case-01-ec-rmd

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Table 1 Values for Digoxin

mean and sd of age

```
## [1] 63.4
```

```
## [1] 11
```

mean and sd of ejection fraction

```
## [1] 28.6
```

```
## [1] 8.8
```

median duration of CHF

```
## # A tibble: 1 x 1
##     med
##   <dbl>
## 1    17
```

prop female

```
## # A tibble: 1 x 3
##   SEX        n  freq
##   <chr>  <int> <dbl>
## 1 Female   755 0.222
```

prop non-white

```
## # A tibble: 1 x 3
##   RACE          n  freq
##   <chr>     <int> <dbl>
## 1 Non-white   487 0.143
```

prop older than 70

```
## # A tibble: 1 x 1
##    freq
##   <dbl>
## 1 0.267
```

prop each method of assessing ejection fraction

```
## # A tibble: 3 x 2
##   EJFMETH                           freq
##   <chr>                            <dbl>
## 1 Contrast angiography             0.055
## 2 Radionuclide ventriculography    0.65
```

```
## 3 Two-dimensional echocardiography 0.295
```

prop cardiothoracic ratio

```
## # A tibble: 1 x 1
##    freq
##   <dbl>
## 1 0.346
```

prop NYHA class

```
## # A tibble: 4 x 2
##   FUNCTCLS  freq
##   <chr>    <dbl>
## 1 I        0.137
## 2 II       0.533
## 3 III      0.307
## 4 IV       0.022
```

prop for each number of signs/symptoms

```
## # A tibble: 5 x 2
##    NSYM  freq
##   <dbl> <dbl>
## 1     0 0.011
## 2     1 0.024
## 3     2 0.071
## 4     3 0.093
## 5     4 0.802
```

prop previous myo infection

```
## # A tibble: 1 x 2
##   PREVMI  freq
##    <dbl> <dbl>
## 1      1 0.647
```

prop angina

```
## # A tibble: 1 x 2
##   ANGINA  freq
##    <dbl> <dbl>
## 1      1 0.271
```

prop diabetes

```
## # A tibble: 1 x 2
##   DIABETES  freq
##      <dbl> <dbl>
## 1        1 0.283
```

prop hypertension

```
## # A tibble: 1 x 2
##   HYPERTEN  freq
##      <dbl> <dbl>
## 1        1  0.45
```

prop previous digoxin use

```
## # A tibble: 1 x 2
##   DIGUSE  freq
```

```
##    <dbl> <dbl>
## 1      1 0.441
```

prop primary cause nonischemic or ischemic

```
## # A tibble: 2 x 2
##   CHFETIOL_ni  freq
##   <chr>       <dbl>
## 1 Ischemic    0.708
## 2 Nonischemic 0.292
```

prop primary cause within nonischemic

```
## # A tibble: 3 x 2
##   CHFETIOL      freq
##   <chr>        <dbl>
## 1 Hypertensive 0.08
## 2 Idiopathic   0.155
## 3 Other        0.055
```

prop diuretics

```
## # A tibble: 1 x 2
##   diurets    freq
##   <chr>     <dbl>
## 1 Diuretics 0.812
```

prop ace inhibitor

```
## # A tibble: 1 x 2
##   ACEINHIB  freq
##      <dbl> <dbl>
## 1        1 0.941
```

prop nitrates

```
## # A tibble: 1 x 2
##   NITRATES  freq
##      <dbl> <dbl>
## 1        1 0.422
```

prop other vasodilators

```
## # A tibble: 1 x 2
##   VASOD  freq
##   <dbl> <dbl>
## 1     1 0.009
```

prop daily dose

```
## # A tibble: 4 x 2
##   DIGDOSE  freq
##     <dbl> <dbl>
## 1   0.125 0.175
## 2   0.25  0.706
## 3   0.375 0.103
## 4   0.5   0.011
```

Table 1 Values for Placebo

mean and sd of age

```
## [1] 63.5
```

```
## [1] 10.8
```

mean and sd of ejection fraction

```
## [1] 28.4
```

```
## [1] 8.9
```

median duration of CHF

```
## # A tibble: 1 x 1
##     med
##   <dbl>
## 1    16
```

prop female

```
## # A tibble: 1 x 3
##   SEX        n  freq
##   <chr>  <int> <dbl>
## 1 Female   764 0.225
```

prop non-white

```
## # A tibble: 1 x 3
##   RACE          n  freq
##   <chr>     <int> <dbl>
## 1 Non-white   504 0.148
```

prop older than 70

```
## # A tibble: 1 x 1
##    freq
##   <dbl>
## 1 0.274
```

prop each method of assessing ejection fraction

```
## # A tibble: 3 x 2
##   EJFMETH                           freq
##   <chr>                            <dbl>
## 1 Contrast angiography             0.058
## 2 Radionuclide ventriculography    0.642
## 3 Two-dimensional echocardiography 0.3
```

prop cardiothoracic ratio

```
## # A tibble: 1 x 1
##    freq
##   <dbl>
## 1 0.344
```

prop NYHA class

```
## # A tibble: 4 x 2
##   FUNCTCLS  freq
##   <chr>    <dbl>
## 1 I        0.13
```

```
## 2 II       0.545
## 3 III      0.305
## 4 IV       0.019
```

prop for each number of signs/symptoms

```
## # A tibble: 5 x 2
##    NSYM  freq
##   <dbl> <dbl>
## 1     0 0.011
## 2     1 0.02
## 3     2 0.071
## 4     3 0.086
## 5     4 0.812
```

prop previous myo infection

```
## # A tibble: 1 x 2
##   PREVMI  freq
##    <dbl> <dbl>
## 1      1 0.653
```

prop angina

```
## # A tibble: 1 x 2
##   ANGINA  freq
##    <dbl> <dbl>
## 1      1 0.264
```

prop diabetes

```
## # A tibble: 1 x 2
##   DIABETES  freq
##      <dbl> <dbl>
## 1        1 0.286
```

prop hypertension

```
## # A tibble: 1 x 2
##   HYPERTEN  freq
##      <dbl> <dbl>
## 1        1 0.458
```

prop previous digoxin use

```
## # A tibble: 1 x 2
##   DIGUSE  freq
##    <dbl> <dbl>
## 1      1 0.446
```

prop primary cause nonischemic or ischemic

```
## # A tibble: 2 x 2
##   CHFETIOL_ni  freq
##   <chr>       <dbl>
## 1 Ischemic    0.705
## 2 Nonischemic 0.295
```

prop primary cause within nonischemic

```
## # A tibble: 3 x 2
##   CHFETIOL      freq
```

```
##   <chr>        <dbl>
## 1 Hypertensive 0.091
## 2 Idiopathic   0.142
## 3 Other        0.06
```

prop diuretics

```
## # A tibble: 1 x 2
##   diurets    freq
##   <chr>     <dbl>
## 1 Diuretics 0.822
```

prop ace inhibitor

```
## # A tibble: 1 x 2
##   ACEINHIB  freq
##      <dbl> <dbl>
## 1        1 0.948
```

prop nitrates

```
## # A tibble: 1 x 2
##   NITRATES  freq
##      <dbl> <dbl>
## 1        1 0.431
```

prop other vasodilators

```
## # A tibble: 1 x 2
##   VASOD  freq
##   <dbl> <dbl>
## 1     1 0.015
```

prop daily dose

```
## # A tibble: 4 x 2
##   DIGDOSE  freq
##     <dbl> <dbl>
## 1   0.125 0.174
## 2   0.25  0.701
## 3   0.375 0.113
## 4   0.5   0.009
```

Table 4 Digoxin Values

ejection fraction .25-.45

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   613  0.27
```

ejection fraction $<$ .25

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   428  0.38
```

previous use of digoxin

```
## # A tibble: 2 x 4
## # Groups:   DIGUSE [2]
##   DIGUSE  DWHF     n  freq
##   <chr>  <dbl> <int> <dbl>
## 1 No         1   491 0.259
## 2 Yes        1   550 0.367
```

cause of heart failure

```
## # A tibble: 2 x 4
## # Groups:   CHFETIOL_ni [2]
##   CHFETIOL_ni  DWHF     n  freq
##   <chr>       <dbl> <int> <dbl>
## 1 Ischemic        1   731 0.304
## 2 Nonischemic     1   310 0.312
```

cardiothoracic ratio <= .55

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   600  0.27
```

cardiothoracic ratio > .55

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   441 0.375
```

nyha class

```
## # A tibble: 2 x 4
## # Groups:   FUNCTCLS [2]
##   FUNCTCLS  DWHF     n  freq
##   <chr>    <dbl> <int> <dbl>
## 1 1 or 2       1   601 0.264
## 2 3 or 4       1   440 0.392
```

overall study

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1  1041 0.306
```

Table 4 Placebo Values

ejection fraction .25-.45

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   735 0.323
```

ejection fraction < .25

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
```

```
## 1     1   556 0.492
```

previous use of digoxin

```
## # A tibble: 2 x 4
## # Groups:   DIGUSE [2]
##   DIGUSE  DWHF     n  freq
##   <chr>  <dbl> <int> <dbl>
## 1 No         1   603 0.32
## 2 Yes        1   688 0.453
```

cause of heart failure

```
## # A tibble: 2 x 4
## # Groups:   CHFETIOL_ni [2]
##   CHFETIOL_ni  DWHF     n  freq
##   <chr>       <dbl> <int> <dbl>
## 1 Ischemic        1   873 0.364
## 2 Nonischemic     1   418 0.416
```

cardiothoracic ratio <= .55

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   724 0.324
```

cardiothoracic ratio > .55

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1   567 0.485
```

nyha class

```
## # A tibble: 2 x 4
## # Groups:   FUNCTCLS [2]
##   FUNCTCLS  DWHF     n  freq
##   <chr>    <dbl> <int> <dbl>
## 1 1 or 2       1   739 0.322
## 2 3 or 4       1   552 0.499
```

overall study

```
## # A tibble: 1 x 3
##    DWHF     n  freq
##   <dbl> <int> <dbl>
## 1     1  1291 0.379
```

Table 4: Absolute Difference

absolute dif ejection fraction .25-.45

```
## [1] -0.053
```

```
## [1] -0.080 -0.027
## attr(,"conf.level")
## [1] 0.95
```

absolute dif ejection fraction <.25

```
## [1] -0.112
```

```
## [1] -0.153 -0.072
## attr(,"conf.level")
## [1] 0.95
```

absolute dif previous digoxin use = yes

```
## [1] -0.086
```

```
## [1] -0.121 -0.051
## attr(,"conf.level")
## [1] 0.95
```

absolute dif previous digoxin use = no

```
## [1] -0.062
```

```
## [1] -0.090 -0.033
## attr(,"conf.level")
## [1] 0.95
```

absolute dif cause of heart failure = ischemic

```
## [1] -0.06
```

```
## [1] -0.088 -0.035
## attr(,"conf.level")
## [1] 0.95
```

absolute dif cause of heart failure = nonischemic

```
## [1] -0.103
```

```
## [1] -0.145 -0.061
## attr(,"conf.level")
## [1] 0.95
```

absolute dif ct ratio <= .55

```
## [1] -0.054
```

```
## [1] -0.081 -0.027
## attr(,"conf.level")
## [1] 0.95
```

absolute dif ct ratio > .55

```
## [1] -0.11
```

```
## [1] -0.149 -0.070
## attr(,"conf.level")
## [1] 0.95
```

absolute dif nyha class = 1 or 2

```
## [1] -0.058
```

```
## [1] -0.084 -0.031
## attr(,"conf.level")
## [1] 0.95
```

absolute dif nyha class = 3 or 4

```
## [1] -0.108
```

```
## [1] -0.149 -0.067
## attr(,"conf.level")
## [1] 0.95
```

absolute dif overall pop

```
## [1] -0.073
```

```
## [1] -0.095 -0.050
## attr(,"conf.level")
## [1] 0.95
```

Table 4: Risk Ratio

risk ratio ejection fraction .25-.45

```
## [1] 0.835
```

```
## [1] 0.835 0.836
## attr(,"conf.level")
## [1] 0.95
```

risk ratio ejection fraction <.25

```
## [1] 0.772
```

```
## [1] 0.771 0.773
## attr(,"conf.level")
## [1] 0.95
```

risk ratio prev digoxin use = yes

```
## [1] 0.811
```

```
## [1] 0.810 0.811
## attr(,"conf.level")
## [1] 0.95
```

risk ratio prev digoxin use = no

```
## [1] 0.808
```

```
## [1] 0.807 0.809
## attr(,"conf.level")
## [1] 0.95
```

risk ratio cause of heart failure = ischemic

```
## [1] 0.835
```

```
## [1] 0.834 0.835
## attr(,"conf.level")
## [1] 0.95
```

risk ratio cause of heart failure = nonischemic

```
## [1] 0.751
```

```
## [1] 0.749 0.752
## attr(,"conf.level")
## [1] 0.95
```

risk ratio ct ratio <= .55

```
## [1] 0.815
```

```
## [1] 0.815 0.816
## attr(,"conf.level")
## [1] 0.95
```

risk ratio ct ratio $> .55$

```
## [1] 0.774
```

```
## [1] 0.773 0.775
## attr(,"conf.level")
## [1] 0.95
```

risk ratio nyha = 1 or 2

```
## [1] 0.821
```

```
## [1] 0.820 0.821
## attr(,"conf.level")
## [1] 0.95
```

risk ratio nyha = 3 or 4

```
## [1] 0.784
```

```
## [1] 0.783 0.785
## attr(,"conf.level")
## [1] 0.95
```

risk ratio overall pop

```
## [1] 0.808
```

```
## [1] 0.807 0.808
## attr(,"conf.level")
## [1] 0.95
```

Discussion

The values I calculated for table 1 and table 4 (except the risk ratio column) are very close to the ones in the report. Most of them are only off by .1% or .2% which is likely just due to differences in rounding. However, the risk ratio column in table 4 that I calculated has more differences from the original paper. The values are off by no more than .15, and the confidence intervals are much smaller than in the original paper. I calculated the risk ratios by dividing the percentage of patients on digoxin that experienced each level of the variable (ejection fraction, previous digoxin use cause of heart failure, ct ratio, NYHA class) by the percentage of patients on the placebo that experienced that same level. I chose to do it this way because that is how a risk ratio is usually calculated by hand. The researchers said that they estimated the risk ratios from the Cox proportional-hazards model; however, I tried finding the risk ratios using the model output, and the values were very different from the ones in the paper since many were over 1. Calculating the risk ratios by hand and using the actual definition of risk ratios brought me closer than trying to estimate them from the model, so I chose hand calculation instead. I believe are differences are because the researchers were very unclear in the paper how they calculated their risk ratios. Because it was so vague, I struggled with finding the right calculations to give me the same output. Additionally, Professor Jiang mentioned that the paper used the term risk ratio which is not actually the right term for the calculations which leads to grater confusion. I couldn't figure out what other calculations/formulas the reserarchers were doing to get those number, so I just chose the traditional method to find risk ratios since that was what the paper originally indicated.