NEJM

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.0 --

## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.4     v dplyr   1.0.2
## v tidyr   1.1.2     v stringr 1.4.0
## v readr   1.4.0     v forcats 0.5.0

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(dplyr)
library(tidyr)
library(knitr)
library(memisc)
```

```
## Loading required package: lattice

## Loading required package: MASS

##
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':
##
##     select

##
## Attaching package: 'memisc'

## The following objects are masked from 'package:dplyr':
##
##     collect, recode, rename, syms

## The following object is masked from 'package:purrr':
##
##     %@%

## The following object is masked from 'package:tibble':
##
##     view
```

```
## The following object is masked from 'package:ggplot2':
##
##     syms

## The following objects are masked from 'package:stats':
##
##     contr.sum, contr.treatment, contrasts

## The following object is masked from 'package:base':
##
##     as.array
```

```
library(qwraps2)
library(survival)
```

```
dig <- read_csv("dig.csv")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   .default = col_double()
## )
## i Use `spec()` for the full column specifications.
```

```
options(qwraps2_markup = "markdown")
```

```
#code applied from: https://cran.r-project.org/web/packages/qwraps2/vignettes/summary-statistics.html

#edited the n_perc0 function
get_p <- function (x, digits = getOption("qwraps2_frmt_digits", 1), na_rm = TRUE,
  show_denom = "never", show_symbol = TRUE, markup = getOption("qwraps2_markup",
    "latex"))
{
  d <- sum(!is.na(x))
  n <- sum(x, na.rm = na_rm)
  p <- frmt(100 * n/d, digits)
  if (show_denom == "never") {
    rtn <- paste0("", p)
  }
  if (!show_symbol) {
    rtn <- gsub("%", "", rtn)
  }
  if (markup == "latex") {
    rtn <- gsub("%", "\\\\%", rtn)
  }
  return(rtn)
}
```

```
our_summary1 <-
```

```r
 list(" " =
        list("Age (yr) - mean ± SD"                = ~ qwraps2::mean_sd(AGE, digits = 1),
             "Ejection fraction - mean ± SD"       = ~ qwraps2::mean_sd(EJF_PER, digits = 1),
             "Median duration of CHF - mo" = ~ median(CHFDUR, na.rm = T, digits = 1)),
      "% of patients" =
        list("Female sex" = ~ get_p(SEX == 2),
             "Nonwhite race"  = ~ get_p(RACE == 2),
             "Age>70 yr"  = ~ get_p(AGE > 70)),
      "Method of assessing ejection fraction:" =
        list( "Radionuclide ventriculography" = ~ get_p(EJFMETH == 1),
              "Two-dimensional echocardiography" = ~ get_p(EJFMETH == 3),
              "Contrast angiography"= ~ get_p(EJFMETH == 2)),
      " " = list("Cardiothoracic ratio>0.55" =~ get_p(CHESTX > 0.55)),
      "NYHA class" = list("I" =~ get_p(FUNCTCLS == 1),
                          "II" =~ get_p(FUNCTCLS == 2),
                          "III" =~ get_p(FUNCTCLS == 3),
                          "IV"=~ get_p(FUNCTCLS == 4)
                          ),
      "No. of signs or symptoms of CHF†" = list("0" =~ get_p(NSYM == 0),
                                                "1" =~  get_p(NSYM == 1),
                                                "2" =~ get_p(NSYM == 2),
                                                "3" =~ get_p(NSYM == 3),
                                                "4+" =~ get_p(NSYM >3)),
      "Medical history" = list("Previous myocardial infarction" =~ get_p(PREVMI == 1),
                               "Current angina" =~ get_p(ANGINA == 1),
                               "Diabetes" =~ get_p(DIABETES == 1),
                               "Hypertension" =~ get_p(HYPERTEN == 1)),
      " " = list("Previous digoxin use" =~ get_p(DIGUSE == 1)),
      "Primary Cause of Ischemia" = list( "Ischemic" =~ get_p(CHFETIOL == 1),
                                          "Nonischemic" =~ get_p(CHFETIOL != 1),
                                          "Nonischemic: idiopathic" =~ get_p(CHFETIOL == 4),
                                          "Nonischemic: hypertensive" =~ get_p(CHFETIOL == 2),
                                          "Nonischemic: other" =~ get_p(CHFETIOL %in% c(3,5,6))),
      "Concomitant medications" = list("Diuretics"  =~ get_p(DIURET == 1 | DIURETK == 1),
                                       "Ace Inhibitors"  =~ get_p(ACEINHIB == 1),
                                       "Nitrates"  =~ get_p(NITRATES == 1),
                                       "Other Vasodilators"  =~ get_p(VASOD == 1)),
      "Daily dose of study medication prescribed" = list("0.125 mg" =~ get_p(DIGDOSE == 0.125),
                                                         "0.250 mg" =~ get_p(DIGDOSE == 0.25),
                                                         "0.375 mg" =~ get_p(DIGDOSE == 0.375),
                                                         "0.500 mg" =~ get_p(DIGDOSE == 0.5)))

summary_table(group_by(dig, TRTMT), our_summary1)
```

	0 (N = 3403)	1 (N = 3397)
** **		
Age (yr) — mean ± SD	63.5 ± 10.8	63.4 ± 11.0
Ejection fraction — mean ± SD	28.4 ± 8.9	28.6 ± 8.8
Median duration of CHF — mo	16	17
% of patients		
Female sex	22.5	22.2
Nonwhite race	14.8	14.3
Age>70 yr	27.4	26.7

	0 (N = 3403)	1 (N = 3397)
Method of assessing ejection fraction:		
Radionuclide ventriculography	64.2	65.0
Two-dimensional echocardiography	30.0	29.5
Contrast angiography	5.8	5.5
**		
Cardiothoracic ratio>0.55	34.4	34.6
NYHA class		
I	13.0	13.7
II	54.5	53.3
III	30.5	30.7
IV	1.9	2.2
No. of signs or symptoms of CHF†		
0	1.1	1.1
1	2.0	2.4
2	7.1	7.1
3	8.6	9.3
4+	81.2	80.2
Medical history		
Previous myocardial infarction	65.3	64.7
Current angina	26.4	27.1
Diabetes	28.6	28.3
Hypertension	45.8	45.0
**		
Previous digoxin use	44.6	44.1
Primary Cause of Ischemia		
Ischemic	70.7	71.0
Nonischemic	29.3	29.0
Nonischemic: idiopathic	14.2	15.5
Nonischemic: hypertensive	9.2	8.0
Nonischemic: other	6.0	5.5
Concomitant medications		
Diuretics	82.2	81.2
Ace Inhibitors	94.8	94.1
Nitrates	43.1	42.2
Other Vasodilators	1.5	0.9
Daily dose of study medication prescribed		
0.125 mg	17.4	17.5
0.250 mg	70.1	70.6
0.375 mg	11.3	10.3
0.500 mg	0.9	1.1

Table 2

```
colnames(dig)
```

[1] “ID” “TRTMT” “AGE” “RACE” “SEX” “EJF_PER” [7] “EJFMETH” “CHESTX” “BMI” “KLEVEL” “CREAT” “DIGDOSER” [13] “CHFDUR” “RALES” “ELEVJVP” “PEDEMA” “RESTDYS” “EXERTDYS” [19] “ACTLIMIT” “S3” “PULCONG” “NSYM” “HEARTRTE” “DIABP” [25] “SYSBP” “FUNCTCLS” “CHFETIOL” “PREVMI” “ANGINA” “DIABETES” [31] “HYPERTEN”

"DIGUSE" "DIURETK" "DIURET" "KSUPP" "ACEINHIB" [37] "NITRATES" "HYDRAL" "VASOD" "DIGDOSE" "CVD" "CVDDAYS" [43] "WHF" "WHFDAYS" "DIG" "DIGDAYS" "MI" "MIDAYS" [49] "UANG" "UANGDAYS" "STRK" "STRKDAYS" "SVA" "SVADAYS" [55] "VENA" "VENADAYS" "CREV" "CREVDAYS" "OCVD" "OCVDDAYS" [61] "RINF" "RINFDAYS" "OTH" "OTHDAYS" "HOSP" "HOSPDAYS" [67] "NHOSP" "DEATH" "DEATHDAY" "REASON" "DWHF" "DWHFDAYS"

```
our_summary2 <-
  list(" " = list( "ALL" =~ n_perc0(DEATH == 1, digits = 1),
                   "Cardiovascular" =~ n_perc0(REASON %in% c(1:4), digits =1)),
       " " = list( "Cardiovascular: Worsening Heart Failure" =~ n_perc0(REASON == 1, na_rm = TRUE, digi
                   "Cardiovascular: Other Cardiac" =~ n_perc0(REASON == 2, na_rm = TRUE, digits = 1),
                   "Cardiovascular: Other Vascular" =~ n_perc0(REASON == 3, na_rm = TRUE, digits = 1),
                   "Cardiovascular: Unknown" =~ n_perc0(REASON == 4, na_rm = TRUE, digits =1),
                   "Noncardiac and non-vascular" =~ n_perc0(REASON == 5, na_rm = TRUE, digits =1)))

tab <-  summary_table(group_by(dig, TRTMT), our_summary2)

tab
```

	0 (N = 3403)	1 (N = 3397)
** **		
ALL	1,194 (35.1)	1,181 (34.8)
Cardiovascular	1,004 (29.5)	1,016 (29.9)
**		
Cardiovascular: Worsening Heart Failure	449 (37.6)	394 (33.4)
Cardiovascular: Other Cardiac	444 (37.2)	508 (43.0)
Cardiovascular: Other Vascular	45 (3.8)	50 (4.2)
Cardiovascular: Unknown	66 (5.5)	64 (5.4)
Noncardiac and non-vascular	190 (15.9)	165 (14.0)

#COX Results

```
#cox models
dig <- dig %>%
  mutate(
    "death1" = case_when(
    REASON == 1 ~ 1,
    TRUE ~ 0),
    "death2" = case_when(
    REASON == 2 ~ 1,
    TRUE ~ 0),
    "death3" = case_when(
    REASON == 3 ~ 1,
    TRUE ~ 0),
    "death4" = case_when(
    REASON == 4 ~ 1,
    TRUE ~ 0),
    "death5" = case_when(
    REASON == 5 ~ 1,
    TRUE ~ 0),
    "cardiodeath" = case_when(
      REASON %in% c(1:4) ~ 1,
```

```
      TRUE ~ 0  )
    )


surva = Surv(dig$DEATHDAY, dig$DEATH)

survc = Surv(dig$DEATHDAY, dig$cardiodeath)

surv1=Surv(dig$DEATHDAY, dig$death1)

surv2=Surv(dig$DEATHDAY, dig$death2)

surv3=Surv(dig$DEATHDAY, dig$death3)

surv4=Surv(dig$DEATHDAY, dig$death4)

surv5=Surv(dig$DEATHDAY, dig$death5)


extract_p <- function(mod1){
  HR = exp(mod1$coefficients)
  lb = exp(confint(mod1))[1]
  ub = exp(confint(mod1))[2]
  p = summary(mod1)$coefficients[, 5]
  data.frame(HR, lb, ub, p)
}

mod1 <- coxph(surv1 ~ TRTMT, data = dig)


map_df(list(coxph(surva ~ TRTMT, data = dig),
            coxph(survc ~ TRTMT, data = dig),
            coxph(surv1 ~ TRTMT, data = dig),
            coxph(surv2 ~ TRTMT, data = dig),
            coxph(surv3 ~ TRTMT, data = dig),
            coxph(surv4 ~ TRTMT, data = dig),
            coxph(surv5 ~ TRTMT, data = dig)), ~extract_p(.x)) %>%
  knitr::kable()
```

	HR	lb	ub	p
TRTMT...1	0.9897291	0.9132349	1.072631	0.8013846
TRTMT...2	1.0124118	0.9278499	1.104680	0.7816322
TRTMT...3	0.8786338	0.7674446	1.005932	0.0608914
TRTMT...4	1.1435411	1.0068172	1.298832	0.0389666
TRTMT...5	1.1127996	0.7438911	1.664656	0.6029694
TRTMT...6	0.9710935	0.6885412	1.369595	0.8672144
TRTMT...7	0.8698142	0.7060665	1.071537	0.1899682