69      5.7
##       6      10       5      12      10      13       9      10       5      11
##    5.71    5.72    5.73    5.74    5.75    5.76    5.77    5.78    5.79      5.8
##      13      13       5       8      17      11      12      11      12      10
##    5.81    5.82    5.83    5.84    5.85    5.86    5.87    5.88    5.89      5.9
##       9       7      14       7       7       4      12      12       9      12
##    5.91    5.92    5.93    5.94    5.95    5.96    5.97    5.98    5.99        6
##       6      12       4       7       9       7      12      11       7      19
##    6.01    6.02    6.03    6.04    6.05    6.06    6.07    6.08    6.09      6.1
##       9      10       7       9      13       8      10       6       9       6
##    6.11    6.12    6.13    6.14    6.15    6.16    6.17    6.18    6.19      6.2
##       6      11       6       7      12       6       3      11       7       6
##    6.21    6.22    6.23    6.24    6.25    6.26    6.27    6.28    6.29      6.3
##       9      10       2      12      11       5       7       6       6       8
##    6.31    6.32    6.33    6.34    6.35    6.36    6.37    6.38    6.39      6.4
##      13      11      15      12       4       5       7       5      11      14
##    6.41    6.42    6.43    6.44    6.45    6.46    6.47    6.48    6.49      6.5
##      11       7       7       8       7       7      10       6       9      14
##    6.51    6.52    6.53    6.54    6.55    6.56    6.57    6.58    6.59      6.6
##       8      10       4       7       5      10       7       5       6       7
##    6.61    6.62    6.63    6.64    6.65    6.66    6.67    6.68    6.69      6.7
##       5       6       4       9      10      10       8       7       9       6
##    6.71    6.72    6.73    6.74    6.75    6.76    6.77    6.78    6.79      6.8
##       9       7       6       6       5       7       6       9       8      10
##    6.81    6.82    6.83    6.84    6.85    6.86    6.87    6.88    6.89      6.9
##       8      10       6       6       5      11       9      11       3       5
##    6.91    6.92    6.93    6.94    6.95    6.96    6.97    6.98    6.99        7
##       8       7       9       7       5       5       9      12       9      12
##    7.01    7.02    7.03    7.04    7.05    7.06    7.07    7.08    7.09      7.1
##      11      16       9       5      11       7       9       6       6      10
##    7.11    7.12    7.13    7.14    7.15    7.16    7.17    7.18    7.19      7.2
##      12       8       5       9      10       6       9       4       3       8
##    7.21    7.22    7.23    7.24    7.25    7.26    7.27    7.28    7.29      7.3
##       7      10       8       6       6      11      13       8       8      10
##    7.31    7.32    7.33    7.34    7.35    7.36    7.37    7.38    7.39      7.4
##       9       7       8      10       4       6       7       5       8       8
```

```
##    7.41    7.42    7.43    7.44    7.45    7.46    7.47    7.48    7.49     7.5
##       9      10      10      12       7       8       4       7      11      20
##    7.51    7.52    7.53    7.54    7.55    7.56    7.57    7.58    7.59     7.6
##      12       4      11       7       9       9       5       9      13      16
##    7.61    7.62    7.63    7.64    7.65    7.66    7.67    7.68    7.69     7.7
##       5       8       3       8       5       9       6      10       5       9
##    7.71    7.72    7.73    7.74    7.75    7.76    7.77    7.78    7.79     7.8
##      14      10       6       9       5       8       8       4       5       5
##    7.81    7.82    7.83    7.84    7.85    7.86    7.87    7.88    7.89     7.9
##       6       7      11       4       4       8       7      11       3      10
##    7.91    7.92    7.93    7.94    7.95    7.96    7.97    7.98    7.99       8
##       3       5       7       6      12       6       9       8      11      13
##    8.01    8.02    8.03    8.04    8.05    8.06    8.07    8.08    8.09     8.1
##       6      10       3       7       6       7       6       7       9      14
##    8.11    8.12    8.13    8.14    8.15    8.16    8.17    8.18    8.19     8.2
##       6       3      10       6       6       5       7       4      11      11
##    8.21    8.22    8.23    8.24    8.25    8.26    8.27    8.28    8.29     8.3
##       8       6       5       6       7       9      11       8       7       8
##    8.31    8.32    8.33    8.34    8.35    8.36    8.37    8.38    8.39     8.4
##       5      10      13       8      12       6       5       4       8       5
##    8.41    8.42    8.43    8.44    8.45    8.46    8.47    8.48    8.49     8.5
##       5       4      10       5       5       5       5      10       8      10
##    8.51    8.52    8.53    8.54    8.55    8.56    8.57    8.58    8.59     8.6
##       8       8       7       5       3      11       8       6       4      10
##    8.61    8.62    8.63    8.64    8.65    8.66    8.67    8.68    8.69     8.7
##       3       5       1       6       6       1       8       4       7      10
##    8.71    8.72    8.73    8.74    8.75    8.76    8.77    8.78    8.79     8.8
##       2       7       3      11       7       4       9       8       4      14
##    8.81    8.82    8.83    8.84    8.85    8.86    8.87    8.88    8.89     8.9
##       3       5       7       7       8       6       9       4       5      11
##    8.91    8.92    8.93    8.94    8.95    8.96    8.97    8.98    8.99       9
##       2       5       8       4       9       4       8       7       8      17
##    9.01    9.02    9.03    9.04    9.05    9.06    9.07    9.08    9.09     9.1
##      10       7       5       7       4       8       9       8      10       8
##    9.11    9.12    9.13    9.14    9.15    9.16    9.17    9.18    9.19     9.2
##       5       4       9       8       6       9       6       4       7       7
##    9.21    9.22    9.23    9.24    9.25    9.26    9.27    9.28    9.29     9.3
##      10       4       4      13       6       5       9       1       4       7
##    9.31    9.32    9.33    9.34    9.35    9.36    9.37    9.38    9.39     9.4
##       8       6       7      10       3       6       3      10       2      12
##    9.41    9.42    9.43    9.44    9.45    9.46    9.47    9.48    9.49     9.5
##       5       9       5       6       2       5       4       7       9      11
##    9.51    9.52    9.53    9.54    9.55    9.56    9.57    9.58    9.59     9.6
##       2       5       3       4       5       3       5       4       6       6
##    9.61    9.62    9.63    9.64    9.65    9.66    9.67    9.68    9.69     9.7
##       5       7       9       5       5       2       2       9       7       7
##    9.71    9.72    9.73    9.74    9.75    9.76    9.77    9.78    9.79     9.8
##       7       6       4      10       5       2       4       1       4       3
##    9.81    9.82    9.83    9.84    9.85    9.86    9.87    9.88    9.89     9.9
##       8       5       1       8       7       6       3       7       6       5
##    9.91    9.92    9.93    9.94    9.95    9.96    9.97    9.98    9.99      10
##       1       7       3       4       5       4       7       7      11      37
##    10.1    10.2    10.3    10.4    10.5    10.6    10.7   10.75    10.8    10.9
##      57      52      55      51      54      61      50       1      44      50
```

```
##      11    11.1    11.2    11.3    11.4    11.5    11.6    11.7   11.75    11.8
##      60      43      44      40      43      48      38      45       1      38
##    11.9      12    12.1    12.2   12.25    12.3    12.4    12.5    12.6    12.7
##      46      39      48      44       2      44      38      51      36      54
##   12.75    12.8    12.9      13    13.1    13.2   13.25    13.3    13.4    13.5
##       2      43      42      55      50      48       1      48      44      54
##    13.6    13.7    13.8    13.9      14    14.1    14.2    14.3    14.4    14.5
##      40      48      35      51      43      43      27      41      39      50
##    14.6    14.7    14.8    14.9      15    15.1    15.2    15.3    15.4    15.5
##      43      40      47      29      38      40      45      38      41      29
##    15.6    15.7    15.8    15.9      16    16.1    16.2   16.25    16.3    16.4
##      32      39      41      28      42      34      39       1      29      27
##    16.5    16.6    16.7    16.8    16.9      17    17.1    17.2    17.3    17.4
##      35      35      41      31      30      33      36      23      21      30
##    17.5    17.6    17.7    17.8    17.9      18    18.1    18.2   18.25    18.3
##      29      34      33      32      18      42      27      42       2      28
##    18.4    18.5    18.6    18.7    18.8    18.9      19    19.1    19.2    19.3
##      29      30      27      22      26      26      27      38      23      25
##    19.4    19.5    19.6    19.7    19.8    19.9      20    20.1    20.2    20.3
##      25      25      23      27      24      25      34      29      32      25
##    20.4    20.5    20.6    20.7    20.8    20.9      21    21.1    21.2   21.25
##      14      25      19      25      23      25      24      23      24       1
##    21.3    21.4    21.5    21.6    21.7   21.75    21.8    21.9      22    22.1
##      29      25      28      21      19       1      23      27      17      31
##    22.2    22.3    22.4    22.5    22.6    22.7    22.8    22.9      23    23.1
##      27      11      18      16      21      14      20      17      27      23
##    23.2   23.25    23.3    23.4    23.5    23.6    23.7    23.8    23.9      24
##      24       1      26      22      18      19      24      21      17      32
##    24.1    24.2    24.3    24.4    24.5    24.6    24.7    24.8    24.9      25
##      25      16      25      22      25      24      23      21      26      32
##    25.1    25.2   25.25    25.3    25.4    25.5    25.6    25.7    25.8    25.9
##      16      19       2      26      16      24      20      22      30      26
##      26    26.1    26.2    26.3    26.4    26.5    26.6    26.7    26.8    26.9
##      15      30      25      10      14      16      16      16      28      15
##      27    27.1    27.2    27.3    27.4    27.5    27.6    27.7    27.8    27.9
##      24      19      16      18      21      23      12      10      21      18
##      28    28.1    28.2   28.25    28.3    28.4    28.5    28.6    28.7    28.8
##      18      20      32       1      24      22      35      24      18      34
##    28.9      29    29.1    29.2    29.3    29.4    29.5    29.6    29.7    29.8
##      25      25      18      22      13      20      17      24      20      22
##    29.9      30    30.1    30.2   30.25    30.3    30.4    30.5    30.6    30.7
##      10      27      15      19       1      17      26      16      19      31
##   30.75    30.8    30.9      31    31.1    31.2    31.3    31.4    31.5    31.6
##       1      20      17      20      24      22      22      26      15      25
##    31.7   31.75    31.8    31.9      32    32.1    32.2    32.3    32.4    32.5
##      20       1      27      18      27      18      18      21      18      19
##    32.6    32.7   32.75    32.8    32.9      33    33.1    33.2   33.25    33.3
##      20      28       2      23      20      23      15      20       3      27
##    33.4    33.5    33.6    33.7   33.75    33.8    33.9      34    34.1    34.2
##      15      23      24      21       2      20      23      22      20      22
##   34.25    34.3    34.4    34.5    34.6    34.7    34.8    34.9      35    35.1
##       1      25      25      25      32      25      19      19      27      26
##    35.2    35.3    35.4    35.5    35.6    35.7    35.8    35.9      36    36.1
##      22      22      19      24      16      22      16      15      18      19
```

```
##    36.2   36.25    36.3    36.4    36.5    36.6    36.7    36.8    36.9      37
##      22       1      17      22      20      18      18      18      19      16
##    37.1    37.2    37.3    37.4    37.5    37.6    37.7   37.75    37.8    37.9
##      26      25      24      18      24      15      17       1      21      15
##      38    38.1    38.2   38.25    38.3    38.4    38.5    38.6    38.7    38.8
##      31      18      15       1      19      17      15      30      23      16
##    38.9      39    39.1    39.2    39.3    39.4    39.5    39.6    39.7   39.75
##      15      23      23      20      10      22      15      21      25       1
##    39.8    39.9      40    40.1    40.2    40.3    40.4    40.5    40.6    40.7
##      23      15      32      23      20      24      18      22      11      24
##   40.75    40.8    40.9      41    41.1    41.2   41.25    41.3    41.4    41.5
##       1      17      25      19      20      16       1      22      11      16
##    41.6    41.7    41.8    41.9      42    42.1    42.2    42.3    42.4    42.5
##      18      19      16      13      20      18      14      15      17      15
##    42.6    42.7    42.8    42.9      43    43.1    43.2    43.3    43.4    43.5
##      17      14      16      15      18      11      13      13      14      14
##    43.6    43.7    43.8    43.9      44    44.1    44.2    44.3    44.4    44.5
##      15      28      20      10      17      20      11      16      19      21
##    44.6    44.7    44.8    44.9      45    45.1    45.2    45.3    45.4    45.5
##      11      15      18      17       8       9      18      15      14      16
##    45.6    45.7    45.8    45.9      46    46.1    46.2    46.3    46.4    46.5
##      19      12       9      10      13      12       6      17       7      11
##    46.6    46.7    46.8    46.9      47    47.1    47.2    47.3    47.4    47.5
##      11      14      18      15      14      16      16      13      13      19
##    47.6    47.7   47.75    47.8    47.9      48    48.1    48.2    48.3    48.4
##      13      12       1      17       9      16      11       9      26      12
##    48.5    48.6    48.7    48.8    48.9      49    49.1    49.2    49.3    49.4
##      17      15      14      11      12      21      19      13      14      10
##    49.5    49.6    49.7    49.8    49.9      50    50.1    50.2    50.3    50.4
##      16      26      14      12      13      28      11      21       4      14
##    50.5    50.6    50.7   50.75    50.8    50.9      51    51.1    51.2   51.25
##      16      10      18       1      15      13      10      11       9       1
##    51.3    51.4    51.5    51.6    51.7   51.75    51.8    51.9      52    52.1
##       6      17      13      15      10       1      13      18       9      16
##    52.2    52.3    52.4    52.5    52.6    52.7    52.8    52.9      53    53.1
##       7      11      17      14      11      14      15      19      11      17
##    53.2    53.3    53.4    53.5    53.6    53.7    53.8    53.9      54    54.1
##      12      12      16      19      17      10      10      12      16      11
##    54.2    54.3    54.4    54.5    54.6    54.7   54.75    54.8    54.9      55
##      17      15      14      19      13      22       1      15      18       9
##    55.1    55.2    55.3    55.4    55.5    55.6    55.7    55.8    55.9      56
##      18      13      16      18      21      18      13      18      12      16
##    56.1    56.2    56.3    56.4    56.5    56.6    56.7   56.75    56.8    56.9
##      19      19       9      18      13      22      17       1      10      23
##      57    57.1    57.2   57.25    57.3    57.4    57.5    57.6    57.7    57.8
##      13      17      15       1      11      18      21      15      16      13
##    57.9      58    58.1    58.2    58.3    58.4    58.5    58.6    58.7    58.8
##      18      23      11      17      20      20      17      13      12      16
##    58.9      59    59.1    59.2    59.3    59.4    59.5    59.6    59.7    59.8
##      12      15      20      20      13      11      17      11      13      15
##    59.9      60    60.1    60.2    60.3    60.4    60.5    60.6    60.7   60.75
##      15      17      15      14      10      11      14      18      10       1
##    60.8    60.9      61    61.1    61.2   61.25    61.3    61.4    61.5    61.6
##      13      15      14      14      22       1      19      19      19      22
```

```
##    61.7   61.75    61.8    61.9      62    62.1    62.2   62.25    62.3    62.4
##      21       1      14      24      20      17      16       1      12      25
##    62.5    62.6    62.7    62.8    62.9      63    63.1    63.2   63.25    63.3
##      19      20      21      19      23      24      18      16       1      21
##    63.4    63.5    63.6    63.7    63.8    63.9      64    64.1    64.2    64.3
##      13      16      18      14      19      11      17      13      16      14
##    64.4    64.5    64.6    64.7   64.75    64.8    64.9      65    65.1    65.2
##      10      13      18      17       1      16      12      10      14      19
##   65.25    65.3    65.4    65.5    65.6    65.7    65.8    65.9      66    66.1
##       1      10      22      16      17      18      12      14      19      22
##    66.2    66.3    66.4    66.5    66.6    66.7   66.75    66.8    66.9      67
##      13      11      12      17      14      17       1      10      12      25
##    67.1    67.2    67.3    67.4    67.5    67.6    67.7    67.8    67.9      68
##      20      21      14      18      22      15      18      16      14      14
##    68.1    68.2    68.3    68.4    68.5    68.6    68.7    68.8    68.9      69
##      14      18      14      22      12      19       9      16       9      15
##    69.1    69.2    69.3    69.4    69.5    69.6    69.7    69.8    69.9      70
##      15      10      11      12      19      18      14      11      16      10
##    70.1    70.2    70.3    70.4    70.5    70.6    70.7    70.8    70.9      71
##      12       7      15      14       9      15      12       9      13      17
##    71.1    71.2    71.3    71.4    71.5    71.6    71.7    71.8    71.9      72
##      14      11      10      16      13      17       7      15       8      15
##    72.1    72.2    72.3    72.4    72.5    72.6    72.7    72.8    72.9      73
##      11       8      14       9      11      12      18      16      10       6
##    73.1    73.2    73.3    73.4    73.5    73.6    73.7    73.8    73.9      74
##      19      11      12      15      12      17       5      12       8      17
##    74.1    74.2    74.3    74.4    74.5    74.6    74.7    74.8    74.9      75
##       5      16      15      13      12      16      11      14      16      14
##    75.1    75.2    75.3    75.4    75.5    75.6    75.7    75.8    75.9      76
##      11      16      15       7      14       9       8       6       6       8
##    76.1    76.2    76.3    76.4    76.5    76.6    76.7    76.8    76.9      77
##       8      12       8      13       4      13      14      12      12      16
##    77.1    77.2    77.3    77.4    77.5    77.6    77.7    77.8    77.9      78
##      11      17      13       9      16      10       6       8      11      15
##    78.1    78.2    78.3    78.4    78.5    78.6    78.7    78.8    78.9      79
##      12       9      15      10      12      11      13      13      15      14
##    79.1    79.2    79.3    79.4    79.5    79.6    79.7    79.8    79.9      80
##      10      18       9      18      12      15      10      19       9      15
##    80.1    80.2    80.3    80.4    80.5    80.6    80.7    80.8    80.9      81
##      16      15       8      13       5      16      13      17      13      13
##    81.1    81.2   81.25    81.3    81.4    81.5    81.6    81.7    81.8    81.9
##      19      19       1       8      17       9      13      16       8       8
##      82    82.1    82.2    82.3    82.4    82.5    82.6    82.7    82.8    82.9
##      10      11       9       7      10      13       7      11       8       9
##      83    83.1    83.2    83.3    83.4    83.5    83.6    83.7    83.8    83.9
##       5       6      11      13      10      10      12       6       9      11
##      84    84.1    84.2    84.3    84.4    84.5    84.6    84.7   84.75    84.8
##       6      20       6      12       4      15      11       5       1       9
##    84.9      85    85.1    85.2    85.3    85.4    85.5    85.6    85.7    85.8
##       8      13       8      10      10       8      14       8       8      12
##    85.9      86    86.1    86.2    86.3    86.4    86.5    86.6    86.7    86.8
##      11       9       7       4      12       8      13      10       5       6
##    86.9      87    87.1    87.2    87.3    87.4    87.5    87.6    87.7    87.8
##      11       5       7       8      10       6       7       8      11       8
```

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##    87.9      88    88.1    88.2    88.3    88.4    88.5    88.6    88.7    88.8
##       9      14      13      10       9      11       7      11      10       8
##    88.9      89    89.1    89.2    89.3    89.4    89.5    89.6    89.7    89.8
##      10       6      15      13      11      16       9       8      12      19
##    89.9      90    90.1    90.2    90.3    90.4    90.5    90.6    90.7    90.8
##      11      11      15      14      10      10      11      16       8      12
##    90.9      91    91.1    91.2    91.3    91.4    91.5    91.6    91.7    91.8
##       9      11       6      12       8      11       8       8      13       4
##    91.9      92    92.1    92.2    92.3    92.4    92.5    92.6    92.7    92.8
##       9      12      16      12      10       3      11      15      11      15
##    92.9      93    93.1    93.2    93.3    93.4    93.5    93.6    93.7    93.8
##      14       9      13      11       8       9       7      10       8       8
##    93.9      94    94.1    94.2    94.3    94.4    94.5    94.6    94.7    94.8
##       6       9      10       6      18      11       7      11      15      20
##    94.9      95    95.1    95.2    95.3    95.4    95.5    95.6    95.7    95.8
##      14      13       9      18       9      15      15      14      13      21
##    95.9      96    96.1    96.2    96.3    96.4    96.5    96.6    96.7    96.8
##      13      15       9      12       8      10      11      10       6      12
##    96.9      97    97.1    97.2    97.3    97.4    97.5    97.6    97.7    97.8
##      13      13       8       7       5      10      14       8       9      13
##    97.9      98    98.1    98.2    98.3    98.4    98.5    98.6    98.7    98.8
##       8      17      18      10      12      12      11      17      12      15
##    98.9      99    99.1    99.2    99.3    99.4    99.5    99.6    99.7    99.8
##      18      19      11       6       7       6       6       8      11      14
##    99.9     100     101     102     103     104     105     106   106.5     107
##      18     142       3       2       2       2       1       2       1      11
##     108     109     110     111     112   112.5     113     114     115  115.25
##       2       5       2       5       1       1       9       3       8       1
##     116     117     118     119     120     121     122     123     124     125
##       3       5       7       2       5      10      10       9      10       6
##     126     127     128  128.25     129     130     131   131.5     132   132.5
##       8       8      15       1      16      14      17       1      18       1
##     133   133.5     134     135     136   136.5     137     138     139     140
##      34       1      26      31      20       1      21      19      28      25
##   140.5     141     142  142.75     143   143.5     144     145     146     147
##       1      19      33       1      19       1      23      25      21      22
##     148     149     150     151     152     153     154     155   155.5     156
##      32      29      28      27      31      28      24      27       1      20
##   156.5     157   157.5     158   158.5     159     160     161  161.25     162
##       2      21       1      26       1      12      28      25       1      33
##     163     164     165   165.5     166     167     168     169   169.5     170
##      29      24      25       1      39      39      40      43       1      31
##     171  171.25     172   172.5     173   173.5     174     175     176   176.5
##      62       1      45       1      56       1      38      55      51       1
##     177     178     179     180     181   181.5     182   182.5     183   183.5
##      58      52      38      39      47       1      53       1      48       1
##     184     185     186   186.5     187   187.5     188     189     190   190.5
##      64      48      61       1      52       1      56      74      38       1
##     191     192   192.5     193  193.25   193.5     194     195     196     197
##      48      69       1      69       1       4      49      40      50      54
##     198     199     200     201     202     203     204   204.5     205     206
##      52      69      53      61      60      51      39       1      68      62
##     207     208   208.5     209   209.5     210     211     212     213     214
##      54      82       2      59       1      58      78      66      75      79
```

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##   214.5     215   215.5     216   216.5     217   217.5     218     219     220
##       1      87       1      84       1      78       2      76      62      73
##     221   221.5     222   222.5     223     224   224.5     225   225.5     226
##      60       1      71       2      64      73       1      70       1      64
##   226.5     227     228     229   229.5     230     231     232     233     234
##       1      61      61      58       1      62      82      77      69      73
##   234.5     235     236     237     238     239     240   240.5     241     242
##       2      76      64      83      61      67      72       1      78      72
##   242.5     243     244     245     246   246.5     247   247.5     248     249
##       2      71      65      68      66       1      63       1      55      65
##     250     251     252   252.5     253  253.25   253.5     254     255     256
##      59      65      61       1      49       1       1      58      56      62
##   256.5     257   257.5     258     259     260     261   261.5     262     263
##       1      71       1      66      57      62      62       1      47      73
##     264     265     266     267     268     269     270   270.5     271   271.5
##      66      56      70      58      63      70      59       1      52       1
##     272     273     274   274.5     275     276     277     278   278.5     279
##      55      61      57       1      38      68      52      57       1      61
##  279.75     280   280.5     281   281.5     282   282.5     283   283.5     284
##       1      63       1      69       1      47       1      56       1      50
##     285     286   286.5     287     288     289     290     291     292     293
##      59      50       1      62      61      62      61      73      70      63
##     294     295     296     297   297.5     298     299   299.5     300     301
##      68      58      46      70       1      59      53       1      58      46
##   301.5     302     303   303.5     304     305     306   306.5     307     308
##       1      71      58       1      57      67      67       1      61      73
##     309  309.25   309.5     310     311     312     313     314     315     316
##      46       1       1      75      64      52      64      77      72      54
##   316.5     317     318   318.5     319     320     321   321.5     322     323
##       1      76      75       1      72      55      51       1      63      53
##     324     325   325.5  325.75     326     327     328     329     330   330.5
##      71      56       1       1      74      67      49      62      65       1
##     331     332     333     334   334.5     335     336   336.5     337     338
##      49      72      51      62       1      70      70       1      59      57
##   338.5     339   339.5  339.75     340     341     342     343   343.5     344
##       1      55       1       1      45      54      46      55       1      49
##     345     346   346.5     347     348   348.5     349     350     351     352
##      57      63       1      71      55       1      56      61      66      74
##     353     354     355     356     357  357.75     358   358.5     359     360
##      44      71      62      58      47       1      68       1      67      57
##     361     362   362.5     363     364     365     366   366.5     367   367.5
##      48      62       1      62      61      71      72       2      58       1
##     368   368.5     369   369.5  369.75     370     371     372     373     374
##      72       1      49       1       1      68      67      64      50      60
##     375   375.5     376     377   377.5     378     379     380   380.5     381
##      48       1      55      58       1      59      55      60       1      54
##     382     383     384     385  385.75     386     387     388     389     390
##      62      46      56      61       1      62      49      44      57      63
##     391   391.5     392     393     394   394.5     395   395.5     396     397
##      40       1      63      54      41       1      51       1      42      49
##     398   398.5     399     400     401     402     403   403.5     404     405
##      54       1      37      55      48      48      53       1      52      49
##     406     407     408     409     410     411     412   412.5     413     414
##      45      40      48      51      44      45      42       1      34      34
```

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##     415  415.75     416     417     418     419   419.5     420   420.5     421
##      45       1      28      44      43      44       1      36       1      49
##     422   422.5     423     424   424.5     425     426     427     428     429
##      27       1      58      33       1      47      30      50      35      48
##     430     431   431.5     432     433     434     435   435.5     436     437
##      35      53       1      40      47      37      33       1      45      18
##     438     439     440     441     442   442.5     443     444   444.5     445
##      39      33      49      31      44       1      28      39       1      36
##     446   446.5     447   447.5     448  448.25     449     450     451   451.5
##      55       1      35       1      47       1      36      39      42       3
##     452     453     454     455   455.5     456     457     458     459     460
##      40      43      45      33       1      46      32      36      31      31
##     461   461.5     462     463     464     465     466   466.5     467     468
##      36       1      40      41      44      29      33       1      27      30
##     469     470   470.5     471     472     473     474     475     476     477
##      28      21       1      27      34      30      27      43      30      36
##     478     479     480     481     482     483     484     485     486     487
##      25      45      26      32      33      34      43      30      28      28
##   487.5     488     489     490     491     492     493     494   494.5     495
##       1      21      30      28      29      21      38      27       1      31
##     496     497  497.25     498     499   499.5     500     501     502     503
##      31      35       1      33      29       1      23      25      38      29
##     504   504.5     505     506   506.5     507     508     509     510   510.5
##      22       1      35      25       2      34      32      20      31       2
##     511     512     513     514     515     516     517     518     519     520
##      31      28      23      24      26      30      26      29      33      31
##     521     522     523     524   524.5     525     526     527     528     529
##      26      23      31      21       1      27      27      33      31      27
##     530     531     532   532.5     533  533.75     534     535     536   536.5
##      29      26      33       1      18       1      27      33      15       1
##     537     538     539     540     541     542     543     544     545     546
##      39      26      31      17      21      25      29      21      31      20
##     547     548   548.5     549     550     551     552  552.75     553     554
##      29      25       1      29      25      22      22       1      11      28
##     555     556     557   557.5     558     559     560     561     562  562.25
##      21      30      25       1      25      21      25      30      23       1
##     563     564     565     566   566.5     567     568     569     570     571
##      20      23      13      25       1      29      20      27      21      28
##     572     573     574     575     576     577     578     579     580     581
##      22      31      30      31      24      31      18      15      31      33
##     582     583   583.5     584     585     586   586.5     587     588     589
##      11      31       1      25      22      11       1      19      25      25
##     590     591   591.5     592     593     594   594.5     595     596     597
##      33      22       1      32      22      25       2      20      23      22
##     598  598.25     599     600     601     602     603     604     605     606
##      14       1      21      21      20      16      18      20      21      27
##     607   607.5     608     609     610     611     612     613     614     615
##      16       1      26      29      28      24      18      25      21      11
##     616     617     618     619     620     621     622     623     624     625
##      16      16      31      16      21      20      19      18      28      16
##     626     627     628     629  629.25     630   630.5     631     632     633
##      17      13      18      17       1      25       1      18      20      22
##     634     635   635.5     636     637     638   638.5     639     640     641
##      20      15       1      24      10      15       1      15      11      17
```

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##     642     643     644     645     646     647     648     649     650   650.5
##      22      26      18      16      22      15      16      24      15       1
##     651     652     653     654     655     656     657     658     659     660
##      19      16      18      12      26      12      17      17      19      13
##     661   661.5     662     663     664     665     666     667     668     669
##      11       1      18      21       7      21      22      20      19       9
##     670     671     672     673  673.25     674     675     676     677     678
##      22      15      17      19       1      12      10      15      11      17
##     679     680     681     682     683     684     685     686     687     688
##      13      21      12      14      18       9      17      17      13      25
##     689     690     691     692     693     694   694.5     695     696     697
##      13      13      19      11      17      16       1       8      22      11
##     698     699   699.5     700   700.5     701     702     703     704     705
##      15      12       1      16       1      10      20      20       9      13
##     706     707     708     709     710     711   711.5     712  712.75     713
##       7      15      18      10      11      12       1      13       1      12
##     714     715     716     717     718     719     720     721     722     723
##       8      13      20      15      18      12       7      17       5       9
##     724   724.5     725     726     727     728     729   729.5     730     731
##      11       1      19      16      12      14      16       1       7      16
##     732     733     734     735     736     737     738     739     740   740.5
##      16       8      20      13      12      15       8      16      12       1
##     741     742     743     744  744.25     745     746     747     748     749
##       8      16       9      20       1      13       4      15      10       8
##     750     751     752     753     754     755     756     757     758     759
##       5      12      17      19      10      14      10      16      12      16
##   759.5     760     761   761.5     762     763     764     765     766   766.5
##       1      11      12       2      12      16      16      14      18       1
##     767     768     769     770   770.5     771     772     773     774     775
##       9      17      10       8       1      14      14      12       6      16
##     776     777     778     779     780     781     782     783     784     785
##      15      20      11      18      12      11      17      13      11      12
##     786     787     788     789     790     791     792   792.5     793     794
##      15      12      15      18      14      11       9       1      10       9
##     795     796     797     798     799     800     801   801.5     802     803
##      11       8      16       9      15       6      14       1      17      14
##     804     805     806   806.5     807     808     809     810     811   811.5
##       8       9       5       1       9       5      16       8      21       1
##     812     813     814     815     816     817     818     819     820     821
##       7      13      14      18       8      10       6      16      13      15
##     822     823     824     825     826     827     828     829     830     831
##      15      10       9      15      14      15      11      11       9      11
##   831.5     832     833     834     835     836     837     838     839     840
##       1       8       8      19      12      11       4      10      11      10
##     841     842     843     844     845     846     847     848     849     850
##      15      15      15      18       7      14      12      17       8      13
##     851     852     853     854     855     856     857   857.5     858     859
##      15      10      12      13      14      12      13       1      11      13
##     860     861   861.5     862     863     864     865     866     867     868
##      12      13       1       9       2       8      16      13      14       9
##     869     870     871     872     873     874     875     876     877     878
##       6      14       7      12      10      12      12      14      11       6
##     879   879.5     880   880.5     881     882     883     884     885     886
##      12       1       4       1      16      11      12       8       6       9
```

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##     887     888     889   889.5     890     891     892   892.5     893     894
##      13       4      16       1       8       9       6       1      12       8
##   894.5     895     896     897     898     899   899.5     900     901     902
##       1      15       7      14       8      13       1      10      13      11
##     903     904     905     906     907     908   908.5     909     910     911
##      12       2       9       6       9       9       1       8      18       5
##     912     913     914     915   915.5     916   916.5     917     918     919
##       9       5      11       3       1       7       1       8      11       9
##     920     921   921.5     922  922.25   922.5     923     924     925     926
##      13       8       1      10       1       1      13       7       8      12
##     927  927.25     928     929     930     931   931.5     932     933     934
##      10       1       7      14       9       7       1       4       9       3
##     935  935.25   935.5     936     937     938     939     940     941     942
##      14       1       1       5      14       6       9       4      11      11
##     943     944     945     946     947     948     949     950     951   951.5
##       8       6       5      10       6       8       7      10       6       1
##     952     953     954     955     956     957     958     959     960     961
##       9       4       6      10      11       6       9       5       6      11
##     962   962.5     963   963.5     964     965     966   966.5     967     968
##      15       1       7       1      14      11       6       1      10       6
##     969     970     971     972     973     974     975     976     977     978
##       8       8       7       3      11       7       6      11       4      11
##     979     980     981     982     983     984     985     986     987     988
##       3      19       4       7       8       8       9       5       7       8
##     989     990     991     992     993     994     995     996   996.5     997
##       6       8       5       9       5      11       5      10       1      12
##     998     999   999.5    1000    1001    1002  1002.5    1003    1004  1004.5
##       5       6       2       8      12      13       1       7       3       1
##    1005    1006    1007    1008    1009    1010  1010.5    1011    1012    1013
##       2      11       8       9       9       4       1       5       8       7
##    1014    1015    1016  1016.5    1017    1018    1019    1020    1021    1022
##      12       5       6       2       9      10      11       2       4      11
##    1023    1024    1025    1026    1027    1028  1028.5    1029    1030    1031
##       8       6       6       5       6       8       1       8       6       8
##    1032    1033    1034    1035    1036    1037  1037.5    1038  1038.5    1039
##       5       5       5       7       4       6       1       6       1       3
##    1040    1041    1042    1043    1044    1045    1046    1047    1048    1049
##      12       5       9       5       9       6       4       8       2       7
##    1050    1051  1051.5    1052    1053    1054    1055  1055.5    1056    1057
##       5      10       1       6       4       5       1       1       8       3
##  1057.5    1058    1059    1060    1061    1062    1063    1064    1065  1065.5
##       2       2       4       7      10       4       7       7       4       1
##    1066    1067  1067.5    1068    1069    1070    1071    1072    1073    1074
##       4       7       1       5       3      12       7       6       5       5
##    1075    1076    1077  1077.5    1078  1078.5    1079    1080    1081    1082
##       6       1       4       1       4       1       7       2       2       6
##    1083 1083.75    1084    1085  1085.5    1086  1086.5    1087    1088  1088.5
##       8       1       2      11       1       3       2       3      10       1
##    1089    1090    1091    1092    1093  1093.5    1094    1095    1096    1097
##       5       7       5       6       6       1       4       6       3       2
##    1098    1099    1100    1101    1102    1103    1104    1105  1105.5    1106
##      10       8       5       7       3       5       1       9       1       4
##    1107    1108    1109    1110    1111    1112    1113    1114    1115    1116
##       2       9       5       8       3       4       4       4       7       6
```

```
##    1117  1117.5    1118    1119  1119.5    1120    1121    1122    1123    1124
##       6       1       6       5       1       9      12       7      11       6
##    1125    1126    1127    1128  1128.5    1129    1130    1131    1132    1133
##       5       6       3       9       1       3       1       6       2       8
##    1134    1135    1136    1137    1138    1139    1140    1141    1142    1143
##      11       4       3       5       7       3       7       7       5       8
##    1144    1145 1145.25    1146    1147    1148    1149    1150    1151    1152
##       9       2       1       2       7       2       6       7       1       6
##    1153    1154    1155    1156    1157    1158    1159    1160    1161    1162
##       9       6       6       8       6       5       6       5       2       5
##    1163    1164    1165    1166    1167    1168  1168.5    1169    1170    1171
##       5       4       5       4       3       6       1       8       2       5
##    1172    1173    1174    1175    1176    1177    1178    1179    1180    1181
##       4       1       4       2      10       6       5       6       1       4
##    1182    1183    1184    1185    1186    1187    1188    1189    1190    1191
##       5       2      11       7       3       6       4       6       4       4
##    1192    1193    1194    1195    1196    1197    1198    1199    1200    1201
##       3       8       7       2       8       5       3       1       4       6
##    1202    1203    1204    1205    1206    1207    1208    1209    1210    1211
##       7       7       1       8       4       2       5       3       6       5
##    1212    1213    1214    1215    1216    1217    1218    1219    1220    1221
##       5       5       5       2       3       4       1       4       2       1
##    1222    1223    1225    1226    1227    1228    1229    1230    1231    1232
##       5       3       3       4       2       6       4       3       4       1
##    1233    1234    1235    1236    1237  1237.5    1238    1239    1240    1241
##       2       5       2       2       7       1       3       3       2       3
##  1241.5    1242    1243    1244    1245    1246    1247    1248    1249    1250
##       1       3       4       2       3       1       3       6       5       4
##    1251    1252    1253    1254    1255    1257    1258    1259    1260    1261
##       7       2       2       4       2       5       3       4       1       4
##    1262    1263    1264    1265    1266    1267    1268    1269    1270    1271
##      11       4       1       5       2       7       5       4       3       2
##  1271.5    1272  1272.5    1273  1273.5    1274    1275    1276  1276.5    1277
##       1       3       1       4       1       5       4       4       1       5
##    1278    1279    1280    1281    1282    1283    1284  1284.5 1284.75    1285
##       2       3       3       2       4       3       1       2       1       1
##    1286    1287    1288    1289    1290    1291    1292    1293    1294    1295
##       6       4       2       7       2       3       4       5       1       2
##    1296    1297    1298    1299    1300    1301    1302    1303    1304    1305
##       4       3       4       2       2       8       3       2       3       2
##    1306    1307    1308    1309    1310  1310.5    1311    1312  1312.5    1313
##       1       4       2       5       4       1       1       8       1       3
##    1314  1314.5    1316    1317    1318    1319    1320  1320.5    1321    1322
##       3       1       1       2       2       3       3       1       6       5
##    1323    1324    1325  1325.5    1326    1327    1328    1329    1330    1331
##       1       2       2       1       3       4       2       3       3       3
##  1331.5    1332    1333    1334    1335    1336    1337    1338    1339    1340
##       1       5       3       3       1       4       1       3       1       2
## 1340.75    1341    1342    1343    1344    1345    1346    1347    1348 1348.25
##       1       3       1       1       4       1       5       5       1       1
##    1349    1350    1352    1353    1355    1356    1357    1358    1359    1360
##       1       5       1       3       3       1       3       1       3       2
##    1361    1362    1363    1364    1365    1366    1367    1368    1369    1371
##       5       2       2       7       5       7       3       1       5       2
```

```
##    1372    1373  1373.5    1374    1375    1376    1377    1379    1380    1381
##       3       3       1       2       1       2       2       5       1       2
##    1382    1383    1384    1386    1387    1389    1390    1391    1392    1393
##       2       5       3       3       1       4       4       3       4       2
##    1394  1394.5    1395    1396    1397    1398    1399    1401    1402    1403
##       2       1       5       4       1       8       1       6       1       4
##    1404    1405    1406    1408    1409    1410    1411    1412    1413    1414
##       1       3       2       3       1       2       1       2       2       4
##    1415    1416    1417    1418  1418.5    1419    1420  1420.5    1421    1422
##       4       3       3       4       1       1       2       1       3       2
##    1424    1425    1426    1427  1427.5    1428    1429    1430  1431.5    1432
##       2       1       2       3       1       1       2       3       1       3
##    1433    1434  1434.5    1435    1436    1437    1438    1439    1440    1441
##       1       6       2       1       1       2       8       4       2       1
##    1442    1444    1446    1447    1448    1449    1450  1450.5    1451  1451.5
##       1       3       5       1       1       1       2       1       4       2
##    1453    1454    1455    1456    1457    1458    1459    1460    1461    1462
##       3       1       2       1       1       5       3       1       6       2
##    1463    1465    1466    1467  1467.5    1468    1469    1470    1471    1472
##       3       2       1       4       1       4       2       1       5       3
##    1473  1474.5    1475    1476    1478    1479    1482    1483    1484    1485
##       4       1       3       2       5       2       6       2       1       5
##    1486  1486.5    1487    1488    1489    1491    1492    1493    1494  1494.5
##       1       1       4       2       3       1       3       1       1       1
##    1495    1496    1497    1499    1500    1501    1502    1503    1504    1506
##       1       2       2       1       1       1       2       4       5       7
##    1507    1508    1509    1510    1511    1512    1513    1514    1515    1516
##       1       2       3       2       2       2       2       2       1       2
##  1516.5    1517    1518    1519    1520    1521    1522    1523  1524.5    1525
##       1       2       1       1       3       3       4       5       1       2
##    1528  1528.5    1529    1531    1532    1533    1534    1535    1536    1537
##       1       1       2       1       1       2       8       1       4       3
##    1538    1539    1540    1541    1542    1543    1544    1545    1546  1546.5
##       3       1       2       2       1       1       2       2       4       1
##    1547    1548    1549    1550    1552    1553  1553.5    1554    1555    1556
##       2       1       3       1       3       2       1       1       2       4
##    1559    1560    1562    1563    1564    1565    1566    1567    1568    1570
##       2       2       3       2       2       3       3       1       1       2
##  1570.5    1572    1573    1574    1576    1578    1579    1581    1582    1583
##       1       2       3       1       1       1       1       2       1       5
##    1585    1587    1589    1590    1594    1595    1596    1597    1598    1599
##       2       3       2       3       1       1       1       7       2       4
##    1600    1601    1602 1602.25    1605    1606    1608    1609    1613    1614
##       1       1       1       1       1       4       3       1       1       2
##    1615    1616    1617    1618    1619    1620    1621    1623    1624    1627
##       1       2       1       1       2       3       1       4       2       3
##    1628    1629    1630    1631    1632    1633    1634  1634.5    1635    1638
##       1       2       1       1       1       1       1       1       3       1
##    1640    1641    1642    1643    1644    1645    1646    1647 1647.75    1648
##       3       2       2       3       1       2       3       2       1       1
##    1649    1650    1652    1653    1654  1654.5    1656    1657    1658    1659
##       1       2       2       2       4       1       3       3       3       2
##    1660    1664    1666    1667    1668    1669    1670    1672    1673    1674
##       1       2       1       1       2       1       2       3       4       1
```

```
##    1675    1676    1678    1679    1681    1683    1684    1685    1686    1688
##       3       4       2       1       2       3       4       3       3       1
##    1689    1690    1691    1693 1693.25    1694    1696    1697  1697.5    1698
##       4       2       2       1       1       1       1       1       1       2
##    1699    1700    1701    1703    1704    1705    1706    1708    1709    1712
##       2       1       2       1       2       3       2       1       1       1
##    1713    1714    1715    1717  1717.5    1718    1719    1721    1725    1726
##       2       1       1       2       1       2       2       4       2       1
##    1727    1729    1730    1731    1732    1733    1734    1735    1736    1737
##       2       3       3       1       2       2       5       1       1       2
##    1738    1741    1742    1743    1744    1745    1746    1747    1750    1753
##       4       1       3       1       1       1       3       1       4       1
##    1755    1758    1760    1761    1762    1763    1764    1765    1766    1767
##       1       3       1       2       1       1       2       1       5       1
##    1768    1770    1772    1773    1775    1778    1779    1782    1783  1783.5
##       1       2       1       2       5       1       4       2       3       1
##    1784    1785    1786  1787.5    1790    1791    1792    1793    1794    1795
##       5       1       3       1       3       1       2       1       2       1
##    1796    1798    1800    1801    1802    1803    1804    1806    1807    1809
##       1       1       2       4       2       1       5       4       3       1
##    1811    1812    1813    1814    1815    1816 1816.75    1817    1818    1819
##       2       1       1       2       2       2       1       2       2       1
##    1820    1821    1822    1823    1826    1827    1829    1830    1831    1832
##       1       1       4       2       1       3       1       1       1       1
##    1834    1835    1836    1839    1840  1840.5 1840.75    1841    1844    1845
##       2       1       3       1       3       1       1       1       4       2
##    1846    1847    1849    1850    1851    1853    1854    1856    1857    1858
##       1       2       1       3       1       1       3       1       2       1
##  1859.5    1860 1860.75    1861    1862    1863    1864    1865    1866    1868
##       1       1       1       1       1       3       1       1       1       3
##    1870    1871    1874    1875    1876  1876.5    1878    1882    1883    1885
##       1       3       2       1       1       1       2       1       1       1
##  1885.5    1887    1890    1891    1892    1894    1896    1898    1899    1902
##       1       2       1       1       2       1       1       1       1       4
##    1905    1907    1909    1910    1911    1912    1913    1917    1918    1920
##       2       2       4       1       1       2       2       1       2       1
##    1922    1923    1924    1925    1926    1927    1928    1930    1931    1932
##       1       1       3       1       1       2       1       2       2       1
##    1934    1935    1938    1941    1942    1943    1945    1947    1949    1951
##       1       3       1       1       1       1       2       1       2       4
##    1952    1954    1955    1959    1960    1962    1963    1966    1967    1968
##       1       1       1       1       2       1       2       1       1       2
##    1969    1970    1972    1976    1978  1978.5    1979    1980    1981    1982
##       4       1       1       1       1       1       2       1       4       2
##    1984    1985    1988    1989    1991    1992    1994    1995    1996    1997
##       1       1       1       2       1       1       1       1       2       2
##    1998    2001    2004    2005    2006    2008    2009    2010    2011    2015
##       1       2       3       2       1       2       1       2       1       2
##    2017  2017.5    2019    2021    2029    2030    2032    2033    2034    2035
##       1       1       2       2       2       1       5       1       1       4
##    2036    2038    2040    2041    2042    2044    2045    2046    2047    2048
##       4       2       1       1       1       1       3       3       1       1
##    2049    2050    2051    2052    2054    2057    2059    2060    2062    2063
##       1       1       2       1       5       2       2       1       1       1
```

```
##    2064    2065    2067    2069    2070    2072    2074    2075    2076    2077
##       3       1       1       1       1       1       3       1       1       2
##    2081    2084    2085    2086    2088    2089    2091    2094    2095    2097
##       1       3       2       1       2       2       1       4       1       2
##    2098    2099  2100.5    2103    2107  2107.5    2108    2112    2114    2115
##       1       1       1       1       1       1       2       2       1       1
##    2118    2120    2121    2124    2126    2128    2129    2130    2133  2135.5
##       4       4       1       1       1       3       1       4       1       1
##    2138    2140    2143    2144    2145    2146    2147    2152    2154    2155
##       1       2       1       2       1       1       1       1       2       1
##    2160    2161    2162  2163.5    2165    2166    2168    2169    2170    2173
##       1       1       2       1       1       2       2       1       1       1
##    2175    2178    2180    2181    2182    2183    2186    2187    2188    2189
##       1       1       2       2       2       1       1       1       3       1
##    2192  2192.5    2194    2197    2198    2202    2203  2204.5    2208    2210
##       1       1       2       3       1       4       1       1       2       2
##    2213    2215    2217    2218    2221    2225    2226    2228    2235    2239
##       3       3       1       1       2       1       2       1       3       1
##    2240    2241    2244    2246    2252    2253    2254    2255    2257  2260.5
##       2       1       1       1       1       1       1       2       2       1
##    2262    2266    2267    2268    2269    2270    2271  2271.5  2272.5    2274
##       1       2       1       3       1       3       1       1       1       1
##    2276    2279    2280    2281    2282    2283 2284.75    2285    2286    2288
##       3       3       1       2       1       1       1       1       1       2
##    2290    2292    2297    2298    2302    2303    2304    2305    2307    2308
##       3       2       1       2       1       1       1       1       1       2
##    2309  2309.5    2314    2318    2320    2323    2324  2324.5    2326    2330
##       1       1       1       1       1       1       1       1       1       1
##  2330.5    2332    2333    2334    2335    2342    2343    2345    2346    2351
##       1       2       1       1       1       1       1       2       1       1
##    2354    2356    2357    2359    2361    2364 2366.75    2371    2372    2374
##       1       1       2       3       1       1       1       1       1       1
##    2376    2377    2379    2382    2384    2385    2393    2394    2395    2396
##       1       2       2       2       1       1       1       1       2       2
##    2400    2402    2407    2408    2414    2417    2419    2423    2425    2428
##       2       2       2       1       1       1       1       1       1       1
##    2430    2432    2434    2435    2436    2447    2449    2456    2459    2460
##       1       1       1       1       1       1       1       1       4       2
##    2464    2465    2466    2467    2470    2471    2473    2474    2479    2482
##       1       1       2       1       1       2       1       1       2       2
##    2487    2489    2493    2497    2498    2499    2502    2504    2508    2509
##       1       1       1       2       1       1       1       1       2       1
##    2518    2521    2522    2527    2528    2533    2534    2535    2540    2541
##       1       2       1       1       1       1       1       1       1       2
##    2542    2545 2545.25    2551    2554    2558    2567    2569    2570    2574
##       1       1       1       1       2       2       1       1       1       1
##    2579    2581    2584    2586    2590    2592    2593  2595.5    2596    2602
##       3       1       1       1       1       1       1       1       1       1
##    2603    2604    2605    2606    2609    2611    2618    2619    2621    2622
##       1       2       1       1       1       1       1       1       1       1
##    2624  2625.5    2627    2632    2637    2638    2641    2645    2648    2656
##       1       1       1       1       1       1       1       1       1       1
##    2660    2670    2673    2675    2676    2677    2678    2688    2689    2690
##       3       1       1       1       1       1       1       2       1       1
```

```
##    2696    2698    2700    2703    2709    2713    2714    2716    2718    2720
##       1       1       1       2       1       1       1       1       1       1
##    2721    2722    2723    2726    2729    2736    2737    2739    2740    2743
##       1       1       2       1       2       1       1       1       2       1
##    2751    2760    2764    2765    2767    2778    2784    2788    2791    2794
##       1       2       1       1       2       1       2       1       1       2
##    2801    2802    2804    2808    2823    2824    2832 2834.75    2838    2843
##       2       1       3       2       1       1       1       1       1       1
##    2846    2851    2854    2857    2859    2860    2861    2864    2866    2868
##       1       1       1       2       1       1       1       2       2       1
##    2870    2875    2881    2884    2885    2890    2892    2895    2896    2897
##       1       1       2       1       2       2       1       1       1       1
##    2898    2906    2911    2914    2920    2924    2933    2934    2939    2944
##       1       1       1       1       1       1       1       1       1       1
##    2946    2947    2957    2962    2970    2974    2976    2989    2993    2994
##       1       1       1       1       1       1       1       1       1       1
##    2996    3001    3002    3008    3010    3016    3019    3020    3021    3023
##       1       1       1       2       1       1       1       1       1       1
##    3025    3029    3035    3041    3042    3046    3050    3051    3061    3062
##       1       1       1       1       1       1       1       1       1       1
##    3068    3069    3074    3076    3087    3089    3095    3098    3104    3105
##       3       1       1       1       2       1       1       2       1       1
##    3110    3120 3123.25    3131    3143    3145    3151    3158    3161    3166
##       1       1       1       1       1       1       1       1       1       1
##    3170    3175    3182    3183    3184    3191    3207    3208    3209    3215
##       1       1       1       1       1       2       2       1       1       1
##    3216    3222    3230    3231    3236    3238    3247    3248    3249    3255
##       1       1       1       1       1       1       1       1       1       2
##    3264    3268    3279    3280    3295    3297    3303    3304    3309    3326
##       1       1       2       1       4       1       1       1       2       1
##    3333    3338    3340    3342    3352    3355    3357    3361 3369.75    3375
##       2       1       1       1       1       1       1       1       1       1
##    3377    3383    3391    3392    3400    3402    3416    3417    3425    3426
##       2       1       1       1       1       2       1       1       1       1
##    3437    3438    3445    3448    3453    3454    3459  3459.5    3462    3468
##       1       1       1       1       1       1       1       1       1       1
##    3470    3474    3479    3480    3485    3488    3490    3502    3505    3516
##       1       1       2       1       1       1       1       2       1       1
##    3519    3537    3538    3542    3545    3548    3550    3552    3555    3559
##       1       1       1       1       1       1       1       2       1       1
##    3573    3574    3575    3583    3586    3593    3594    3601    3602    3603
##       1       1       1       1       1       2       1       1       1       1
##    3608    3612    3617    3619    3624 3627.75    3628    3632    3635    3637
##       1       1       1       1       1       1       1       1       2       1
##    3644    3646    3680    3682    3683    3692    3708    3710    3715    3718
##       1       1       1       1       1       1       1       1       1       1
##  3723.5    3726    3728    3735    3738    3740    3745    3746    3755    3756
##       1       1       1       1       1       1       1       1       1       1
##    3762    3765    3774  3774.5    3781    3784    3786    3787    3791    3806
##       1       1       1       1       1       1       1       1       1       1
##    3812    3820    3831    3833    3849  3858.5    3862 3865.75    3888    3898
##       2       1       2       1       1       1       1       1       1       1
##    3908  3910.5    3915    3921    3925    3927    3930    3933    3935    3952
##       1       1       1       1       2       1       1       1       2       1
```

```
##    3954    3966    3974    3978 3979.75    3980    3984    4000    4001    4002
##       1       1       1       1       1       1       1       1       1       1
##    4004    4012    4017    4036    4044    4053    4059    4060    4066    4075
##       2       1       1       1       1       1       1       1       1       2
##    4083    4084    4093    4094    4101    4115    4116    4125    4135    4146
##       1       2       1       1       1       1       1       1       1       2
##    4148    4156    4166    4167    4172    4177    4208    4224    4228    4236
##       1       1       1       1       1       2       1       1       1       1
##    4239    4250    4278    4282    4293    4300    4301    4303    4308    4314
##       1       1       1       2       1       1       1       1       1       1
##    4315    4321    4325    4332    4357    4398    4401    4406    4408    4411
##       1       1       1       1       1       1       1       1       1       1
##    4422    4433    4444    4461    4480    4489    4495    4499    4515    4524
##       1       1       1       1       1       1       1       1       1       1
##    4526  4526.5    4532    4567    4590    4592    4604    4613    4636    4643
##       1       1       1       1       1       1       1       1       1       1
##    4659    4694    4704    4709    4711    4717    4727    4776    4824    4825
##       2       1       1       1       1       1       1       1       1       1
##    4836    4841    4874    4894    4895    4926    4927    4945    4984    4987
##       1       1       1       1       1       1       1       1       1       1
##    4998    5007    5017    5045    5056    5057    5058    5070 5076.75    5082
##       1       1       1       1       1       1       2       3       1       1
##    5097    5111    5159  5201.5    5209  5220.5    5242    5255    5263    5275
##       1       1       1       1       1       1       1       1       1       1
##    5360    5374    5384    5387  5430.5    5461    5465  5468.5  5486.5    5512
##       1       1       1       1       1       1       1       1       1       1
##    5636  5652.5    5665    5669    5718    5728    5814    5837    5846  5919.5
##       1       1       1       1       1       1       1       1       1       1
##    5964    5975  5996.5  6008.5    6069    6081    6089  6121.5    6130    6161
##       1       1       1       1       1       1       1       1       1       1
##    6175  6178.5  6220.5    6284    6315    6337    6378    6380    6396    6399
##       1       1       1       1       1       1       1       1       1       1
##    6441  6467.5    6524    6545    6658  6684.5    6690    6720    6729    6734
##       1       1       1       1       1       1       1       1       1       1
##  6787.5    6809    6831    7396    7410  7559.5    7577 7681.75    7824  7831.5
##       1       1       1       1       1       1       1       1       1       1
##  7950.5    8083 8120.25    8125  8158.5    8479    8896    8917 8987.75    9000
##       1       1       1       1       1       1       1       1       1       1
##  9015.5  9028.5    9065    9133    9536  9688.5    9710  9849.5    9874 9991.25
##       1       1       1       1       1       1       1       1       1       1
##   10258   10295   10484   11300 11461.5   11697 11826.5 11925.5   12006   12361
##       1       1       1       1       1       1       1       1       1       1
## 12431.5   12438 12667.5   12792   12895 13151.2   13176 13270.5 13283.8 13581.5
##       1       1       1       1       1       1       1       1       1       1
## 13750.5 13771.5   13776   13889 14202.5 14267.5 14322.5   14339   14456   15094
##       1       1       1       1       1       1       1       1       1       1
## 15108.5 15340.5 15486.2   15675   15699 17483.5
##       1       1       1       1       1       1
```

Create categorical variables for analysis Variable are already factored, don’t need this section

```
flu$Gender <- factor(flu$gender)

flu$Vaccine <- factor(flu$vaccine)

flu$Vaccine_Response <- factor(flu$vaccine_response)

flu$Influenza_Infection <- factor(flu$influenza_infection_history)

flu$Influenza_Hospitalization <- factor(flu$influenza_hospitalization)

flu$subtest <- factor(flu$subset)

head(flu)
```

	donor_id <int>	study_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_type_hai <fctr>	visit
1	813	15	Female	Caucasian	2937	2014	0	pre	
2	813	15	Female	Caucasian	2937	2014	0	pre	
3	813	15	Female	Caucasian	2937	2014	0	pre	
4	813	15	Female	Caucasian	2937	2014	0	pre	
5	813	15	Female	Caucasian	2937	2014	0	pre	
6	813	15	Female	Caucasian	2937	2014	0	pre	

6 rows | 1-10 of 45 columns

Import data from file

```
#Import file
result <- read.csv(file = "C:/Users/Christine/Documents/Bellevue/DSC 680/Project 1/result_flu.cs
v", header = TRUE, na.strings = " ")
```

Display first five records of file

```
head(result)
```

	donor_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_age <dbl>	cmv_status <dbl>	ebv_stat <db
1	813	Female	Caucasian	2937	2014	0	23	0	
2	812	Male	Caucasian	2936	2014	0	28	1	
3	811	Male	Caucasian	2935	2014	0	23	0	
4	810	Male	Caucasian	2934	2014	0	27	1	
5	809	Female	Asian	2933	2014	0	27	1	

	donor_id	gen…	race	visit_id	visit_year	visit_day	visit_age	cmv_status	ebv_stat
	<int>	<fctr>	<fctr>	<int>	<int>	<int>	<dbl>	<dbl>	<db
6	808	Female	Other	2932	2014	0	29	0	

6 rows | 1-10 of 16 columns

Create categorical variables for analysis Variable are already factored, don't need this section

```
result$Gender <- factor(result$gender)

result$Race <- factor(result$race)

result$Vaccine <- factor(result$vaccine)

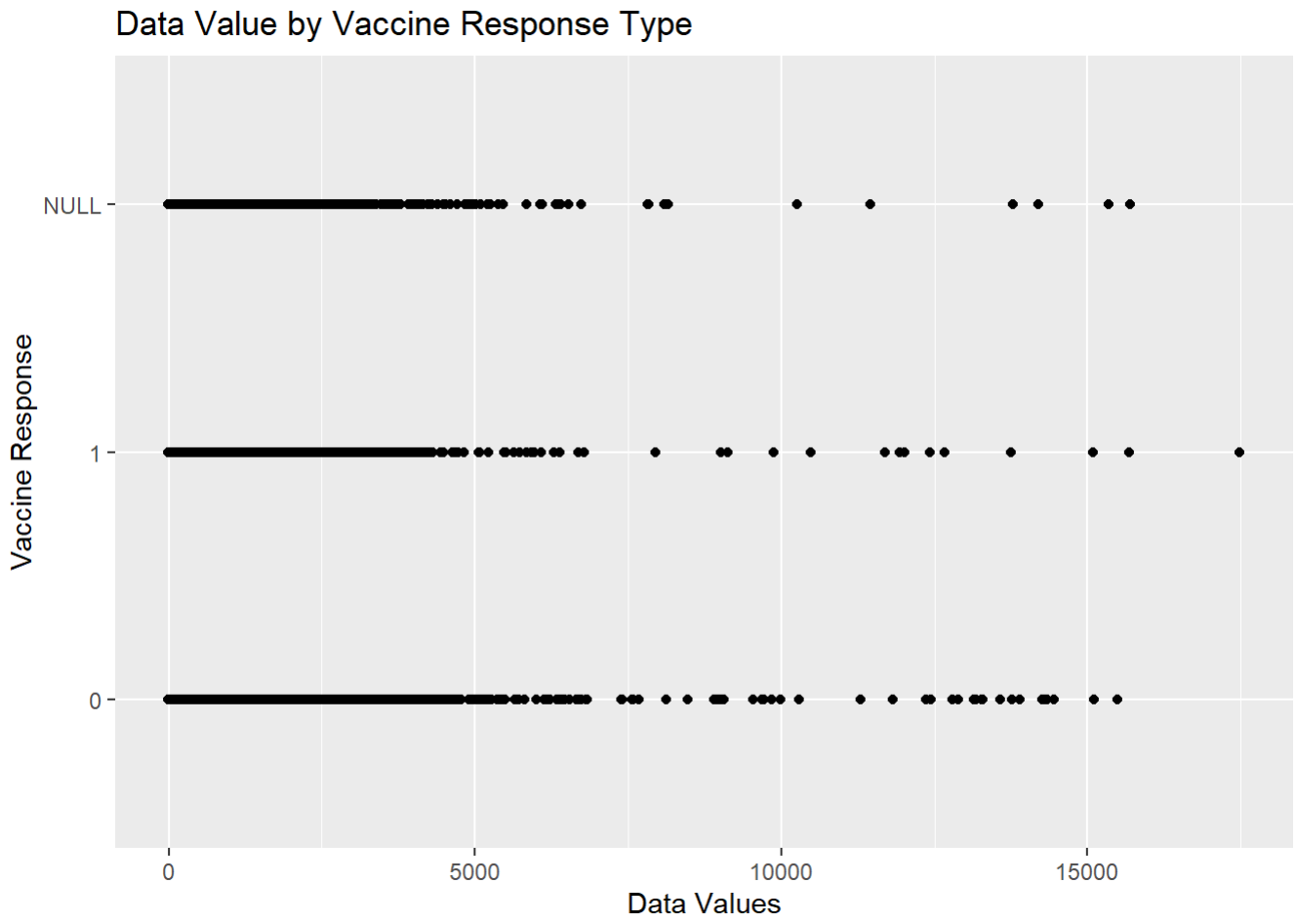
result$Vaccine_Response <- factor(result$vaccine_response)

result$Influenza_Infection <- factor(result$influenza_infection_history)

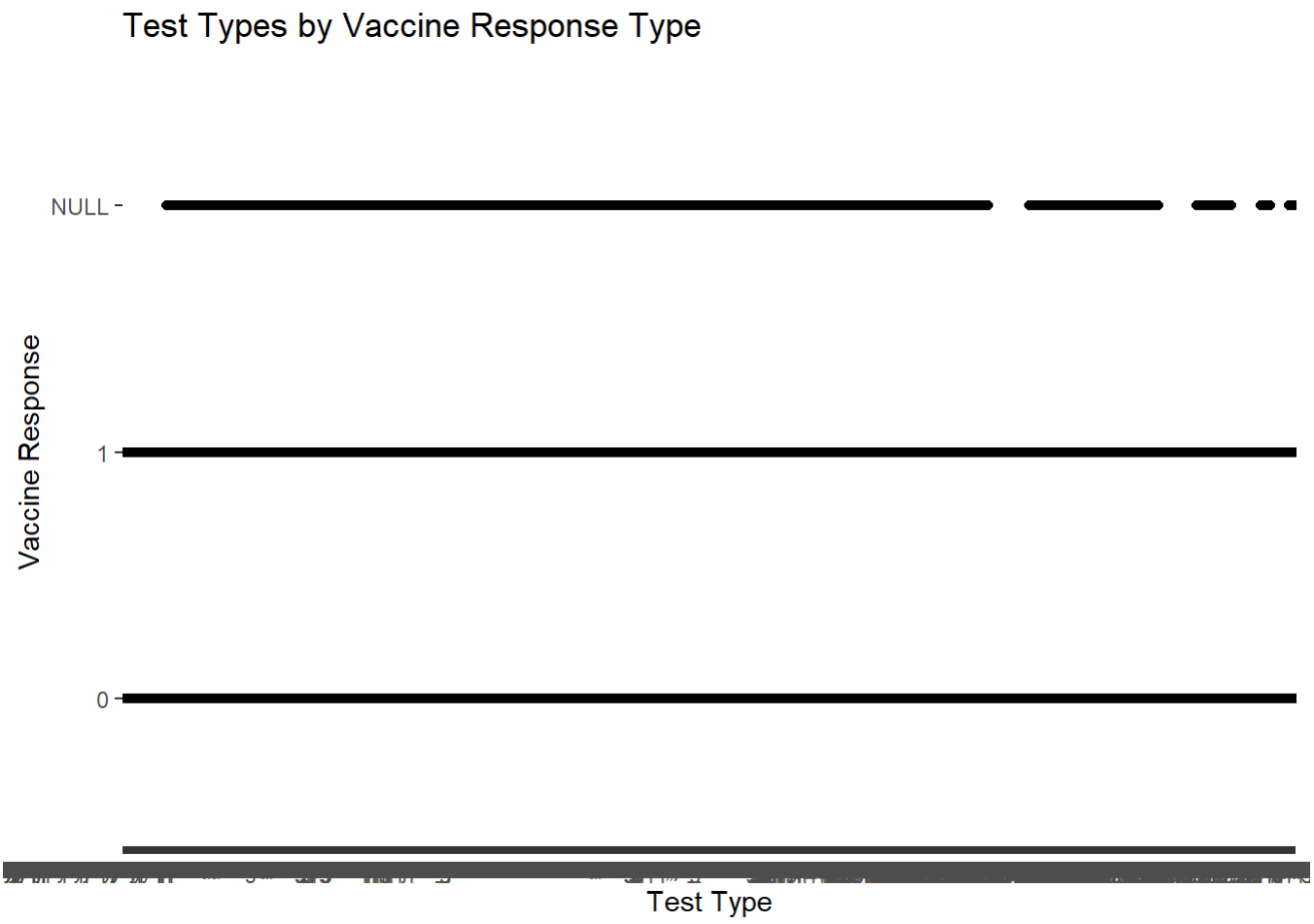
result$Influenza_Hospitalization <- factor(result$influenza_hospitalization)
```

Scatterplot

```
ggplot(flu, aes(x=data, y=vaccine_response)) + geom_point() + ggtitle("Data Value by Vaccine Res
ponse Type") +
  xlab("Data Values") + ylab("Vaccine Response")
```

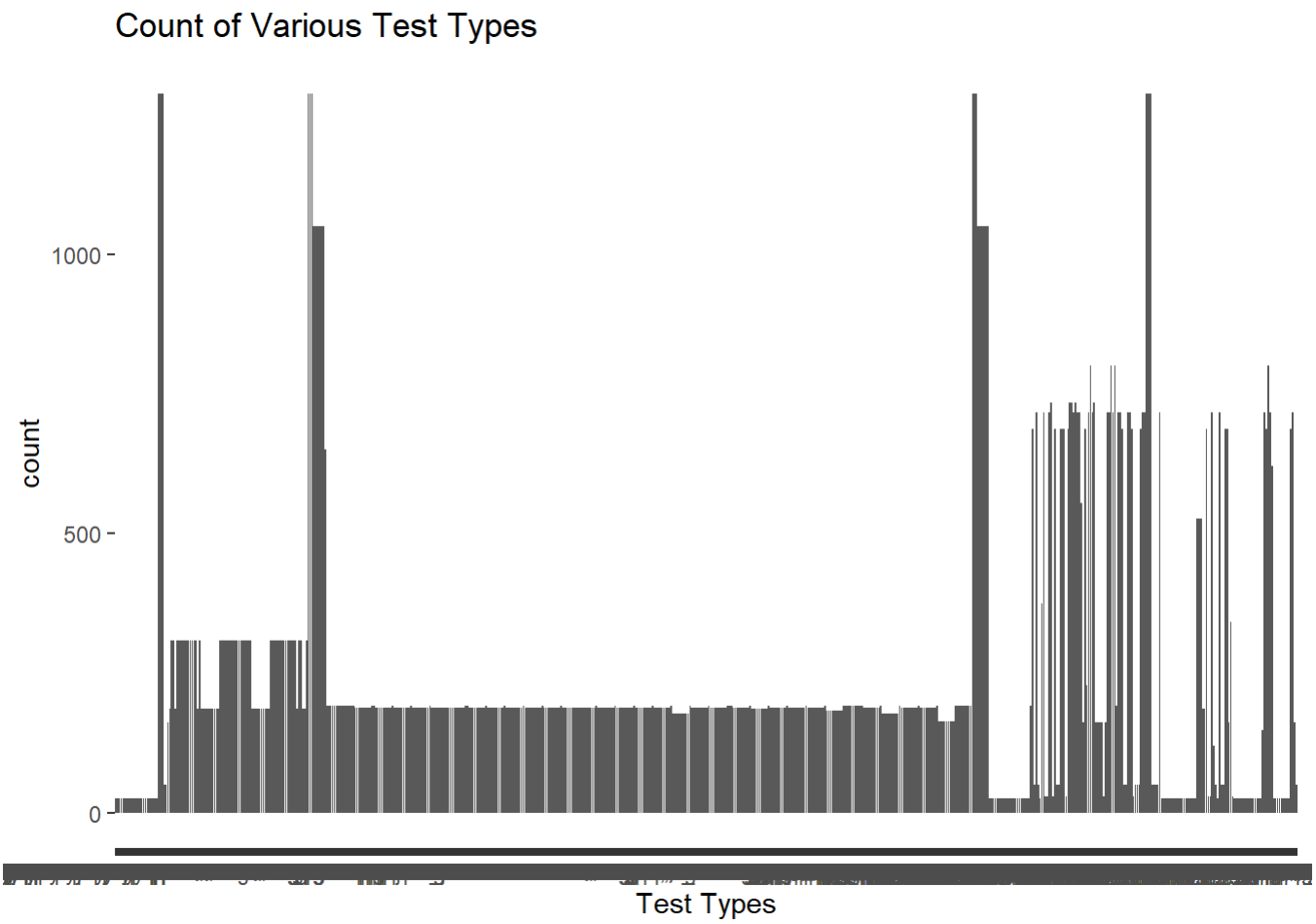



```
ggplot(flu, aes(x=subset, y=vaccine_response)) + geom_point()+ ggtitle("Test Types by Vaccine Re
sponse Type") +
  xlab("Test Type") + ylab("Vaccine Response")
```

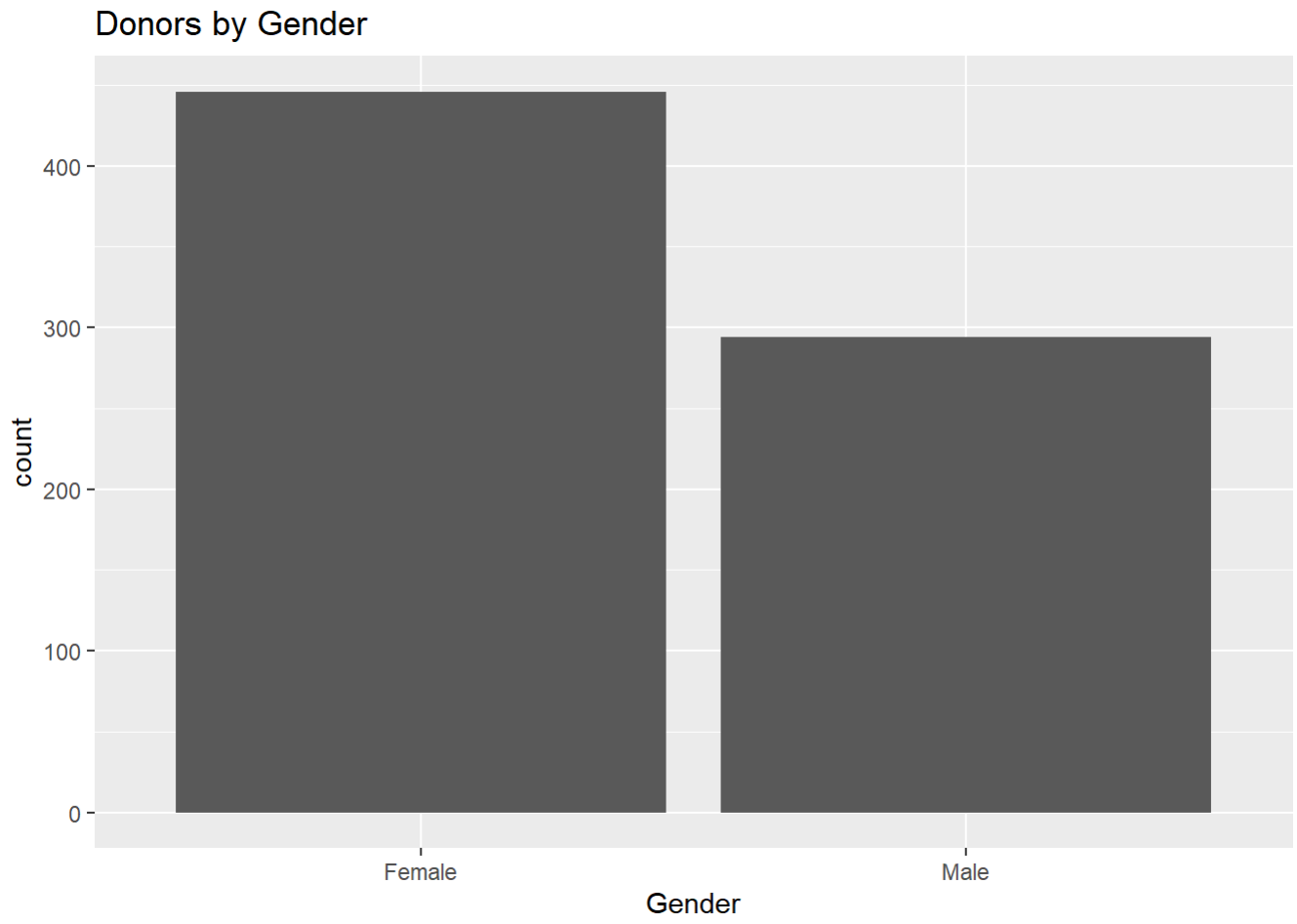


Histograms

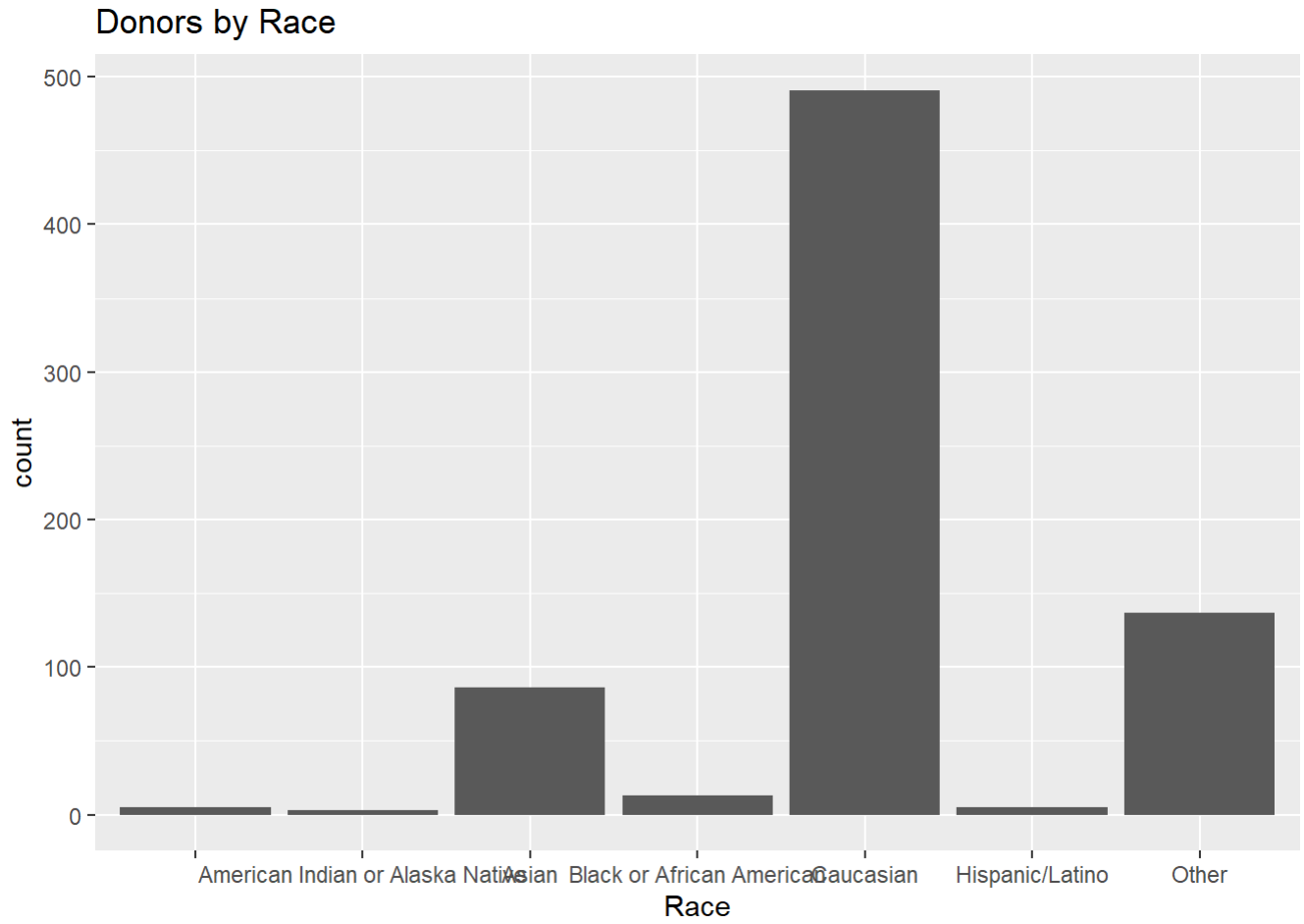
```
ggplot(flu, aes(x=subset)) + geom_bar()+ ggtitle("Count of Various Test Types") +
  xlab("Test Types")
```



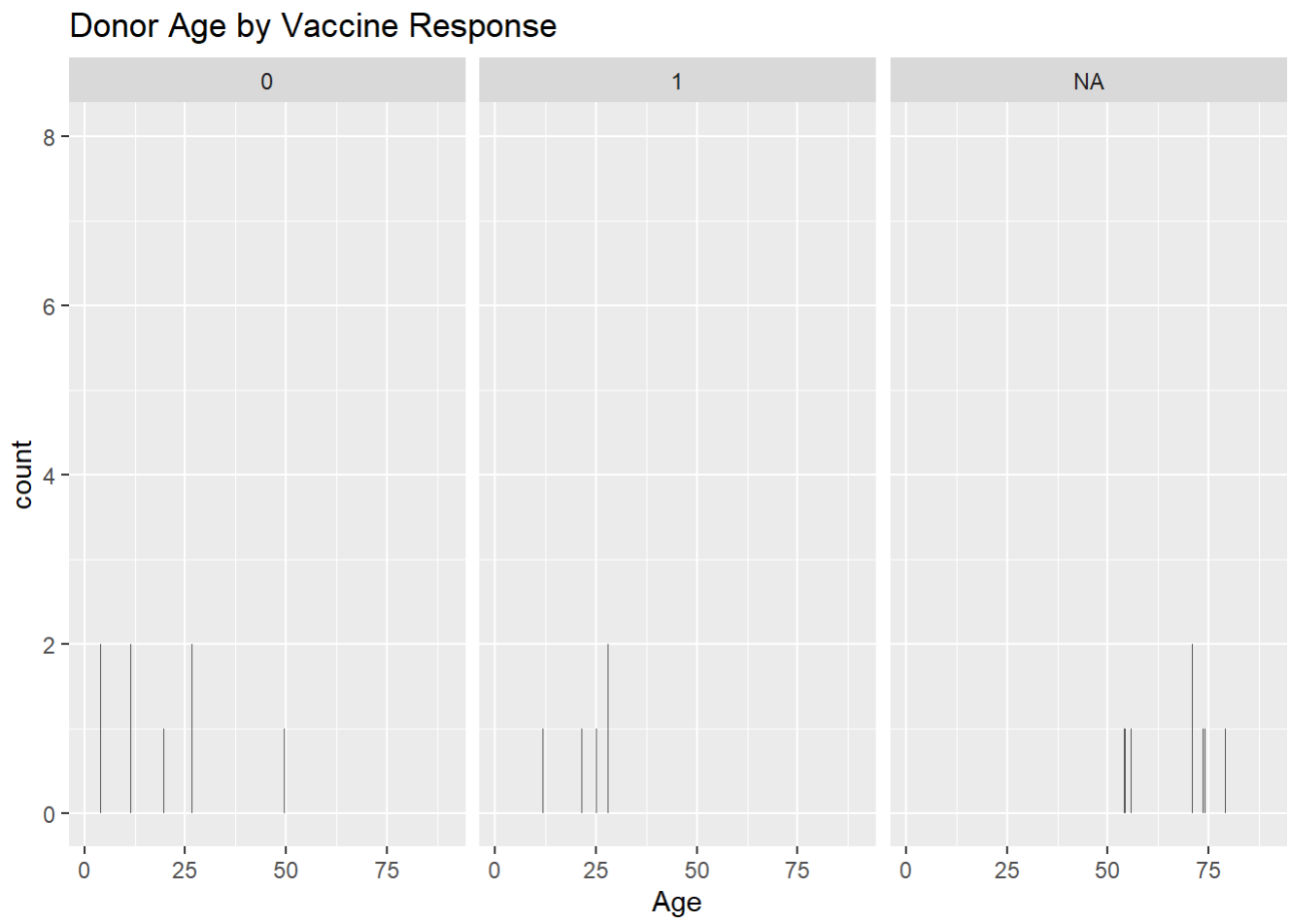

```
ggplot(result, aes(x=Gender)) + geom_bar()+ ggtitle("Donors by Gender") +
  xlab("Gender")
```



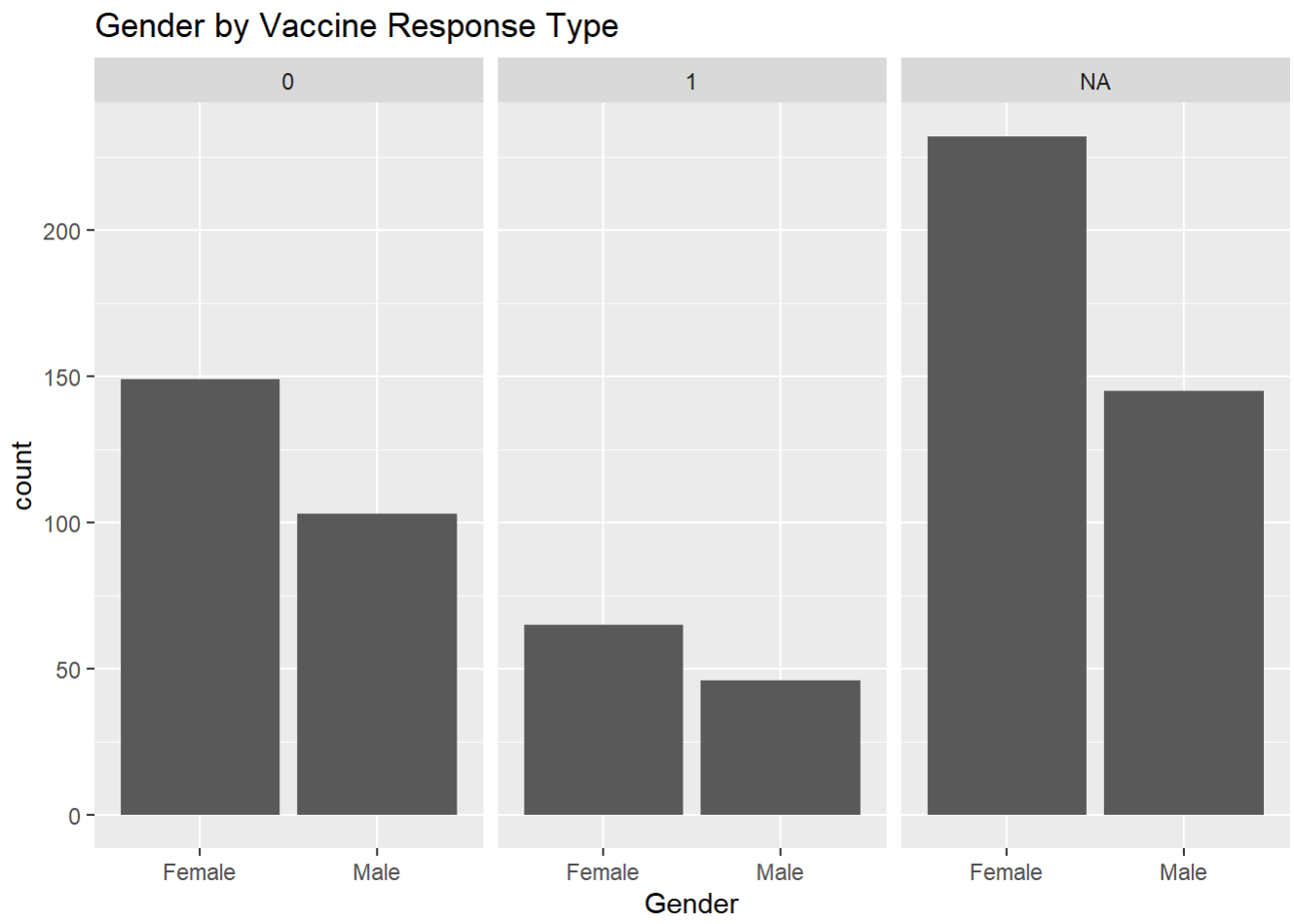

```
ggplot(result, aes(x=Race)) + geom_bar()+ ggtitle("Donors by Race") +
  xlab("Race")
```



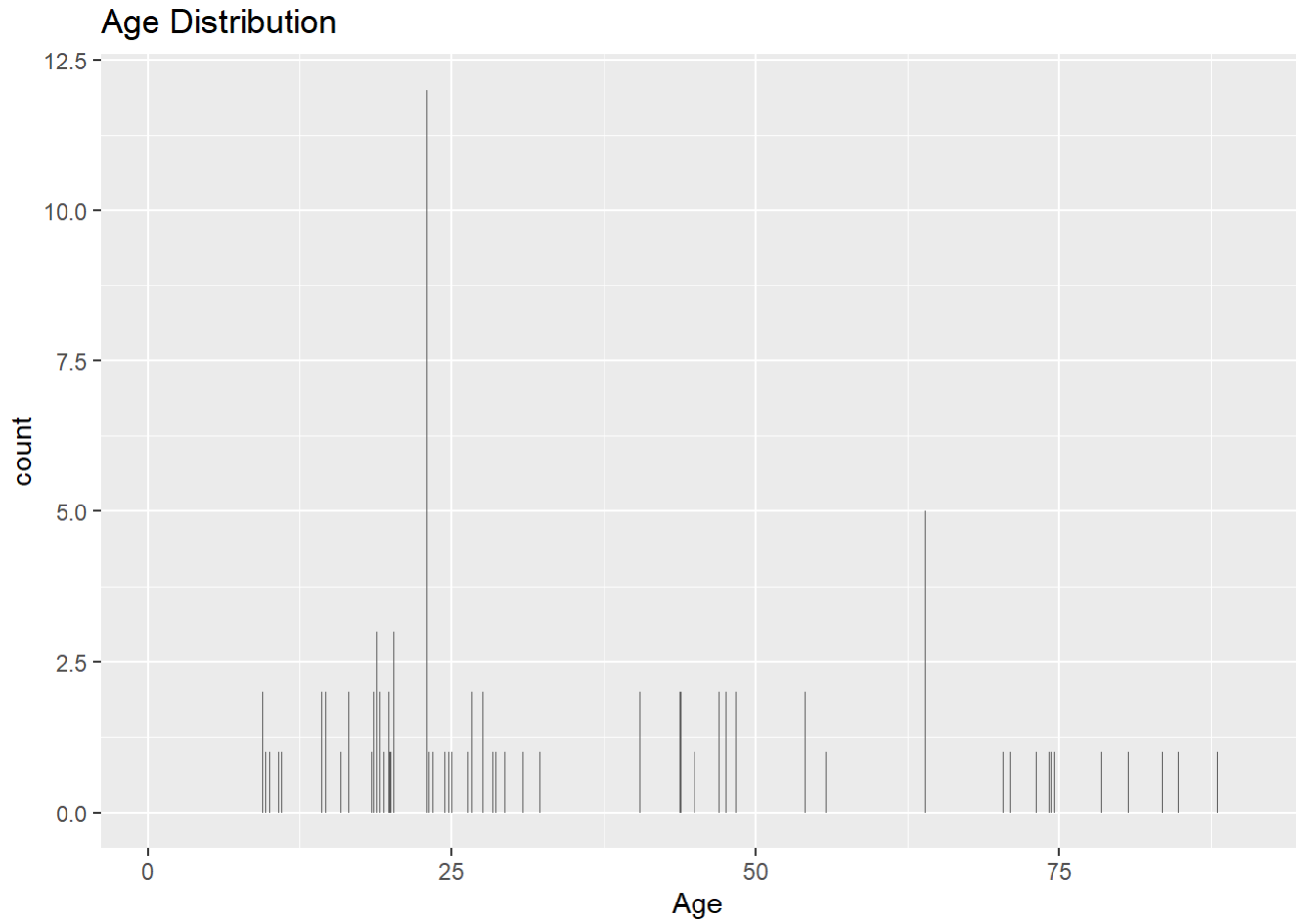

```
ggplot(result, aes(x=visit_age)) + geom_bar()+facet_wrap(~Vaccine_Response) + ggtitle("Donor Age by Vaccine Response") +
  xlab("Age")
```




```
ggplot(result, aes(x=Gender)) + geom_bar()+facet_wrap(~Vaccine_Response)+ ggtitle("Gender by Vac
cine Response Type") +
  xlab("Gender")
```

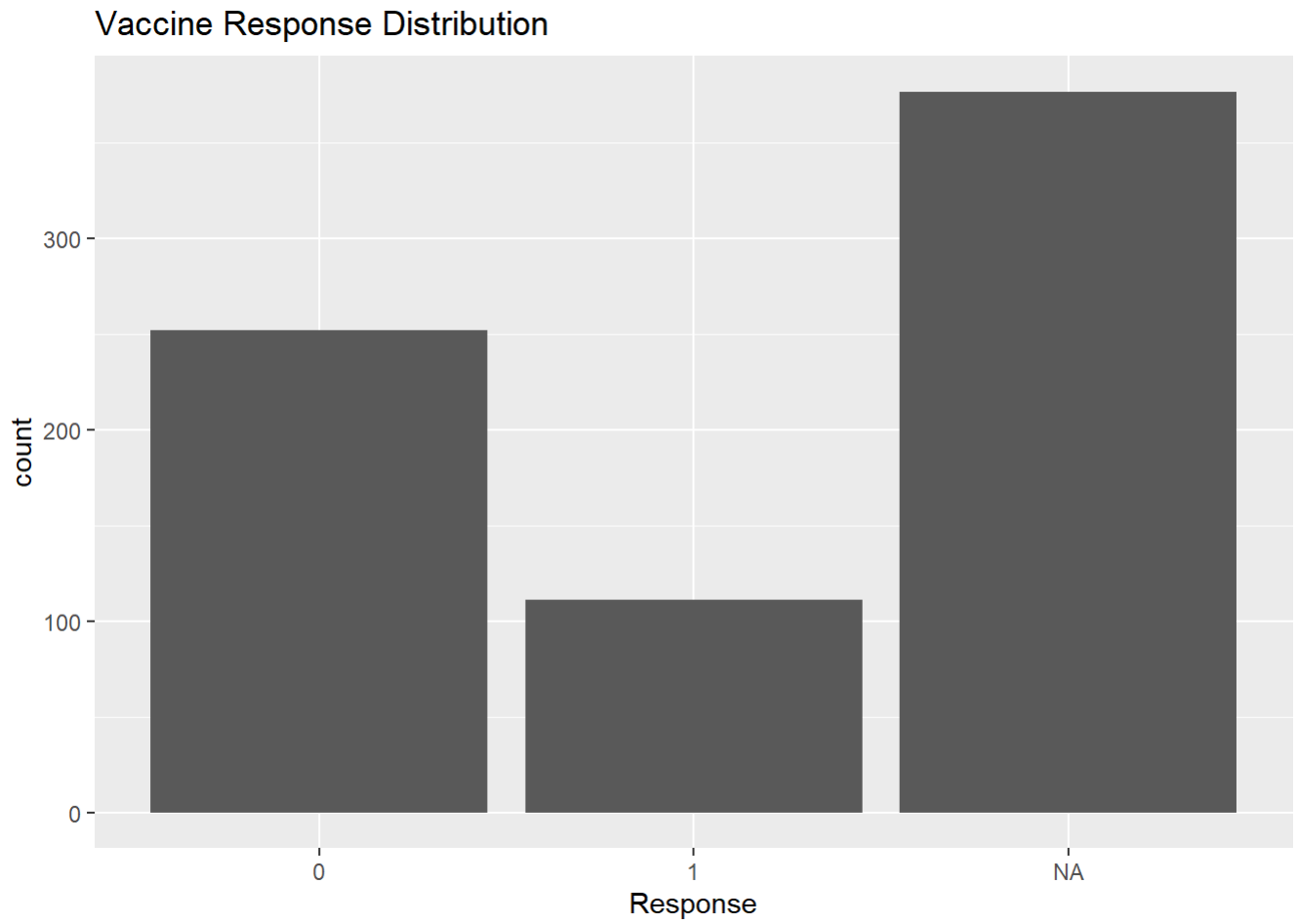



```
ggplot(result, aes(x=visit_age)) + geom_bar() + ggtitle("Age Distribution") +
  xlab("Age")
```



Histograms

```
ggplot(result, aes(x=Vaccine_Response)) + geom_bar() + ggtitle("Vaccine Response Distribution")
 +
  xlab("Response")
```



Create regression model for influenze infection based on vaccine type

```
model1 <- glm(Influenza_Infection~Vaccine+Gender+visit_age+Race, data = result, family = "binomi
al")
```

Output model results

```
summary(model1)
```

```
##
## Call:
## glm(formula = Influenza_Infection ~ Vaccine + Gender + visit_age +
##     Race, family = "binomial", data = result)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -0.6409  -0.4781  -0.4585  -0.4360   2.4153
##
## Coefficients:
##                                     Estimate Std. Error z value Pr(>|z|)
## (Intercept)                        -1.660e+01  1.697e+03  -0.010    0.992
## Vaccine2                            1.843e-01  8.296e-01   0.222    0.824
## Vaccine3                           -1.441e+01  1.385e+03  -0.010    0.992
## Vaccine4                           -1.845e-02  3.989e-01  -0.046    0.963
## Vaccine5                           -1.437e+01  1.385e+03  -0.010    0.992
## Vaccine6                            5.951e-01  5.898e-01   1.009    0.313
## GenderMale                         -1.341e-01  2.762e-01  -0.486    0.627
## visit_age                           1.118e-03  6.789e-03   0.165    0.869
## RaceAmerican Indian or Alaska Native -1.902e-01  2.185e+03   0.000    1.000
## RaceAsian                           1.386e+01  1.697e+03   0.008    0.993
## RaceBlack or African American       1.439e+01  1.697e+03   0.008    0.993
## RaceCaucasian                       1.442e+01  1.697e+03   0.009    0.993
## RaceHispanic/Latino                -9.349e-03  2.189e+03   0.000    1.000
## RaceOther                           1.449e+01  1.697e+03   0.009    0.993
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 407.27  on 618  degrees of freedom
## Residual deviance: 399.57  on 605  degrees of freedom
##   (121 observations deleted due to missingness)
## AIC: 427.57
##
## Number of Fisher Scoring iterations: 15
```

Create regression model for vaccine response based on vaccine type

```
model2 <- glm(Vaccine_Response~Vaccine+Gender+visit_age+Race, data = result, family = "binomial"
)
```

Output model results

```
summary(model2)
```

```
##
## Call:
## glm(formula = Vaccine_Response ~ Vaccine + Gender + visit_age +
##     Race, family = "binomial", data = result)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.3538  -0.9118  -0.7107   1.2705   2.1781
##
## Coefficients:
##                               Estimate Std. Error z value Pr(>|z|)
## (Intercept)                  -17.06254 1455.39768  -0.012   0.9906
## Vaccine2                       1.11051    0.55320   2.007   0.0447 *
## Vaccine4                       0.65104    0.30951   2.103   0.0354 *
## GenderMale                    -0.07348    0.26914  -0.273   0.7848
## visit_age                      0.03335    0.02324   1.435   0.1513
## RaceAsian                     14.50095 1455.39759   0.010   0.9921
## RaceBlack or African American 14.71753 1455.39801   0.010   0.9919
## RaceCaucasian                 14.98843 1455.39756   0.010   0.9918
## RaceHispanic/Latino           31.40365 1664.83303   0.019   0.9850
## RaceOther                     15.55404 1455.39757   0.011   0.9915
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 369.19  on 292  degrees of freedom
## Residual deviance: 345.38  on 283  degrees of freedom
##   (447 observations deleted due to missingness)
## AIC: 365.38
##
## Number of Fisher Scoring iterations: 14
```

Create regression model for influenze infection based on donor factors

```
model12 <- glm(Influenza_Infection~Gender+visit_age+Race + bmi + statin_use, data = result, fami
ly = "binomial")
```

Output model results

```
summary(model12)
```

```
##
## Call:
## glm(formula = Influenza_Infection ~ Gender + visit_age + Race +
##     bmi + statin_use, family = "binomial", data = result)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -0.7678  -0.4840  -0.4194  -0.3313   2.7170
##
## Coefficients:
##                                     Estimate Std. Error z value Pr(>|z|)
## (Intercept)                        -1.725e+01  1.693e+03  -0.010    0.992
## GenderMale                         -3.863e-01  3.656e-01  -1.057    0.291
## visit_age                          -1.486e-02  9.749e-03  -1.524    0.128
## RaceAmerican Indian or Alaska Native  5.472e-01  2.394e+03   0.000    1.000
## RaceAsian                           1.317e+01  1.693e+03   0.008    0.994
## RaceBlack or African American       1.470e+01  1.693e+03   0.009    0.993
## RaceCaucasian                       1.483e+01  1.693e+03   0.009    0.993
## RaceHispanic/Latino                 2.531e-01  2.186e+03   0.000    1.000
## RaceOther                           1.484e+01  1.693e+03   0.009    0.993
## bmi                                 3.510e-02  2.965e-02   1.184    0.236
## statin_use                          3.054e-01  6.488e-01   0.471    0.638
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 256.00  on 424  degrees of freedom
## Residual deviance: 246.89  on 414  degrees of freedom
##   (315 observations deleted due to missingness)
## AIC: 268.89
##
## Number of Fisher Scoring iterations: 15
```

Create regression model for vaccine response based on donor factors

```
model13 <- glm(Vaccine_Response~Gender+visit_age+Race + bmi + statin_use, data = result, family
= "binomial")
```

Output model results

```
summary(model13)
```

```
##
## Call:
## glm(formula = Vaccine_Response ~ Gender + visit_age + Race +
##     bmi + statin_use, family = "binomial", data = result)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.4918  -0.8577  -0.7401   1.2363   1.9507
##
## Coefficients: (1 not defined because of singularities)
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -19.03908 2399.54496  -0.008    0.994
## GenderMale                      0.05579    0.30182   0.185    0.853
## visit_age                       0.03408    0.02843   1.199    0.231
## RaceAsian                      16.18334 2399.54478   0.007    0.995
## RaceBlack or African American   -0.03774 2769.09463   0.000    1.000
## RaceCaucasian                  16.22066 2399.54475   0.007    0.995
## RaceHispanic/Latino            33.71846 2766.12814   0.012    0.990
## RaceOther                      16.87326 2399.54476   0.007    0.994
## bmi                             0.04670    0.03022   1.545    0.122
## statin_use                           NA         NA      NA       NA
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 293.46  on 231  degrees of freedom
## Residual deviance: 271.80  on 223  degrees of freedom
##   (508 observations deleted due to missingness)
## AIC: 289.8
##
## Number of Fisher Scoring iterations: 15
```

Regression model showing correlation between data values and vaccine response is significant

```
#Too big to run
model3 <- glm(vaccine_response~ data +gender+visit_age+race, data = flu, family = "binomial")
```

Output model results

```
summary(model3)
```

```
##
## Call:
## glm(formula = vaccine_response ~ data + gender + visit_age +
##     race, family = "binomial", data = flu)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.9610  -1.0190  -0.7537   1.1855   3.0467
##
## Coefficients:
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   1.155e+01  2.960e+01   0.390    0.696
## data                         -2.801e-04  1.556e-05 -17.998   <2e-16 ***
## genderMale                    1.325e-01  1.135e-02  11.679   <2e-16 ***
## visit_age                     5.605e-02  5.477e-04 102.342   <2e-16 ***
## raceAsian                    -1.298e+01  2.960e+01  -0.438    0.661
## raceBlack or African American -1.288e+01  2.960e+01  -0.435    0.663
## raceCaucasian                -1.250e+01  2.960e+01  -0.422    0.673
## raceHispanic/Latino          -1.102e+01  2.960e+01  -0.372    0.710
## raceNULL                     -1.447e+01  2.960e+01  -0.489    0.625
## raceOther                    -1.278e+01  2.960e+01  -0.432    0.666
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 216418  on 156117  degrees of freedom
## Residual deviance: 190792  on 156108  degrees of freedom
## AIC: 190812
##
## Number of Fisher Scoring iterations: 12
```

Names of tests with most frequent count of high vaccine response

```
fluyes <- subset(flu, flu$vaccine_response == 1)
#head(fluyes)
rank <- sort(table(fluyes$name), decreasing = T)
head(rank)
```

```
##
## CD8+ T cells CD4+ T cells      T cells      B cells     NK cells    L50_CD40L
##           96           94           94           90           90           88
```

Create subset of data based on CD8+ T cells

```
tcell8 <- subset(flu, name == 'CD8+ T cells')
head(tcell8)
```

donor_id	study_id	gen…	race	visit_id	visit_year	visit_day	visit_type_hai	vi
<int>	<int>	<fctr>	<fctr>	<int>	<int>	<int>	<fctr>	

	donor_id	study_id	gen…	race	visit_id	visit_year	visit_day	visit_type_hai	vi
	<int>	<int>	<fctr>	<fctr>	<int>	<int>	<int>	<fctr>	
22	813	15	Female	Caucasian	2937	2014	0	pre	
162	812	15	Male	Caucasian	2936	2014	0	pre	
302	811	15	Male	Caucasian	2935	2014	0	pre	
441	810	15	Male	Caucasian	2934	2014	0	pre	
582	809	15	Female	Asian	2933	2014	0	pre	
722	808	15	Female	Other	2932	2014	0	pre	

6 rows | 1-10 of 45 columns

```
str(tcell8)
```

```
## 'data.frame':    464 obs. of  44 variables:
##  $ donor_id                  : int  813 812 811 810 809 808 807 806 805 804 ...
##  $ study_id                  : int  15 15 15 15 15 15 15 15 15 15 ...
##  $ gender                    : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ race                      : Factor w/ 7 levels "American Indian or Alaska Native",..: 4 4
4 4 2 7 4 7 4 4 ...
##  $ visit_id                  : int  2937 2936 2935 2934 2933 2932 2931 2930 2929 2927 ...
##  $ visit_year                : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ visit_day                 : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ visit_type_hai            : Factor w/ 2 levels "pre","single": 1 1 1 1 1 1 1 1 1 1 ...
##  $ visit_age                 : num  23 28 23 27 27 29 24 27 23 26 ...
##  $ cmv_status                : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 1 2 2 2 2 ...
##  $ ebv_status                : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 2 1 2 2 2 ...
##  $ bmi                       : Factor w/ 401 levels "13.12","13.59",..: 401 401 401 401 401
401 401 401 401 401 ...
##  $ vaccine                   : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ geo_mean                  : num  380.6 47.6 95.1 190.3 56.6 ...
##  $ d_geo_mean                : Factor w/ 40 levels "0","1","10","101",..: 2 2 2 23 16 2 16 1
6 34 9 ...
##  $ vaccine_response          : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ mesurment_id              : int  371142 371002 370862 370721 370582 370442 370302 370162
370022 369882 ...
##  $ assay                     : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ name                      : Factor w/ 3283 levels "B cells","BASO %",..: 44 44 44 44 44 4
4 44 44 44 44 ...
##  $ name_formatted            : Factor w/ 3283 levels "B_cells","BASO_",..: 44 44 44 44 44 44
44 44 44 44 ...
##  $ subset                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 85 85 85 8
5 85 85 85 85 85 85 ...
##  $ units                     : Factor w/ 8 levels "% of Parent",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ data                      : num  21.3 18.6 26.8 39.7 23.1 16.5 18.9 51.8 35.7 30 ...
##  $ statin_use                : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ flu_vaccination_history   : Factor w/ 3 levels "0","1","NULL": 2 2 2 2 2 2 2 2 2 2 ...
##  $ total_vaccines_received   : Factor w/ 25 levels "0","1","10","11",..: 4 8 6 2 20 24 14 11
8 20 ...
##  $ vaccinated_1yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_1yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_2yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 2 1 3
...
##  $ vaccine_type_2yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 1 3 2 2
...
##  $ vaccinated_3yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_3yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 1 1 2 2
...
##  $ vaccinated_4yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_4yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 3 1 2 2
...
##  $ vaccinated_5yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 1 2 3
```

```
...
##  $ vaccine_type_5yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 3 2 1 2
...
##  $ influenza_infection_history: int  0 0 0 0 0 1 0 0 0 0 ...
##  $ influenza_hospitalization  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ Gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ Vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ Vaccine_Response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ Influenza_Infection        : Factor w/ 2 levels "0","1": 1 1 1 1 1 2 1 1 1 1 ...
##  $ Influenza_Hospitalization  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
##  $ subtest                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 85 85 85 8
5 85 85 85 85 85 85 ...
```

Create regression model for vaccine response based on Test CD8+ T cells

```
model5 <- glm(vaccine_response~ data +gender+visit_age+race, data = tcell8, family = "binomial")
```

Output model results

```
summary(model5)
```

```
##
## Call:
## glm(formula = vaccine_response ~ data + gender + visit_age +
##     race, family = "binomial", data = tcell8)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.4059  -0.8508  -0.6871   1.2752   1.9617
##
## Coefficients:
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                    16.78574 1455.39762   0.012 0.990798
## data                           -0.05305    0.01418  -3.742 0.000183 ***
## genderMale                     -0.04434    0.21838  -0.203 0.839117
## visit_age                       0.01039    0.01360   0.764 0.444768
## raceAsian                     -15.68529 1455.39757  -0.011 0.991401
## raceBlack or African American -31.33409 1674.45202  -0.019 0.985070
## raceCaucasian                 -16.47059 1455.39755  -0.011 0.990971
## raceHispanic/Latino             0.15736 1669.24508   0.000 0.999925
## raceNULL                      -30.32341 2058.24295  -0.015 0.988245
## raceOther                     -15.93886 1455.39756  -0.011 0.991262
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 561.35  on 463  degrees of freedom
## Residual deviance: 523.76  on 454  degrees of freedom
## AIC: 543.76
##
## Number of Fisher Scoring iterations: 14
```

Create subset of data based on CD4+ T cells

```
tcell4 <- subset(flu, name == 'CD4+ T cells')
head(tcell4)
```

	donor_id <int>	study_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_type_hai <fctr>	vi
16	813	15	Female	Caucasian	2937	2014	0	pre	
156	812	15	Male	Caucasian	2936	2014	0	pre	
296	811	15	Male	Caucasian	2935	2014	0	pre	
435	810	15	Male	Caucasian	2934	2014	0	pre	
576	809	15	Female	Asian	2933	2014	0	pre	
716	808	15	Female	Other	2932	2014	0	pre	

6 rows | 1-10 of 45 columns

```
str(tcell4)
```

```
## 'data.frame':    438 obs. of  44 variables:
##  $ donor_id                  : int  813 812 811 810 809 808 807 806 805 804 ...
##  $ study_id                  : int  15 15 15 15 15 15 15 15 15 15 ...
##  $ gender                    : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ race                      : Factor w/ 7 levels "American Indian or Alaska Native",..: 4 4
4 4 2 7 4 7 4 4 ...
##  $ visit_id                  : int  2937 2936 2935 2934 2933 2932 2931 2930 2929 2927 ...
##  $ visit_year                : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ visit_day                 : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ visit_type_hai            : Factor w/ 2 levels "pre","single": 1 1 1 1 1 1 1 1 1 1 ...
##  $ visit_age                 : num  23 28 23 27 27 29 24 27 23 26 ...
##  $ cmv_status                : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 1 2 2 2 2 ...
##  $ ebv_status                : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 2 1 2 2 2 ...
##  $ bmi                       : Factor w/ 401 levels "13.12","13.59",..: 401 401 401 401 401
401 401 401 401 401 ...
##  $ vaccine                   : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ geo_mean                  : num  380.6 47.6 95.1 190.3 56.6 ...
##  $ d_geo_mean                : Factor w/ 40 levels "0","1","10","101",..: 2 2 2 23 16 2 16 1
6 34 9 ...
##  $ vaccine_response          : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ mesurment_id              : int  371136 370996 370856 370715 370576 370436 370296 370156
370016 369876 ...
##  $ assay                     : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ name                      : Factor w/ 3283 levels "B cells","BASO %",..: 36 36 36 36 36 3
6 36 36 36 36 ...
##  $ name_formatted            : Factor w/ 3283 levels "B_cells","BASO_",..: 38 38 38 38 38 38
38 38 38 38 ...
##  $ subset                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 57 57 57 5
7 57 57 57 57 57 57 ...
##  $ units                     : Factor w/ 8 levels "% of Parent",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ data                      : num  70 70.7 63.1 45.4 49.1 71.3 50.8 42.6 53.8 48.4 ...
##  $ statin_use                : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ flu_vaccination_history   : Factor w/ 3 levels "0","1","NULL": 2 2 2 2 2 2 2 2 2 2 ...
##  $ total_vaccines_received   : Factor w/ 25 levels "0","1","10","11",..: 4 8 6 2 20 24 14 11
8 20 ...
##  $ vaccinated_1yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_1yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_2yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 2 1 3
...
##  $ vaccine_type_2yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 1 3 2 2
...
##  $ vaccinated_3yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_3yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 1 1 2 2
...
##  $ vaccinated_4yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_4yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 3 1 2 2
...
##  $ vaccinated_5yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 1 2 3
```

```
...
##  $ vaccine_type_5yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 3 2 1 2
...
##  $ influenza_infection_history: int  0 0 0 0 0 1 0 0 0 0 ...
##  $ influenza_hospitalization  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ Gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ Vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ Vaccine_Response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ Influenza_Infection        : Factor w/ 2 levels "0","1": 1 1 1 1 1 2 1 1 1 1 ...
##  $ Influenza_Hospitalization  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
##  $ subtest                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 57 57 57 5
7 57 57 57 57 57 57 ...
```

Create regression model for vaccine response based on Test CD4+ T cells

```
model6 <- glm(vaccine_response~ data +gender+visit_age+race, data = tcell4, family = "binomial")
```

Output model results

```
summary(model6)
```

```
##
## Call:
## glm(formula = vaccine_response ~ data + gender + visit_age +
##     race, family = "binomial", data = tcell4)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.2665  -0.8617  -0.7370   1.3151   1.8344
##
## Coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                    1.371e+01  1.455e+03   0.009   0.9925
## data                           3.192e-02  1.323e-02   2.413   0.0158 *
## genderMale                    -2.877e-02  2.208e-01  -0.130   0.8963
## visit_age                      8.833e-03  1.340e-02   0.659   0.5098
## raceAsian                     -1.592e+01  1.455e+03  -0.011   0.9913
## raceBlack or African American -3.161e+01  1.678e+03  -0.019   0.9850
## raceCaucasian                 -1.677e+01  1.455e+03  -0.012   0.9908
## raceHispanic/Latino           -2.441e-01  1.675e+03   0.000   0.9999
## raceNULL                      -3.092e+01  2.058e+03  -0.015   0.9880
## raceOther                     -1.626e+01  1.455e+03  -0.011   0.9911
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 539.45  on 437  degrees of freedom
## Residual deviance: 512.76  on 428  degrees of freedom
## AIC: 532.76
##
## Number of Fisher Scoring iterations: 14
```

Create subset of data based on Tcells

```
tcell <- subset(flu, name == 'T cells')
head(tcell)
```

	donor_id <int>	study_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_type_hai <fctr>	vi
60	813	15	Female	Caucasian	2937	2014	0	pre	
200	812	15	Male	Caucasian	2936	2014	0	pre	
339	811	15	Male	Caucasian	2935	2014	0	pre	
478	810	15	Male	Caucasian	2934	2014	0	pre	
620	809	15	Female	Asian	2933	2014	0	pre	
760	808	15	Female	Other	2932	2014	0	pre	

6 rows | 1-10 of 45 columns

```
str(tcell)
```

```
## 'data.frame':    438 obs. of  44 variables:
##  $ donor_id                   : int  813 812 811 810 809 808 807 806 805 804 ...
##  $ study_id                   : int  15 15 15 15 15 15 15 15 15 15 ...
##  $ gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ race                       : Factor w/ 7 levels "American Indian or Alaska Native",..: 4 4
4 4 2 7 4 7 4 4 ...
##  $ visit_id                   : int  2937 2936 2935 2934 2933 2932 2931 2930 2929 2927 ...
##  $ visit_year                 : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ visit_day                  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ visit_type_hai             : Factor w/ 2 levels "pre","single": 1 1 1 1 1 1 1 1 1 1 ...
##  $ visit_age                  : num  23 28 23 27 27 29 24 27 23 26 ...
##  $ cmv_status                 : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 1 2 2 2 2 ...
##  $ ebv_status                 : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 2 1 2 2 2 ...
##  $ bmi                        : Factor w/ 401 levels "13.12","13.59",..: 401 401 401 401 401
401 401 401 401 401 ...
##  $ vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ geo_mean                   : num  380.6 47.6 95.1 190.3 56.6 ...
##  $ d_geo_mean                 : Factor w/ 40 levels "0","1","10","101",..: 2 2 2 23 16 2 16 1
6 34 9 ...
##  $ vaccine_response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ mesurment_id               : int  371180 371040 370899 370758 370620 370480 370340 370199
370060 369920 ...
##  $ assay                      : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ name                       : Factor w/ 3283 levels "B cells","BASO %",..: 2885 2885 2885 2
885 2885 2885 2885 2885 2885 2885 ...
##  $ name_formatted             : Factor w/ 3283 levels "B_cells","BASO_",..: 2885 2885 2885 28
85 2885 2885 2885 2885 2885 2885 ...
##  $ subset                     : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 46 46 46 4
6 46 46 46 46 46 46 ...
##  $ units                      : Factor w/ 8 levels "% of Parent",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ data                       : num  56.3 51.8 53.2 56.2 59.8 52.7 69.9 67 71.9 43.1 ...
##  $ statin_use                 : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ flu_vaccination_history    : Factor w/ 3 levels "0","1","NULL": 2 2 2 2 2 2 2 2 2 2 ...
##  $ total_vaccines_received    : Factor w/ 25 levels "0","1","10","11",..: 4 8 6 2 20 24 14 11
8 20 ...
##  $ vaccinated_1yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_1yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_2yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 2 1 3
...
##  $ vaccine_type_2yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 1 3 2 2
...
##  $ vaccinated_3yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_3yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 1 1 2 2
...
##  $ vaccinated_4yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_4yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 3 1 2 2
...
##  $ vaccinated_5yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 1 2 3
```

```
...
##  $ vaccine_type_5yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 3 2 1 2
...
##  $ influenza_infection_history: int  0 0 0 0 0 1 0 0 0 0 ...
##  $ influenza_hospitalization  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ Gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ Vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ Vaccine_Response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ Influenza_Infection        : Factor w/ 2 levels "0","1": 1 1 1 1 1 2 1 1 1 1 ...
##  $ Influenza_Hospitalization  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
##  $ subtest                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 46 46 46 4
6 46 46 46 46 46 46 ...
```

Create regression model for vaccine response based on Test Tcells

```
model7 <- glm(vaccine_response~ data +gender+visit_age+race, data = tcell, family = "binomial")
```

Output model results

```
summary(model7)
```

```
##
## Call:
## glm(formula = vaccine_response ~ data + gender + visit_age +
##     race, family = "binomial", data = tcell)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.1656  -0.8618  -0.7429   1.3000   2.0072
##
## Coefficients:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                    1.430e+01  1.455e+03   0.010    0.992
## data                           1.974e-02  9.416e-03   2.097    0.036 *
## genderMale                    -5.265e-02  2.195e-01  -0.240    0.810
## visit_age                      1.125e-02  1.354e-02   0.831    0.406
## raceAsian                     -1.618e+01  1.455e+03  -0.011    0.991
## raceBlack or African American -3.140e+01  1.680e+03  -0.019    0.985
## raceCaucasian                 -1.692e+01  1.455e+03  -0.012    0.991
## raceHispanic/Latino           -2.979e-01  1.680e+03   0.000    1.000
## raceNULL                      -3.147e+01  2.058e+03  -0.015    0.988
## raceOther                     -1.642e+01  1.455e+03  -0.011    0.991
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 539.45  on 437  degrees of freedom
## Residual deviance: 514.19  on 428  degrees of freedom
## AIC: 534.19
##
## Number of Fisher Scoring iterations: 14
```

Create subset of data based on B Cells

```
bcells <- subset(flu, name == 'B cells')
head(bcells)
```

	donor_id <int>	study_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_type_hai <fctr>	vi
1	813	15	Female	Caucasian	2937	2014	0	pre	
141	812	15	Male	Caucasian	2936	2014	0	pre	
281	811	15	Male	Caucasian	2935	2014	0	pre	
421	810	15	Male	Caucasian	2934	2014	0	pre	
561	809	15	Female	Asian	2933	2014	0	pre	
701	808	15	Female	Other	2932	2014	0	pre	

6 rows | 1-10 of 45 columns

```
str(bcells)
```

```
## 'data.frame':    386 obs. of  44 variables:
##  $ donor_id                  : int  813 812 811 810 809 808 807 806 805 804 ...
##  $ study_id                  : int  15 15 15 15 15 15 15 15 15 15 ...
##  $ gender                    : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ race                      : Factor w/ 7 levels "American Indian or Alaska Native",..: 4 4
4 4 2 7 4 7 4 4 ...
##  $ visit_id                  : int  2937 2936 2935 2934 2933 2932 2931 2930 2929 2927 ...
##  $ visit_year                : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ visit_day                 : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ visit_type_hai            : Factor w/ 2 levels "pre","single": 1 1 1 1 1 1 1 1 1 1 ...
##  $ visit_age                 : num  23 28 23 27 27 29 24 27 23 26 ...
##  $ cmv_status                : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 1 2 2 2 2 ...
##  $ ebv_status                : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 2 1 2 2 2 ...
##  $ bmi                       : Factor w/ 401 levels "13.12","13.59",..: 401 401 401 401 401
401 401 401 401 401 ...
##  $ vaccine                   : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ geo_mean                  : num  380.6 47.6 95.1 190.3 56.6 ...
##  $ d_geo_mean                : Factor w/ 40 levels "0","1","10","101",..: 2 2 2 23 16 2 16 1
6 34 9 ...
##  $ vaccine_response          : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ mesurment_id              : int  371121 370981 370841 370701 370561 370421 370281 370141
370001 369861 ...
##  $ assay                     : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ name                      : Factor w/ 3283 levels "B cells","BASO %",..: 1 1 1 1 1 1 1 1
1 1 ...
##  $ name_formatted            : Factor w/ 3283 levels "B_cells","BASO_",..: 1 1 1 1 1 1 1 1 1
1 ...
##  $ subset                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 36 36 36 3
6 36 36 36 36 36 36 ...
##  $ units                     : Factor w/ 8 levels "% of Parent",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ data                      : num  34.4 41 34.6 34.8 40.8 72.5 44.8 48.1 61.6 45.7 ...
##  $ statin_use                : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ flu_vaccination_history   : Factor w/ 3 levels "0","1","NULL": 2 2 2 2 2 2 2 2 2 2 ...
##  $ total_vaccines_received   : Factor w/ 25 levels "0","1","10","11",..: 4 8 6 2 20 24 14 11
8 20 ...
##  $ vaccinated_1yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_1yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_2yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 2 1 3
...
##  $ vaccine_type_2yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 1 3 2 2
...
##  $ vaccinated_3yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_3yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 1 1 2 2
...
##  $ vaccinated_4yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_4yr_prior    : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 3 1 2 2
...
##  $ vaccinated_5yr_prior      : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 1 2 3
```

```
...
##  $ vaccine_type_5yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 3 2 1 2
...
##  $ influenza_infection_history: int  0 0 0 0 0 1 0 0 0 0 ...
##  $ influenza_hospitalization  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ Gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ Vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ Vaccine_Response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ Influenza_Infection        : Factor w/ 2 levels "0","1": 1 1 1 1 1 2 1 1 1 1 ...
##  $ Influenza_Hospitalization  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
##  $ subtest                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 36 36 36 3
6 36 36 36 36 36 36 ...
```

Create regression model for vaccine response based on Test Bcells

```
model8 <- glm(vaccine_response~ data +gender+visit_age+race, data = bcells, family = "binomial")
```

Output model results

```
summary(model8)
```

```
##
## Call:
## glm(formula = vaccine_response ~ data + gender + visit_age +
##     race, family = "binomial", data = bcells)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.2420  -0.8981  -0.8004   1.3486   1.7106
##
## Coefficients:
##                                Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   1.549e+01  2.400e+03   0.006    0.995
## data                          1.114e-02  7.752e-03   1.438    0.151
## genderMale                   -3.714e-02  2.270e-01  -0.164    0.870
## visit_age                     1.153e-02  1.365e-02   0.844    0.398
## raceAsian                    -1.666e+01  2.400e+03  -0.007    0.994
## raceBlack or African American -3.289e+01  2.768e+03  -0.012    0.991
## raceCaucasian                -1.714e+01  2.400e+03  -0.007    0.994
## raceHispanic/Latino           2.525e-01  2.771e+03   0.000    1.000
## raceNULL                     -3.294e+01  3.393e+03  -0.010    0.992
## raceOther                    -1.667e+01  2.400e+03  -0.007    0.994
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 493.22  on 385  degrees of freedom
## Residual deviance: 473.61  on 376  degrees of freedom
## AIC: 493.61
##
## Number of Fisher Scoring iterations: 15
```

Create subset of data based on NK cells

```
nkcell <- subset(flu, name == 'NK cells')
head(nkcell)
```

	donor_id <int>	study_id <int>	gen… <fctr>	race <fctr>	visit_id <int>	visit_year <int>	visit_day <int>	visit_type_hai <fctr>	vi
54	813	15	Female	Caucasian	2937	2014	0	pre	
194	812	15	Male	Caucasian	2936	2014	0	pre	
334	811	15	Male	Caucasian	2935	2014	0	pre	
473	810	15	Male	Caucasian	2934	2014	0	pre	
614	809	15	Female	Asian	2933	2014	0	pre	
754	808	15	Female	Other	2932	2014	0	pre	

6 rows | 1-10 of 45 columns

```
str(nkcell)
```

```
## 'data.frame':    386 obs. of  44 variables:
##  $ donor_id                   : int  813 812 811 810 809 808 807 806 805 804 ...
##  $ study_id                   : int  15 15 15 15 15 15 15 15 15 15 ...
##  $ gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ race                       : Factor w/ 7 levels "American Indian or Alaska Native",..: 4 4
4 4 2 7 4 7 4 4 ...
##  $ visit_id                   : int  2937 2936 2935 2934 2933 2932 2931 2930 2929 2927 ...
##  $ visit_year                 : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ visit_day                  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ visit_type_hai             : Factor w/ 2 levels "pre","single": 1 1 1 1 1 1 1 1 1 1 ...
##  $ visit_age                  : num  23 28 23 27 27 29 24 27 23 26 ...
##  $ cmv_status                 : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 1 2 2 2 2 ...
##  $ ebv_status                 : Factor w/ 3 levels "0","1","NULL": 1 2 1 2 2 2 1 2 2 2 ...
##  $ bmi                        : Factor w/ 401 levels "13.12","13.59",..: 401 401 401 401 401
401 401 401 401 401 ...
##  $ vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ geo_mean                   : num  380.6 47.6 95.1 190.3 56.6 ...
##  $ d_geo_mean                 : Factor w/ 40 levels "0","1","10","101",..: 2 2 2 23 16 2 16 1
6 34 9 ...
##  $ vaccine_response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ mesurment_id               : int  371174 371034 370894 370753 370614 370474 370334 370194
370054 369914 ...
##  $ assay                      : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ name                       : Factor w/ 3283 levels "B cells","BASO %",..: 2520 2520 2520 2
520 2520 2520 2520 2520 2520 2520 ...
##  $ name_formatted             : Factor w/ 3283 levels "B_cells","BASO_",..: 2520 2520 2520 25
20 2520 2520 2520 2520 2520 2520 ...
##  $ subset                     : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 31 31 31 3
1 31 31 31 31 31 31 ...
##  $ units                      : Factor w/ 8 levels "% of Parent",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ data                       : num  26.5 20.2 10.6 34.9 5.4 13.7 6.53 39.4 15.7 1.37 ...
##  $ statin_use                 : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 1 1 ...
##  $ flu_vaccination_history    : Factor w/ 3 levels "0","1","NULL": 2 2 2 2 2 2 2 2 2 2 ...
##  $ total_vaccines_received    : Factor w/ 25 levels "0","1","10","11",..: 4 8 6 2 20 24 14 11
8 20 ...
##  $ vaccinated_1yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 2 2 2 2 2 2 2
...
##  $ vaccine_type_1yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 1 1 1 1 1 1 1
...
##  $ vaccinated_2yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 2 1 3
...
##  $ vaccine_type_2yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 1 3 2 2
...
##  $ vaccinated_3yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_3yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 1 1 2 2
...
##  $ vaccinated_4yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 3 1 2 2 2 2 1 3
...
##  $ vaccine_type_4yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 2 2 1 1 3 1 2 2
...
##  $ vaccinated_5yr_prior       : Factor w/ 4 levels "0","1","3","NULL": 2 2 2 1 2 2 2 1 2 3
```

```
...
##  $ vaccine_type_5yr_prior     : Factor w/ 4 levels "2","3","4","NULL": 1 1 1 2 1 1 3 2 1 2
...
##  $ influenza_infection_history: int  0 0 0 0 0 1 0 0 0 0 ...
##  $ influenza_hospitalization  : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ Gender                     : Factor w/ 2 levels "Female","Male": 1 2 2 2 1 1 1 2 1 1 ...
##  $ Vaccine                    : Factor w/ 7 levels "1","2","3","4",..: 4 4 4 4 4 4 4 4 4 4
...
##  $ Vaccine_Response           : Factor w/ 3 levels "0","1","NULL": 1 1 1 1 1 1 1 1 2 3 ...
##  $ Influenza_Infection        : Factor w/ 2 levels "0","1": 1 1 1 1 1 2 1 1 1 1 ...
##  $ Influenza_Hospitalization  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
##  $ subtest                    : Factor w/ 632 levels "Activated T: Lymph/CD3+",..: 31 31 31 3
1 31 31 31 31 31 31 ...
```

Create regression model for vaccine response based on Test NK cells

```
model9 <- glm(vaccine_response~ data +gender+visit_age+race, data = nkcell, family = "binomial")
```

Output model results

```
summary(model9)
```

```
##
## Call:
## glm(formula = vaccine_response ~ data + gender + visit_age +
##     race, family = "binomial", data = nkcell)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.2726  -0.9109  -0.7901   1.3503   1.8293
##
## Coefficients:
##                               Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   16.40939 2399.54475   0.007   0.9945
## data                          -0.02101    0.01036  -2.028   0.0425 *
## genderMale                    -0.01220    0.22811  -0.053   0.9574
## visit_age                      0.01133    0.01370   0.827   0.4080
## raceAsian                    -16.66358 2399.54475  -0.007   0.9945
## raceBlack or African American -32.98700 2764.99387  -0.012   0.9905
## raceCaucasian                -17.21805 2399.54474  -0.007   0.9943
## raceHispanic/Latino            0.21349 2767.31887   0.000   0.9999
## raceNULL                     -33.05937 3393.46870  -0.010   0.9922
## raceOther                    -16.66640 2399.54475  -0.007   0.9945
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 493.22  on 385  degrees of freedom
## Residual deviance: 471.46  on 376  degrees of freedom
## AIC: 491.46
##
## Number of Fisher Scoring iterations: 15
```