Investigation of Transfusion Counts

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From the data, there are essentially four variable columns that tell us whether a patient was or was not transfused. These four are:  
1) Q6.4: Was the patient transfused? Marked either “yes,” “no,” or not marked, which we count as NA.  
2) The column “ATF\_ComponentTxType,” with a number trailing at the end (1 thru 7). This column tells us what type of transfusion that the patient received (RBC, platelet, or plasma). A value of “NA” could mean that the value is missing or that no transfusion was received for that nth transfusion.  
3) The columns “red,” “plt,” and “ffp,” with a number trailing at the end (1 thru 7). These columns are ALL marked with either a value of “0” or “1.” A value of “0” indicates that that type was not received on that nth transfusion. A value of “1” indicates that that type was received on that nth transfusion.  
4) The columns “red,” “plt,” and “ffp,” with the word “Total” trailing at the end. These columns are ALL marked with values that span 0 thru 7. These total columns are, ideally, the sum of the seven columns of that transfusion type.

## Investigation of Transfusion Totals

| **red1** | | **red2** | | **red3** | | **red4** | | **red5** | | **red6** | | **red7** | | **redTotal** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | | 1 | | 1 | | 1 | | 0 | | 0 | | 0 | | 4 | |
| 0 | | 0 | | 1 | | 1 | | 1 | | 0 | | 0 | | 3 | |
| 0 | | 0 | | 1 | | 1 | | 0 | | 0 | | 1 | | 3 | |
| 1 | | 1 | | 1 | | 1 | | 1 | | 0 | | 0 | | 5 | |
| 1 | | 1 | | 1 | | 0 | | 1 | | 1 | | 0 | | 5 | |
| 1 | | 1 | | 0 | | 0 | | 1 | | 0 | | 0 | | 3 | |
| plt1 | | plt2 | | plt3 | | plt4 | | plt5 | | plt6 | | plt7 | | pltTotal | |
| 0 | | 0 | | 0 | | 0 | | 1 | | 0 | | 0 | | 1 | |
| 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 0 | | 1 | | 0 | | 0 | | 0 | | 0 | | 0 | | 1 | |
| 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| **ffp1** | **ffp2** | | **ffp3** | | **ffp4** | | **ffp5** | | **ffp6** | | **ffp7** | | **ffpTotal** | |
| 0 | 0 | | 0 | | 0 | | 0 | | 1 | | 1 | | 2 | |
| 1 | 1 | | 0 | | 0 | | 0 | | 1 | | 1 | | 4 | |
| 1 | 0 | | 0 | | 0 | | 1 | | 1 | | 0 | | 3 | |
| 0 | 0 | | 0 | | 0 | | 0 | | 1 | | 1 | | 2 | |
| 0 | 0 | | 0 | | 1 | | 0 | | 0 | | 0 | | 1 | |
| 0 | 0 | | 1 | | 1 | | 0 | | 0 | | 0 | | 2 | |
|  | |  | |  | |  | |  | |  | |  | |  | |

#investigation of RBC, platelet, and plasma counts  
grep("^red\*",colnames(aim3\_chris.king))

## [1] 91 92 93 94 95 96 97 112

grep("^plt\*",colnames(aim3\_chris.king))

## [1] 98 99 100 101 102 103 104 113

grep("^ffp\*",colnames(aim3\_chris.king))

## [1] 105 106 107 108 109 110 111 114

redT<-rowSums(aim3\_chris.king[c(91:97)],na.rm=TRUE)  
plateT<-rowSums(aim3\_chris.king[c(98:104)],na.rm=TRUE)  
plasmaT<-rowSums(aim3\_chris.king[c(105:111)],na.rm = TRUE)  
all(redT==aim3\_chris.king$redTotal)

## [1] TRUE

all(plateT==aim3\_chris.king$pltTotal)

## [1] TRUE

all(plasmaT==aim3\_chris.king$ffpTotal)

## [1] TRUE

We see that summing the RBC, plate, and plasma rows, they equal the columns that pertain to their respective totals.

## Verify Tx. Entry by Tx. Type

attach(aim3\_chris.king)

| **ATF\_ComponentsTxType1** | **red1** | **ATF\_ComponentsTxType2** | **red2** | **ATF\_ComponentsTxType3** | **red3** |
| --- | --- | --- | --- | --- | --- |
| 01 RedCells | 1 | 01 RedCells | 1 | 01 RedCells | 1 |
| 03 FFP (fresh/frozen plasma) | 0 | 03 FFP | 0 | 01 RedCells | 1 |
| 03 FFP (fresh/frozen plasma) | 0 | 02 Platelets | 0 | 01 RedCells | 1 |
| 01 RedCells | 1 | 01 RedCells | 1 | 01 RedCells | 1 |
| 01 RedCells | 1 | 01 RedCells | 1 | 01 RedCells | 1 |
| 01 RedCells | 1 | 01 RedCells | 1 | 03 FFP | 0 |

col1<-red1  
col2<-ATF\_ComponentsTxType1  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:----------------------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 1| 1| 0.17| 0.17|  
## | |02 Platelets | 3| 4| 0.50| 0.67|  
## | |03 FFP (fresh/frozen plasma) | 19| 23| 3.17| 3.84|  
## | |NA | 42| 65| 7.01| 10.85|  
## |1 |01 RedCells | 534| 599| 89.15| 100.00|

col1<-red2  
col2<-ATF\_ComponentsTxType2  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 1| 1| 0.17| 0.17|  
## | |02 Platelets | 5| 6| 0.83| 1.00|  
## | |03 FFP | 24| 30| 4.01| 5.01|  
## | |NA | 164| 194| 27.38| 32.39|  
## |1 |01 RedCells | 405| 599| 67.61| 100.00|

col1<-red3  
col2<-ATF\_ComponentsTxType3  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |02 Platelets | 3| 3| 0.50| 0.50|  
## | |03 FFP | 29| 32| 4.84| 5.34|  
## | |NA | 418| 450| 69.78| 75.13|  
## |1 |01 RedCells | 149| 599| 24.87| 100.00|

col1<-red4  
col2<-ATF\_ComponentsTxType4  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |02 Platelets | 3| 3| 0.50| 0.50|  
## | |03 FFP | 33| 36| 5.51| 6.01|  
## | |NA | 472| 508| 78.80| 84.81|  
## |1 |01 RedCells | 91| 599| 15.19| 100.00|

col1<-red5  
col2<-ATF\_ComponentsTxType5  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |02 Platelets | 2| 2| 0.33| 0.33|  
## | |03 FFP | 23| 25| 3.84| 4.17|  
## | |NA | 541| 566| 90.32| 94.49|  
## |1 |01 RedCells | 33| 599| 5.51| 100.00|

col1<-red6  
col2<-ATF\_ComponentsTxType6  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |02 Platelets | 1| 1| 0.17| 0.17|  
## | |03 FFP | 17| 18| 2.84| 3.01|  
## | |NA | 566| 584| 94.49| 97.50|  
## |1 |01 RedCells | 15| 599| 2.50| 100.00|

col1<-red7  
col2<-ATF\_ComponentsTxType7  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |02 Platelets | 1| 1| 0.17| 0.17|  
## | |03 FFP | 7| 8| 1.17| 1.34|  
## | |NA | 586| 594| 97.83| 99.17|  
## |1 |01 RedCells | 5| 599| 0.83| 100.00|

col1<-plt1  
col2<-ATF\_ComponentsTxType1  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:----------------------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 535| 535| 89.32| 89.32|  
## | |03 FFP (fresh/frozen plasma) | 19| 554| 3.17| 92.49|  
## | |NA | 42| 596| 7.01| 99.50|  
## |1 |02 Platelets | 3| 599| 0.50| 100.00|

col1<-plt2  
col2<-ATF\_ComponentsTxType2  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 406| 406| 67.78| 67.78|  
## | |03 FFP | 24| 430| 4.01| 71.79|  
## | |NA | 164| 594| 27.38| 99.17|  
## |1 |02 Platelets | 5| 599| 0.83| 100.00|

col1<-plt3  
col2<-ATF\_ComponentsTxType3  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 149| 149| 24.87| 24.87|  
## | |03 FFP | 29| 178| 4.84| 29.72|  
## | |NA | 418| 596| 69.78| 99.50|  
## |1 |02 Platelets | 3| 599| 0.50| 100.00|

col1<-plt4  
col2<-ATF\_ComponentsTxType4  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 91| 91| 15.19| 15.19|  
## | |03 FFP | 33| 124| 5.51| 20.70|  
## | |NA | 472| 596| 78.80| 99.50|  
## |1 |02 Platelets | 3| 599| 0.50| 100.00|

col1<-plt5  
col2<-ATF\_ComponentsTxType5  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 33| 33| 5.51| 5.51|  
## | |03 FFP | 23| 56| 3.84| 9.35|  
## | |NA | 541| 597| 90.32| 99.67|  
## |1 |02 Platelets | 2| 599| 0.33| 100.00|

col1<-plt6  
col2<-ATF\_ComponentsTxType6  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 15| 15| 2.50| 2.50|  
## | |03 FFP | 17| 32| 2.84| 5.34|  
## | |NA | 566| 598| 94.49| 99.83|  
## |1 |02 Platelets | 1| 599| 0.17| 100.00|

col1<-plt7  
col2<-ATF\_ComponentsTxType7  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 5| 5| 0.83| 0.83|  
## | |03 FFP | 7| 12| 1.17| 2.00|  
## | |NA | 586| 598| 97.83| 99.83|  
## |1 |02 Platelets | 1| 599| 0.17| 100.00|

col1<-ffp1  
col2<-ATF\_ComponentsTxType1  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:----------------------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 535| 535| 89.32| 89.32|  
## | |02 Platelets | 3| 538| 0.50| 89.82|  
## | |NA | 42| 580| 7.01| 96.83|  
## |1 |03 FFP (fresh/frozen plasma) | 19| 599| 3.17| 100.00|

col1<-ffp2  
col2<-ATF\_ComponentsTxType2  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 406| 406| 67.78| 67.78|  
## | |02 Platelets | 5| 411| 0.83| 68.61|  
## | |NA | 164| 575| 27.38| 95.99|  
## |1 |03 FFP | 24| 599| 4.01| 100.00|

col1<-ffp3  
col2<-ATF\_ComponentsTxType3  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 149| 149| 24.87| 24.87|  
## | |02 Platelets | 3| 152| 0.50| 25.38|  
## | |NA | 418| 570| 69.78| 95.16|  
## |1 |03 FFP | 29| 599| 4.84| 100.00|

col1<-ffp4  
col2<-ATF\_ComponentsTxType4  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 91| 91| 15.19| 15.19|  
## | |02 Platelets | 3| 94| 0.50| 15.69|  
## | |NA | 472| 566| 78.80| 94.49|  
## |1 |03 FFP | 33| 599| 5.51| 100.00|

col1<-ffp5  
col2<-ATF\_ComponentsTxType5  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 33| 33| 5.51| 5.51|  
## | |02 Platelets | 2| 35| 0.33| 5.84|  
## | |NA | 541| 576| 90.32| 96.16|  
## |1 |03 FFP | 23| 599| 3.84| 100.00|

col1<-ffp6  
col2<-ATF\_ComponentsTxType6  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 15| 15| 2.50| 2.50|  
## | |02 Platelets | 1| 16| 0.17| 2.67|  
## | |NA | 566| 582| 94.49| 97.16|  
## |1 |03 FFP | 17| 599| 2.84| 100.00|

col1<-ffp7  
col2<-ATF\_ComponentsTxType7  
summary(freqlist(table(col1,col2,useNA = "ifany")))

##   
##   
## |col1 |col2 | Freq| cumFreq| freqPercent| cumPercent|  
## |:----|:------------|----:|-------:|-----------:|----------:|  
## |0 |01 RedCells | 5| 5| 0.83| 0.83|  
## | |02 Platelets | 1| 6| 0.17| 1.00|  
## | |NA | 586| 592| 97.83| 98.83|  
## |1 |03 FFP | 7| 599| 1.17| 100.00|

detach(aim3\_chris.king)

We see that if a patient was listed as receiving a RBC, plasma, or platelet transfusion, then they were marked a value of “1” for that respective transfusion in either of the “red,” “plt,” or “ffp” columns. Everything checks out. Some of the transfusion types contain numbers, which we assume to be an incorrect entry for the time and can be disregarded. The researcher made an attempt to find an obvious placement for the incorrectly placed time entry, but there was none.

## Inclusion Criteria

Since we know that the transfusions were marked and totaled correctly, we can remove the observations that do not have an entry for a transfusion (by there being a value of “0” in all of the columns that pertain to the total number of transfusions by type: RBC, platelet, and plasma).

#if an observation has an entry in the last 3 columns   
#(redTotal, pltTotal, and ffpTotal) that sum to zero,  
#then we know that that patient did not get transfused,   
#and thus we can remove them  
  
#sums  
grep("Total$",colnames(aim3\_chris.king))

## [1] 112 113 114

summary(freqlist(table(aim3\_chris.king$ATF\_Transfused,  
 rowSums(aim3\_chris.king[c(112:114)]),useNA = "ifany")),  
 labelTranslations=c("Q6.4 Transfused?","red+plt+ffp Total"))

##   
##   
## |Q6.4 Transfused? |red+plt+ffp Total | Freq| cumFreq| freqPercent| cumPercent|  
## |:----------------|:------------------|----:|-------:|-----------:|----------:|  
## |01 Yes |0 | 37| 37| 6.18| 6.18|  
## | |1 | 120| 157| 20.03| 26.21|  
## | |2 | 242| 399| 40.40| 66.61|  
## | |3 | 54| 453| 9.02| 75.63|  
## | |4 | 66| 519| 11.02| 86.64|  
## | |5 | 23| 542| 3.84| 90.48|  
## | |6 | 13| 555| 2.17| 92.65|  
## | |7 | 12| 567| 2.00| 94.66|  
## |02 No |2 | 1| 568| 0.17| 94.82|  
## |NA |0 | 3| 571| 0.50| 95.33|  
## | |1 | 2| 573| 0.33| 95.66|  
## | |2 | 11| 584| 1.84| 97.50|  
## | |3 | 4| 588| 0.67| 98.16|  
## | |4 | 2| 590| 0.33| 98.50|  
## | |5 | 5| 595| 0.83| 99.33|  
## | |6 | 4| 599| 0.67| 100.00|

summary(freqlist(table(aim3\_chris.king$redTotal,  
 aim3\_chris.king$pltTotal,  
 aim3\_chris.king$ffpTotal),  
 labelTranslations = c("RBC Total",  
 "Platelet Total",  
 "Plasma Total")))

##   
##   
## |RBC Total |Platelet Total |Plasma Total | Freq| cumFreq| freqPercent| cumPercent|  
## |:---------|:--------------|:------------|----:|-------:|-----------:|----------:|  
## |0 |0 |0 | 40| 40| 6.68| 6.68|  
## | | |1 | 1| 41| 0.17| 6.84|  
## | | |3 | 1| 42| 0.17| 7.01|  
## | |1 |0 | 1| 43| 0.17| 7.18|  
## | |2 |0 | 1| 44| 0.17| 7.35|  
## |1 |0 |0 | 120| 164| 20.03| 27.38|  
## | | |1 | 1| 165| 0.17| 27.55|  
## | | |2 | 3| 168| 0.50| 28.05|  
## | | |3 | 1| 169| 0.17| 28.21|  
## | |1 |0 | 1| 170| 0.17| 28.38|  
## | |4 |0 | 1| 171| 0.17| 28.55|  
## |2 |0 |0 | 251| 422| 41.90| 70.45|  
## | | |1 | 6| 428| 1.00| 71.45|  
## | | |2 | 11| 439| 1.84| 73.29|  
## | | |3 | 2| 441| 0.33| 73.62|  
## | | |4 | 1| 442| 0.17| 73.79|  
## | |1 |2 | 1| 443| 0.17| 73.96|  
## |3 |0 |0 | 48| 491| 8.01| 81.97|  
## | | |1 | 7| 498| 1.17| 83.14|  
## | | |2 | 14| 512| 2.34| 85.48|  
## | | |4 | 4| 516| 0.67| 86.14|  
## | |1 |0 | 1| 517| 0.17| 86.31|  
## | | |3 | 3| 520| 0.50| 86.81|  
## | |2 |1 | 1| 521| 0.17| 86.98|  
## |4 |0 |0 | 48| 569| 8.01| 94.99|  
## | | |1 | 4| 573| 0.67| 95.66|  
## | | |2 | 11| 584| 1.84| 97.50|  
## | | |3 | 1| 585| 0.17| 97.66|  
## | |1 |0 | 1| 586| 0.17| 97.83|  
## | | |2 | 1| 587| 0.17| 98.00|  
## |5 |0 |0 | 5| 592| 0.83| 98.83|  
## | | |1 | 1| 593| 0.17| 99.00|  
## | | |2 | 2| 595| 0.33| 99.33|  
## | |1 |1 | 1| 596| 0.17| 99.50|  
## |6 |0 |0 | 3| 599| 0.50| 100.00|