



# SC National Guard Increase New Enlistments

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Dashboard Link: <https://datastudio.google.com/s/p9YoMSdNCI4>

Key Dates ---->

Team  
Launch

Define

Measure

Analyze

Improve

Control

## DEFINE

### DEFINE

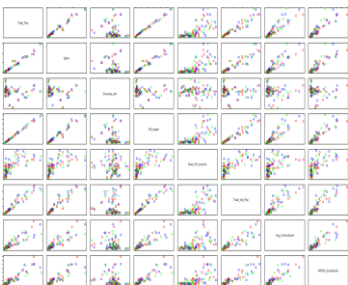
What is your goal? How will you know if you've been successful?

**Goal: find what impacts accessions/new enlistments, how & who and where to place funds.**  
Have clear operational definitions been established for your inputs and outputs?

**Primary factors are Total Population, Unemployment, Diversity index and median household income**

What is the process you're trying to improve? What are the current steps of the process?

**How the SC National guard predicts new enlistments because, the current method is an educated guess on what locations have done well and assume they can do better. Therefore, they would arbitrary increase enlistments to a county and report that to the General.**



## MEASURE

### MEASURE

Was that data continuous or discrete?

**Accessions were discrete data, however, density index is continuous.**

Did you collect your own data or did you use existing data?

**The data is provided to the SC National Guard with the most recent fiscal year available.**

How much data did you collect and why? What is your ideal sample size using the sample size formula?

**Collected Three workbooks consisted of 20 sheets that I condensed to 4 sheets with 400 rows and 10 columns of demographic data military perinate information.**

What is the risk if you collected fewer samples?

**The potential to lose important variables that dramatically impact accessions/new enlistments**

How was your data collected? Describe the methods you used to collect it.

Where could you have measurement error? How much measurement error do you have? What could you do to minimize your measurement error?

**When using County data vs. zip code there was error in the prediction model because there are only 46 Counties and almost 400 zip codes. Therefore, zip code is**

## Data Measurement Plan TR

Performance Measure	Data Source and Location	How Will Data Be Collected	Who Will Collect Data	When Will Data Be Collected	Target Sample Size
*Number of Accession/New Enlistments	*SC National Guard	*Data is collected by County & Zip Code	*Military Contractor	All Year	100%
*Diversity index	*SC National Guard	*Data collected County & Zip	*Contractor	All Year	100%
*How does Total population contribute to Pop	*SC National Guard	*Data collected County & Zip	*Contractor	All Year	100%
*Does unemployment (not in predictive data) impact Accessions/new enlistments	*SC National Guard	*Data collected County & Zip	*Contractor	All Year	100%

### SQL

Defects = loss of new enlistments compared to previous year. = avg. per county potential loss = 40

Units yearly = per county = avg 50

Total possible defects per year D\*U = 2,000

Total actual defects; A = avg. 30

Defect-per opportunity rate = A / DU = DPO = .015

Defects per million opportunities (DPMO): .015 x 1,000,000 = 15,000

AFTER ANALYSIS = SQL value (from SQL table) = 3.6

### SQL

Defects = loss of new enlistments compared to previous year. = avg. per county potential loss = 40

Units yearly = per county = avg 50

Total possible defects per year D\*U = 2,000

Total actual defects; A = avg. 5 \* improvement and increase in enlistments due to knowing where to focus funds.

Defect-per opportunity rate = A / DU = DPO = .0025

Defects per million opportunities (DPMO): .0025 x 1,000,000 = 2,500

AFTER ANALYSIS = SQL value (from SQL table) = 4.3

SQL: improved by (0.7) SQL Value = 1.55% increase.

## ANALYZE

### Larger 7 Counties Contribute Over 50% to Total Accessions

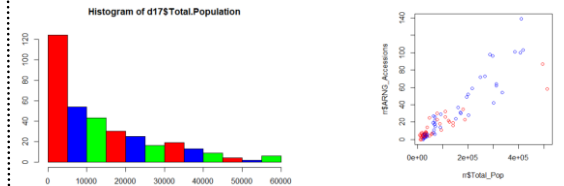
2017 Counties lower than 50 Accession comprise 85% of all Counties in SC.

2017 Counties above 50 Accession comprise 15% of all Counties in SC.

2018 Counties lower than 50 Accession comprise 83% of all Counties in SC.

2018 Counties above 50 Accession, comprise 17% of all Counties in SC.

```
#####
# plot the primary factors Unemployment
plot(r$Avg_Unemployed, r$ARNG_Accessions, col = c("red", "blue"))
cor(r$Avg_Unemployed, r$ARNG_Accessions) # 0.89 Positive very close to 1 correl
# Linear regression for single factors
rr.lm1 <- lm(ARNG_Accessions ~ Avg_Unemployed, data = rr)
abline(rr.lm1, col = "green")
summary(rr.lm1)
#####
# plot the primary factors Total Population
plot(r$Total_Pop, r$ARNG_Accessions, col = c("red", "blue"))
cor(r$Total_Pop, r$ARNG_Accessions) # 0.91 Positive very close to 1 correlation
#####
lm.all <- lm(ARNG_Accessions ~ data = rr[,c(4, -3, -2, -5)])
summary(lm.all)
#####
```



```
Call:
lm(formula = ARNG_Accessions ~ ., data = rr[, c(4, -3, -2, -5)])

Residuals:
    Min       1Q   Median       3Q      Max
-31.850  -3.129   -0.266   3.901  38.585

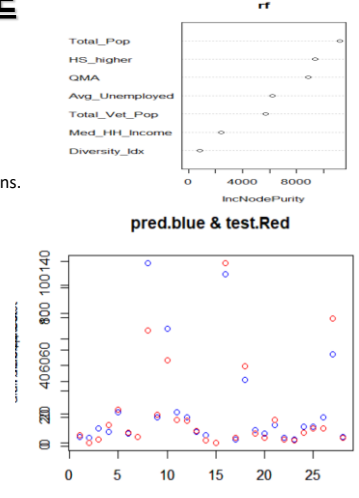
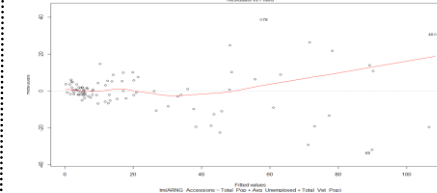
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.513e+00  1.567e+00  -0.966  0.336679
Total_Pop    6.053e-05  3.841e-05   1.576  0.118620
Total_Vet_Pop 1.141e-03  4.509e-04   2.530  0.013176 *
Avg_Unemployed 3.248e-03  9.472e-04   3.429  0.000923 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 10.95 on 88 degrees of freedom
Multiple R-squared:  0.8638, Adjusted R-squared:  0.8592
F-statistic: 186 on 3 and 88 DF, p-value: < 2.2e-16
```

## IMPROVE

**Linear Regression Model Results** (Random Forest: dashboard results were better)

A 10% decrease in unemployment raw numbers, would translate to a 2.5% decrease in End Strength. Unemployment remains the same, predicted Accessions would drop 18% from 1,274 Accessions to 1,045 Accessions. Unemployment trend continues with additional 10% decrease, Accessions of 1,045 will be 941 Accessions. Improvement of Accession is dependent upon Unemployment rate & concentrating on large Populated areas.



## CONTROL

The current process of hiring more Recruiters to acquire on average thirteen people to SC Army National Guard Force Strength/end strength is what we are attempting to improve. Therefore, delving into information to administer viable insights Whereby, Recruiters can target eligible candidates based on location and demographics with reliable statistical accuracy.

