# Analyze Complete Cases Models

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*2018-04-19*

```r
library(readr)
library(here)
```

```
## here() starts at /Users/marskar/gdrive/nhanes
```

```r
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(ggplot2)
library(purrr)

#define function needed to calculate median model stats
get_median <- function(x, model_type, model_stat){
    model_type <- deparse(substitute(model_type))
    model_stat <- enquo(model_stat)
    x %>%
        select(type, !!model_stat) %>%
        group_by(type) %>%
        summarise(model_median =
                    median(!!model_stat)) %>%
        filter(type == model_type) %>%
        select(model_median) %>%
        as.numeric
}

#read in dataset created by script 4
dat_quad <- read_rds(here("dat/6-model-diff-sizes.rds")) %>%
    rename(con = concordance) %>%
    mutate(quad =
           as.factor(
               case_when(con > median(con) &
                         aic <= median(aic) ~ 1,
                         con > median(con) &
                         aic > median(aic) ~ 2,
                         con <= median(con) &
                         aic <= median(aic) ~ 3,
                         con <= median(con) &
                         aic > median(aic) ~ 4
                        )
```

```r
                    )
          )

table(dat_quad$quad)
```

```
##
##   1   2   3   4
## 111 349 369 131
```

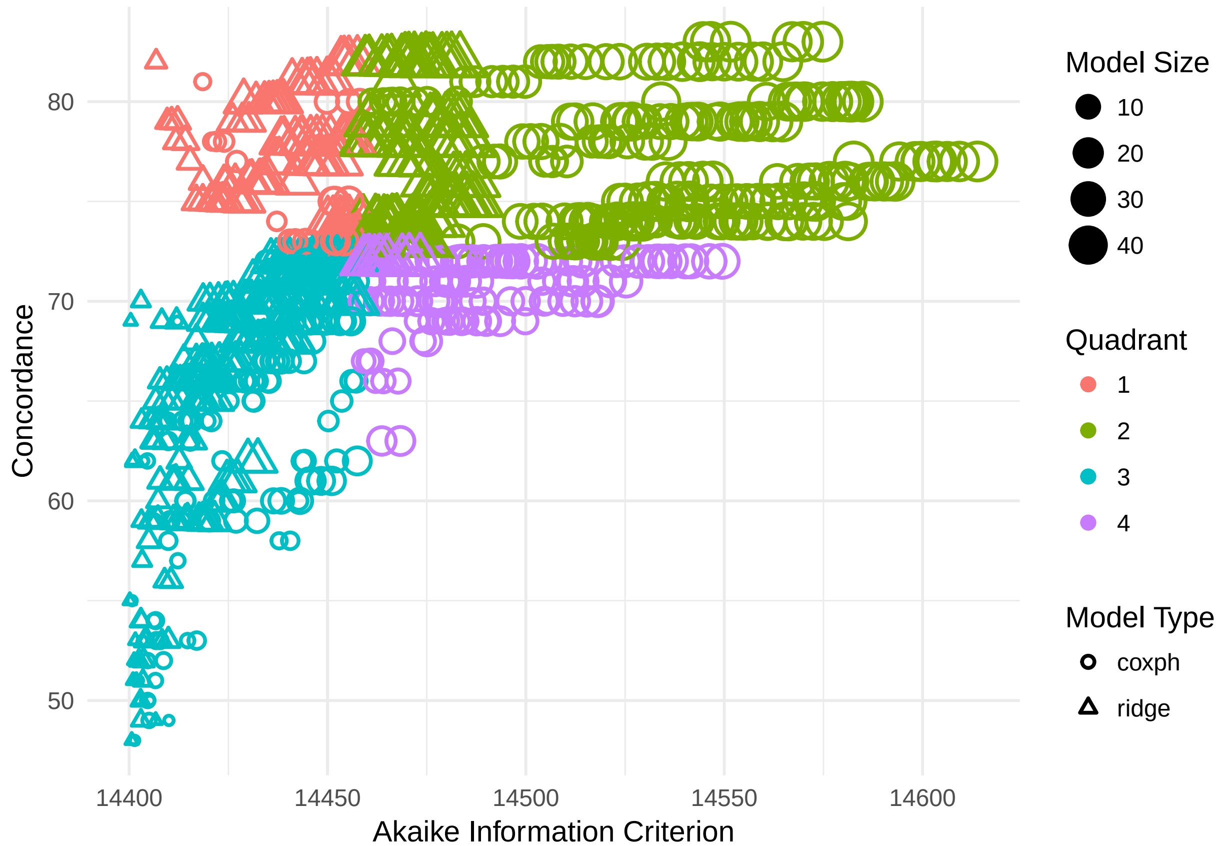
```r
table(dat_quad$type)
```

```
##
## coxph ridge
##   480   480
```

```r
dat_quad %>% group_by(type, quad) %>% summarise(n=n())
```

```
## # A tibble: 8 x 3
## # Groups:   type [?]
##   type  quad      n
##   <chr> <fct> <int>
## 1 coxph 1        21
## 2 coxph 2       232
## 3 coxph 3       118
## 4 coxph 4       109
## 5 ridge 1        90
## 6 ridge 2       117
## 7 ridge 3       251
## 8 ridge 4        22
```

```r
# Figure 1
dat_quad %>%
    ggplot(aes(x = aic,
               y = con,
               size = size,
               colour = quad)) +
geom_point(aes(shape = factor(type)),
           #size = 3,
           stroke = 1) +
scale_shape(solid = FALSE) +
           theme_minimal() +
           labs(
                x = 'Akaike Information Criterion',
                y = 'Concordance',
                size = "Model Size",
                shape = "Model Type",
                colour = "Quadrant")
```




```
ggsave(here("img/1-quad.pdf"))
```

```
## Saving 6.5 x 4.5 in image
```

```
ggsave(here("img/1-quad.png"))
```

```
## Saving 6.5 x 4.5 in image
```

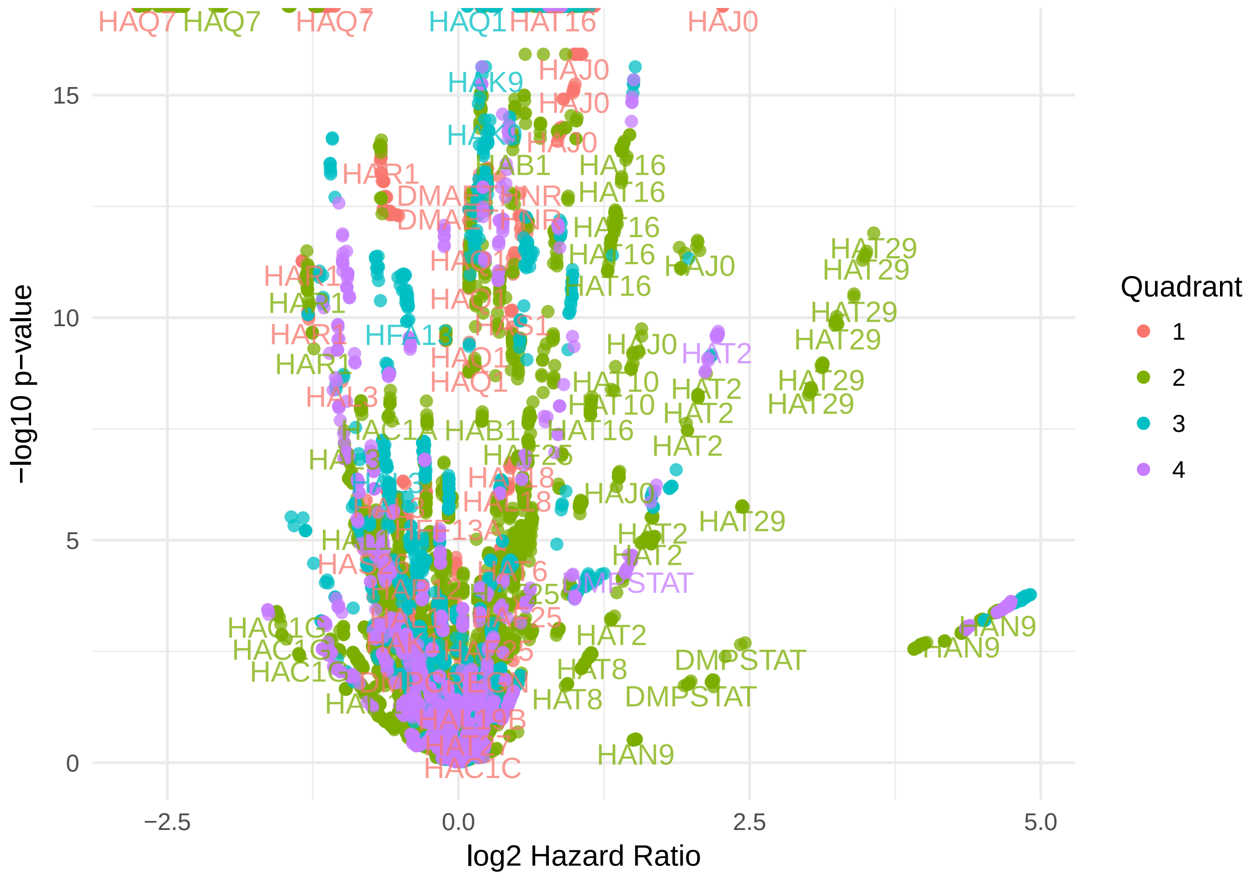
```
#define function to flatten dat_quad
dfs <- function(quadrant) {
dat <- dat_quad %>%
        filter(quad == quadrant) %>%
            select(starts_with('h'),
                   coef_pvalue)

data_frame(name = names(flatten(dat[[1]])),
           HR = flatten_dbl(dat[[1]]),
           HR_CI_lower = flatten_dbl(dat[[2]]),
           HR_CI_upper = flatten_dbl(dat[[3]]),
           coef_pvalue = flatten_dbl(dat[[4]]),
           quad = rep(quadrant,
                      length(flatten(dat[[1]])))
           )
}

#flatten dat_quad
df_coef <- map_dfr(seq(4), dfs)
#remove ridge from name
```

```
df_coef$name <- gsub("ridge\\(|\\)", "", df_coef$name)

# Figure 2
df_coef %>%
    select(-starts_with("HR_CI")) %>%
    filter(!between(HR, .99, 1.01)) %>%
    mutate(coef_pvalue = if_else(near(coef_pvalue, 0),
                                 coef_pvalue+0.1^17,
                                 coef_pvalue)) %>%
    ggplot(aes(x = log2(HR),
               y = -log10(coef_pvalue),
               colour = as.factor(quad))) +
           labs(colour = "Quadrant",
                x = 'log2 Hazard Ratio',
                y = '-log10 p-value') +
           geom_point(alpha = 0.75,
                      size = 1,
                      stroke = 1) +
           guides(colour = guide_legend(override.aes = list(alpha = 1))) +
           geom_text(aes(label=name),
                     alpha = 0.75,
                     vjust = 1.2,
                     show.legend = FALSE,
                     check_overlap = TRUE) +
           theme_minimal() +
           theme(plot.margin = margin(t = -15))
```




```r
ggsave(here("img/2-volcano.pdf"))
```

```
## Saving 6.5 x 4.5 in image
```

```r
ggsave(here("img/2-volcano.png"))
```

```
## Saving 6.5 x 4.5 in image
```

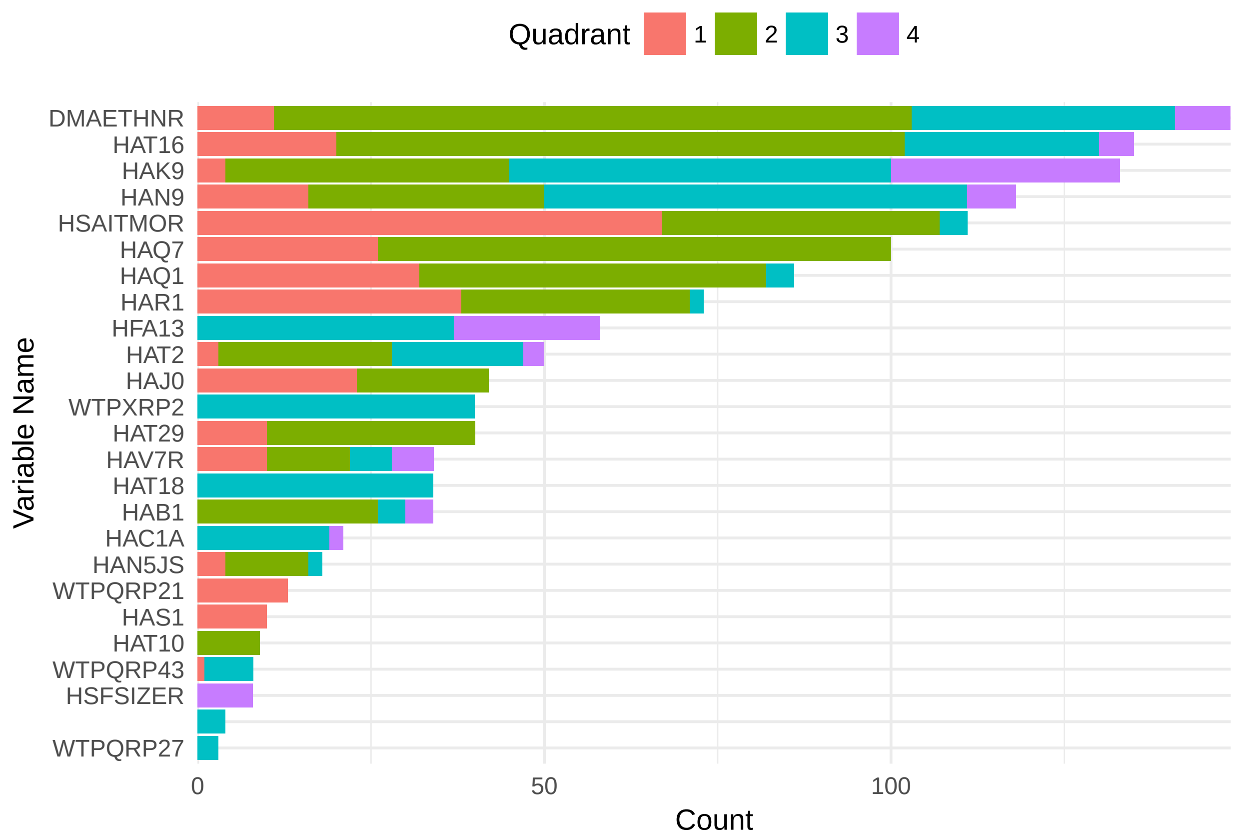
```r
#filter out p-values greater than .1^10
df_sig <- df_coef %>%
    select(-starts_with("HR_CI")) %>%
    filter(coef_pvalue<.1^10)

#obtain the order by count for name
ord <- df_sig %>%
    count(name) %>%
    arrange(n) %>%
    select(name)

#create name factor variable with levels ordered by count
df_sig$ord_name <- factor(df_sig$name, levels=ord$name)

# Figure 3
df_sig %>%
    mutate_if(is.integer, as.factor) %>%
    ggplot(aes(ord_name,fill=quad)) +
    geom_bar(position = position_stack(reverse = TRUE)) +
```

```
    scale_y_continuous(expand = c(0,0)) +
    coord_flip() +
                theme_minimal() +
    theme(legend.position = "top") +
                labs(fill = "Quadrant",
                     x = 'Variable Name',
                     y = 'Count')
```




```
ggsave(here("img/3-varbar.pdf"))
```

```
## Saving 6.5 x 4.5 in image
```

```
ggsave(here("img/3-varbar.png"))
```

```
## Saving 6.5 x 4.5 in image
```

```
# Table 1
df_sig %>%
    group_by(quad) %>%
    rename(Name = name) %>%
    summarise(n = n()) %>%
    arrange(desc(n)) %>%
    knitr::kable()
```

| quad | n |
|---:|---:|
| 2 | 579 |
| 3 | 367 |
| 1 | 288 |

| quad | n |
|---:|---:|
| 4 | 97 |

```r
# Table 2
df_sig %>%
    group_by(name) %>%
    rename(Name = name) %>%
    summarise(medianHR = median(HR),
              n = n()) %>%
    arrange(desc(n)) %>%
    knitr::kable()
```

| Name | medianHR | n |
|:---|---:|---:|
| DMAETHNR | 1.1566884 | 149 |
| HAT16 | 1.7560810 | 135 |
| HAK9 | 1.2189889 | 133 |
| HAN9 | 1.7947078 | 118 |
| HSAITMOR | 1.0004575 | 111 |
| HAQ7 | 0.3036946 | 100 |
| HAQ1 | 1.0664794 | 86 |
| HAR1 | 0.6274918 | 73 |
| HFA13 | 0.6099651 | 58 |
| HAT2 | 1.6533201 | 50 |
| HAJ0 | 1.9863574 | 42 |
| HAT29 | 2.0971949 | 40 |
| WTPXRP2 | 0.9999864 | 40 |
| HAB1 | 1.2485765 | 34 |
| HAT18 | 1.5324396 | 34 |
| HAV7R | 1.0002031 | 34 |
| HAC1A | 0.6096885 | 21 |
| HAN5JS | 0.9980961 | 18 |
| WTPQRP21 | 0.9999893 | 13 |
| HAS1 | 1.3772235 | 10 |
| HAT10 | 1.3949075 | 9 |
| HSFSIZER | 0.9185453 | 8 |
| WTPQRP43 | 0.9999858 | 8 |
| | 1.0260494 | 4 |
| WTPQRP27 | 0.9999872 | 3 |