ed-covid

Anthony Morada

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#Loading data

library(tidyverse)

## ── Attaching packages ─────────────────────────────────────── tidyverse 1.3.0 ──

## ✓ ggplot2 3.3.3 ✓ purrr 0.3.4  
## ✓ tibble 3.0.5 ✓ dplyr 1.0.3  
## ✓ tidyr 1.1.2 ✓ stringr 1.4.0  
## ✓ readr 1.4.0 ✓ forcats 0.5.0

## ── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library(readxl)  
library(janitor)

##   
## Attaching package: 'janitor'

## The following objects are masked from 'package:stats':  
##   
## chisq.test, fisher.test

#For TableOne  
kableone <- function(x, ...) {  
 capture.output(x <- print(x))  
 knitr::kable(x, ...)  
}  
  
#loading data  
df <- read.csv("~/THE GUTHRIE CLINIC/Foundation Research Projects - COVID Trauma/Data4.csv") %>%   
 clean\_names() %>%  
 select(-x, -x\_1) %>%  
 mutate(dos\_tm = paste(dos, time\_of\_arrival)) %>%  
 mutate(dos\_tm = as.POSIXct(dos\_tm,  
 format = "%m/%d/%Y %H:%M",  
 tz = "America/New\_York")) %>%  
 select(-dos, -time\_of\_arrival) %>%  
 mutate(trauma\_number = as.integer(trauma\_number)) %>%  
 mutate(alert\_level = case\_when(  
 str\_detect(alert\_level, "Protocol T") ~ "Protocol T",  
 str\_detect(alert\_level, "Trauma Evaluation") ~ "Trauma Evaluation",  
 str\_detect(alert\_level, "Trauma Alert") ~ "Trauma Alert",  
 )) %>%  
 mutate(alert\_level = as.factor(alert\_level)) %>%  
 mutate(post\_ed\_destination = case\_when(  
 str\_detect(post\_ed\_destination, "ICU/Critical Care Unit") ~ "ICU/Critical Care Unit",  
 str\_detect(post\_ed\_destination, "OR (Including Pre-Op Area)") ~ "OR (Including Pre-Op Area)",  
 str\_detect(post\_ed\_destination, "Step Down Unit/Intermediate") ~ "Step Down Unit/Intermediate",  
 str\_detect(post\_ed\_destination, "Med/Surg Unit") ~ "Med/Surg Unit",  
 str\_detect(post\_ed\_destination, "Transfer to Other Hospital/Trauma Center") ~ "Transfer to Other Hospital/Trauma Center",  
 str\_detect(post\_ed\_destination, "Home") ~ "Home",  
 str\_detect(post\_ed\_destination, "Psychiatric Unit (in-house)") ~ "Psychiatric Unit (in-house)",  
 str\_detect(post\_ed\_destination, "Other") ~ "Other",  
 str\_detect(post\_ed\_destination, "Morgue (Coroner, Death, DOA)") ~ "Morgue (Coroner, Death, DOA)",  
 str\_detect(post\_ed\_destination, "Interventional Angiography") ~ "Interventional Angiography",  
 str\_detect(post\_ed\_destination, "Labor & Delivery") ~ "Labor & Delivery"  
 )) %>%  
 mutate(post\_ed\_destination = as.factor(post\_ed\_destination)) %>%  
 mutate(age = as.numeric(age)) %>%  
 mutate(gender = as.factor(gender)) %>%  
 mutate(it = case\_when(  
 str\_detect(it, "Blunt") ~ "Blunt",  
 str\_detect(it, "Penetrating") ~ "Penetrating"  
 )) %>%  
 mutate(it = as.factor(it)) %>%  
 mutate(iss = as.numeric(iss)) %>%  
 mutate(live\_die = case\_when(  
 str\_detect(live\_die, "Alive") ~ "Alive",  
 str\_detect(live\_die, "Dead") ~ "Dead"  
 )) %>%  
 mutate(live\_die = as.factor(live\_die)) %>%  
 mutate(los = as.numeric(los)) %>%  
 mutate(icu\_los = as.numeric(icu\_los)) %>%  
 mutate(covid\_test = case\_when(  
 str\_detect(covid\_test, "Not Tested") ~ "Not Tested",  
 str\_detect(covid\_test, "NO = Negative COVID19") ~ "NO = Negative COVID19",  
 str\_detect(covid\_test, "YES = Positive COVID19") ~ "YES = Positive COVID19"  
 )) %>%  
 mutate(covid\_test = as.factor(covid\_test)) %>%  
 mutate(mechanism = as.factor(mechanism))  
  
   
#loading alc levels, skipping all other columns  
alc <- read\_excel("~/THE GUTHRIE CLINIC/Foundation Research Projects - COVID Trauma/Data with alcohol.xlsx",   
 sheet = "Sheet1", col\_types = c("numeric",   
 "skip", "skip", "skip", "skip",   
 "skip", "skip", "skip", "skip", "skip",   
 "skip", "skip", "skip", "skip", "skip",   
 "skip", "text", "skip")) %>%  
 clean\_names() %>%  
 mutate(etoh = as.numeric(etoh))

## Warning: Problem with `mutate()` input `etoh`.  
## ℹ NAs introduced by coercion  
## ℹ Input `etoh` is `as.numeric(etoh)`.

#merging by "trauma\_number"  
df <- merge(df, alc, by.x = "trauma\_number",   
 by.y = "trauma\_number", all.x = TRUE, all.y = FALSE)  
  
  
rm(alc)

#Columns we are interested in  
ind\_vars <- c("age", "gender", "etoh","it", "iss", "live\_die", "los", "icu\_los", "mechanism")  
dep\_vars <- c("era")  
  
#preparing for analysis  
df <- df %>%  
 filter( #filtering for march 16 to nov 15 in 2019 and 2020  
 (dos\_tm >= as.POSIXct("2019-03-16 00:00:00") & dos\_tm <= as.POSIXct("2019-11-15 00:00:00")) |   
 (dos\_tm >= as.POSIXct("2020-03-16 00:00:00") & dos\_tm <= as.POSIXct("2020-11-15 00:00:00"))  
 ) %>%  
 mutate(era = as.factor(format(dos\_tm, format="%Y"))) %>% # adding era   
 select(all\_of(ind\_vars) | all\_of(dep\_vars)) # selecting for variables of interest  
  
#FINDING PARAMETRIC OR NONPARAMETRIC VARIABLES  
#creating cont\_vars  
cont\_vars <- colnames(df[,sapply(df, function(x) is.numeric(x))])  
#creating non normal variables by Shapiro test < 0.05 = non normal  
nonnorm\_vars <- c()  
for(i in 1:length(cont\_vars)){  
 if(shapiro.test(df[,cont\_vars[i]])$p.value <= 0.05){  
 nonnorm\_vars[i] <- cont\_vars[i]  
 }  
}  
nonnorm\_vars <- nonnorm\_vars[!is.na(nonnorm\_vars)]  
  
#FINDING CATEGORICAL VARIABLES  
cat\_vars <- colnames(df[,sapply(df, function(x) is.factor(x))])  
exact\_vars <- NULL  
for(i in 1:length(cat\_vars)){  
 if (sum(chisq.test(table(df[,cat\_vars[i]], df$era))$expected < 5)){  
 exact\_vars[i] <- cat\_vars[i]  
 }  
}

## Warning in stats::chisq.test(x, y, ...): Chi-squared approximation may be  
## incorrect

exact\_vars <- exact\_vars[!is.na(exact\_vars)]  
  
  
library(tableone)

##   
## Attaching package: 'tableone'

## The following object is masked \_by\_ '.GlobalEnv':  
##   
## kableone

#description of all   
  
kableone(print(  
 CreateTableOne(data = df, factorVars = cat\_vars),   
 nonnormal = nonnorm\_vars,   
 showAllLevels = TRUE,   
 formatOptions = list(big.mark = ","),   
 quote = FALSE,   
 noSpaces = TRUE,  
 missing = TRUE  
 ))

|  |  |  |  |
| --- | --- | --- | --- |
|  | level | Overall | Missing |
| n |  | 1,865 |  |
| age (median [IQR]) |  | 59.00 [35.00, 77.00] | 0.0 |
| gender (%) | Female | 785 (42.1) | 0.0 |
|  | Male | 1080 (57.9) |  |
| etoh (median [IQR]) |  | 0.00 [0.00, 0.00] | 30.8 |
| it (%) | Blunt | 1778 (95.3) | 0.0 |
|  | Penetrating | 87 (4.7) |  |
| iss (median [IQR]) |  | 5.00 [2.00, 9.00] | 0.0 |
| live\_die (%) | Alive | 1817 (97.4) | 0.0 |
|  | Dead | 48 (2.6) |  |
| los (median [IQR]) |  | 2.00 [1.00, 4.00] | 0.0 |
| icu\_los (median [IQR]) |  | 0.00 [0.00, 0.00] | 3.6 |
| mechanism (%) | Acute DVT | 1 (0.1) | 0.0 |
|  | Animal Assault (Bull) | 2 (0.1) |  |
|  | Assault | 28 (1.5) |  |
|  | ATV | 81 (4.3) |  |
|  | Beam Fell on Head | 1 (0.1) |  |
|  | Bicycle Accident | 39 (2.1) |  |
|  | Burn | 5 (0.3) |  |
|  | Crushed by Garage Door | 1 (0.1) |  |
|  | Crushed by Heavy Object | 1 (0.1) |  |
|  | Dog | 6 (0.3) |  |
|  | Dog Bite | 3 (0.2) |  |
|  | Drowning | 1 (0.1) |  |
|  | Drug overdose | 1 (0.1) |  |
|  | Electrical Shock | 3 (0.2) |  |
|  | Exercise (Bench Press Bar) | 1 (0.1) |  |
|  | Fall | 976 (52.3) |  |
|  | Fence | 1 (0.1) |  |
|  | Fishhook Removal | 1 (0.1) |  |
|  | Furniture Related Injury | 6 (0.3) |  |
|  | Gunshot-Assault | 18 (1.0) |  |
|  | Gunshot-Hunting | 2 (0.1) |  |
|  | Gunshot-Suicide | 2 (0.1) |  |
|  | Hammer Fell on Head | 1 (0.1) |  |
|  | Hiking | 1 (0.1) |  |
|  | Hit by Cellar Door | 1 (0.1) |  |
|  | Hit with Lumber while Using Saw | 1 (0.1) |  |
|  | Horse | 6 (0.3) |  |
|  | Industrial/Farm | 47 (2.5) |  |
|  | Laceration | 3 (0.2) |  |
|  | Lawn Mower Accident | 5 (0.3) |  |
|  | Motor Vehicle Accident | 342 (18.3) |  |
|  | Motorcycle Accident | 162 (8.7) |  |
|  | Nail gun | 1 (0.1) |  |
|  | Pedestrian | 37 (2.0) |  |
|  | Playground Injury | 1 (0.1) |  |
|  | Possible Fall | 1 (0.1) |  |
|  | Punched Window | 2 (0.1) |  |
|  | Punching Glass | 1 (0.1) |  |
|  | Razor Blade (Accident) | 1 (0.1) |  |
|  | Self-Harm | 4 (0.2) |  |
|  | Sheet Metal | 1 (0.1) |  |
|  | Sports Injury | 4 (0.2) |  |
|  | Stabbing-Accident | 1 (0.1) |  |
|  | Stabbing-Assault | 17 (0.9) |  |
|  | Struck by Pipe (Accidental) | 1 (0.1) |  |
|  | Stubbed Toe | 1 (0.1) |  |
|  | Suicide | 4 (0.2) |  |
|  | Tablesaw/Chainsaw Accident | 22 (1.2) |  |
|  | Toy Motorized Car Accident | 1 (0.1) |  |
|  | Trampoline | 1 (0.1) |  |
|  | Traumatic amputation | 1 (0.1) |  |
|  | Tree-Related Injury | 12 (0.6) |  |
|  | Working on a Car at Home that Fell | 2 (0.1) |  |
| era (%) | 2019 | 953 (51.1) | 0.0 |
|  | 2020 | 912 (48.9) |  |

#by era  
kableone(print(  
 CreateTableOne(data = df, factorVars = cat\_vars, strata = "era", argsExact = list(workspace = 2 \* 10^5, simulate.p.value = TRUE)),  
 nonnormal = nonnorm\_vars,   
 exact = exact\_vars,   
 showAllLevels = TRUE,   
 formatOptions = list(big.mark = ","),   
 quote = FALSE,   
 noSpaces = TRUE,  
 missing = TRUE  
 ))

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | level | 2019 | 2020 | p | test | Missing |
| n |  | 953 | 912 |  |  |  |
| age (median [IQR]) |  | 61.00 [38.00, 77.00] | 57.00 [34.00, 75.25] | 0.023 | nonnorm | 0.0 |
| gender (%) | Female | 405 (42.5) | 380 (41.7) | 0.752 |  | 0.0 |
|  | Male | 548 (57.5) | 532 (58.3) |  |  |  |
| etoh (median [IQR]) |  | 0.00 [0.00, 0.00] | 0.00 [0.00, 0.00] | 0.241 | nonnorm | 30.8 |
| it (%) | Blunt | 920 (96.5) | 858 (94.1) | 0.016 |  | 0.0 |
|  | Penetrating | 33 (3.5) | 54 (5.9) |  |  |  |
| iss (median [IQR]) |  | 5.00 [2.00, 9.00] | 5.00 [2.00, 9.00] | 0.935 | nonnorm | 0.0 |
| live\_die (%) | Alive | 925 (97.1) | 892 (97.8) | 0.385 |  | 0.0 |
|  | Dead | 28 (2.9) | 20 (2.2) |  |  |  |
| los (median [IQR]) |  | 2.00 [1.00, 5.00] | 2.00 [1.00, 4.00] | 0.003 | nonnorm | 0.0 |
| icu\_los (median [IQR]) |  | 0.00 [0.00, 0.00] | 0.00 [0.00, 0.00] | 0.262 | nonnorm | 3.6 |
| mechanism (%) | Acute DVT | 1 (0.1) | 0 (0.0) | 0.053 | exact | 0.0 |
|  | Animal Assault (Bull) | 2 (0.2) | 0 (0.0) |  |  |  |
|  | Assault | 15 (1.6) | 13 (1.4) |  |  |  |
|  | ATV | 31 (3.3) | 50 (5.5) |  |  |  |
|  | Beam Fell on Head | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Bicycle Accident | 24 (2.5) | 15 (1.6) |  |  |  |
|  | Burn | 4 (0.4) | 1 (0.1) |  |  |  |
|  | Crushed by Garage Door | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Crushed by Heavy Object | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Dog | 1 (0.1) | 5 (0.5) |  |  |  |
|  | Dog Bite | 2 (0.2) | 1 (0.1) |  |  |  |
|  | Drowning | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Drug overdose | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Electrical Shock | 3 (0.3) | 0 (0.0) |  |  |  |
|  | Exercise (Bench Press Bar) | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Fall | 514 (53.9) | 462 (50.7) |  |  |  |
|  | Fence | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Fishhook Removal | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Furniture Related Injury | 2 (0.2) | 4 (0.4) |  |  |  |
|  | Gunshot-Assault | 6 (0.6) | 12 (1.3) |  |  |  |
|  | Gunshot-Hunting | 1 (0.1) | 1 (0.1) |  |  |  |
|  | Gunshot-Suicide | 1 (0.1) | 1 (0.1) |  |  |  |
|  | Hammer Fell on Head | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Hiking | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Hit by Cellar Door | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Hit with Lumber while Using Saw | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Horse | 2 (0.2) | 4 (0.4) |  |  |  |
|  | Industrial/Farm | 27 (2.8) | 20 (2.2) |  |  |  |
|  | Laceration | 2 (0.2) | 1 (0.1) |  |  |  |
|  | Lawn Mower Accident | 1 (0.1) | 4 (0.4) |  |  |  |
|  | Motor Vehicle Accident | 179 (18.8) | 163 (17.9) |  |  |  |
|  | Motorcycle Accident | 71 (7.5) | 91 (10.0) |  |  |  |
|  | Nail gun | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Pedestrian | 19 (2.0) | 18 (2.0) |  |  |  |
|  | Playground Injury | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Possible Fall | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Punched Window | 2 (0.2) | 0 (0.0) |  |  |  |
|  | Punching Glass | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Razor Blade (Accident) | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Self-Harm | 2 (0.2) | 2 (0.2) |  |  |  |
|  | Sheet Metal | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Sports Injury | 4 (0.4) | 0 (0.0) |  |  |  |
|  | Stabbing-Accident | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Stabbing-Assault | 7 (0.7) | 10 (1.1) |  |  |  |
|  | Struck by Pipe (Accidental) | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Stubbed Toe | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Suicide | 1 (0.1) | 3 (0.3) |  |  |  |
|  | Tablesaw/Chainsaw Accident | 11 (1.2) | 11 (1.2) |  |  |  |
|  | Toy Motorized Car Accident | 0 (0.0) | 1 (0.1) |  |  |  |
|  | Trampoline | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Traumatic amputation | 1 (0.1) | 0 (0.0) |  |  |  |
|  | Tree-Related Injury | 8 (0.8) | 4 (0.4) |  |  |  |
|  | Working on a Car at Home that Fell | 2 (0.2) | 0 (0.0) |  |  |  |
| era (%) | 2019 | 953 (100.0) | 0 (0.0) | <0.001 |  | 0.0 |
|  | 2020 | 0 (0.0) | 912 (100.0) |  |  |  |