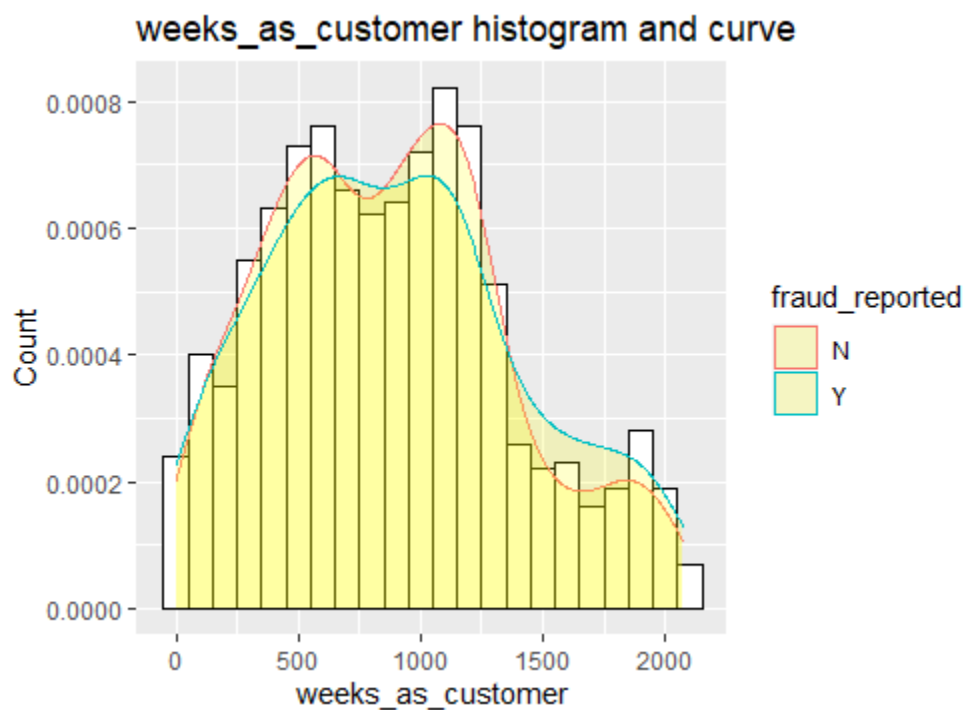


R Code and Visual Outputs

Auto Insurance Claim Fraud Indicators

Mary Donovan Martello

```
# Histogram of the weeks_as_customer variable with normal curve by fraud_reported  
ggplot(claims, aes(x=weeks_as_customer, col = fraud_reported)) +  
  geom_histogram(binwidth = 100, aes(y=..density..), colour="black", fill="white") +  
  geom_density(alpha=.2, fill="yellow") +  
  labs(title="weeks_as_customer histogram and curve", x="weeks_as_customer", y = "Count")
```



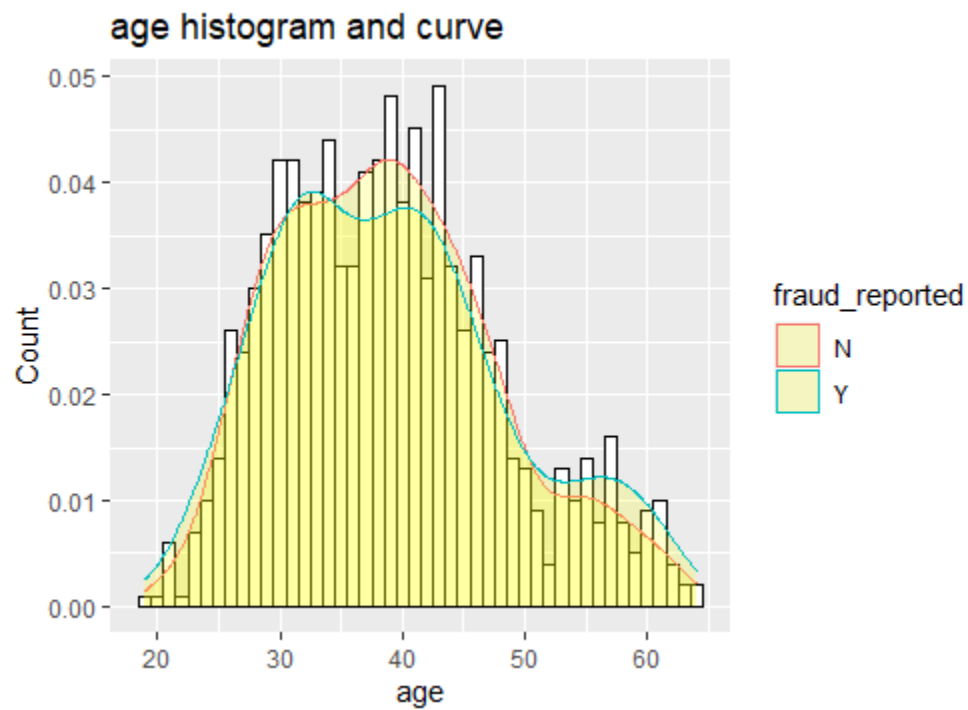
```
# Histogram of the age variable with normal curve
```

```
ggplot(claims, aes(x=age)) +
```

```
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
```

```
  geom_density(alpha=.2, fill="yellow") +
```

```
  labs(title="age histogram and curve", x="age", y = "Count")
```



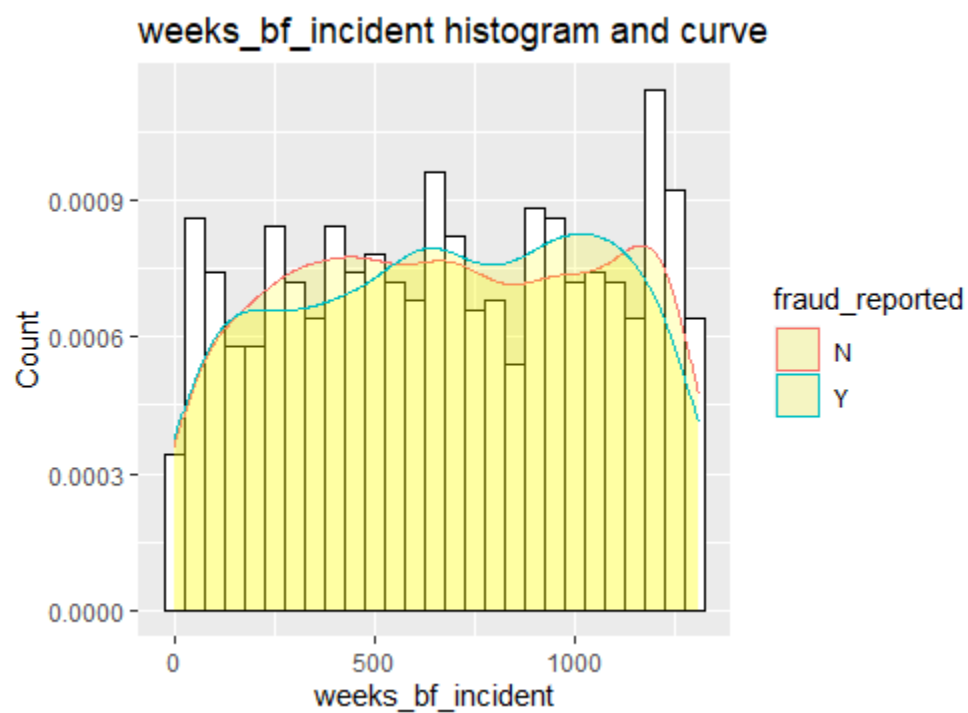
```
# Histogram of the weeks_bf_incident variable with normal curve
```

```
ggplot(claims, aes(x=weeks_bf_incident)) +
```

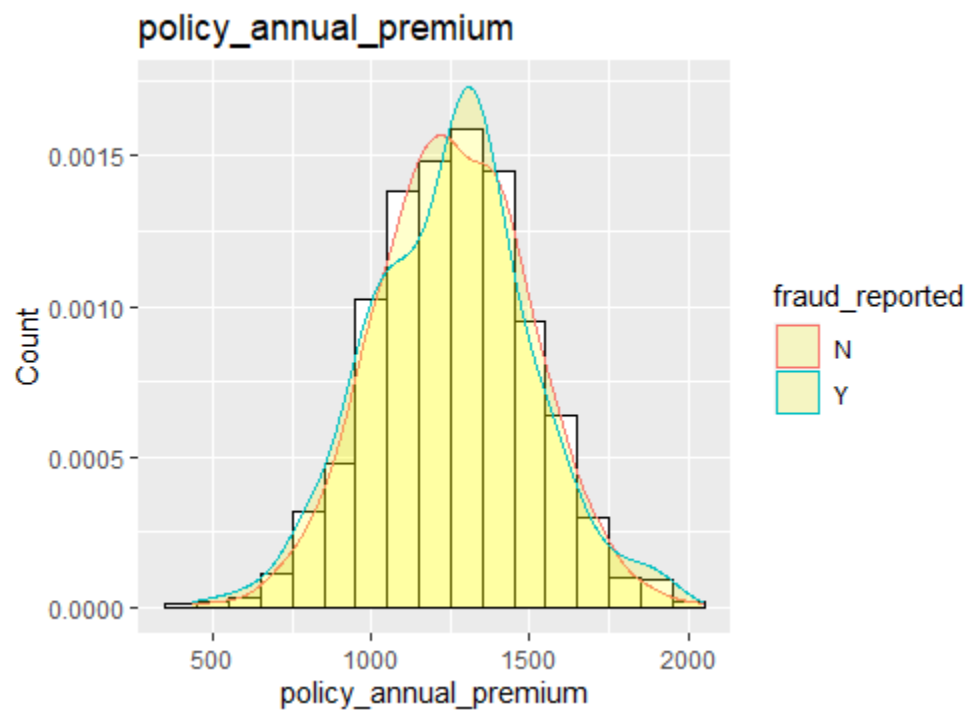
```
  geom_histogram(binwidth = 50, aes(y=..density..), colour="black", fill="white") +
```

```
  geom_density(alpha=.2, fill="yellow") +
```

```
  labs(title="weeks_bf_incident histogram and curve", x="weeks_bf_incident", y = "Count")
```

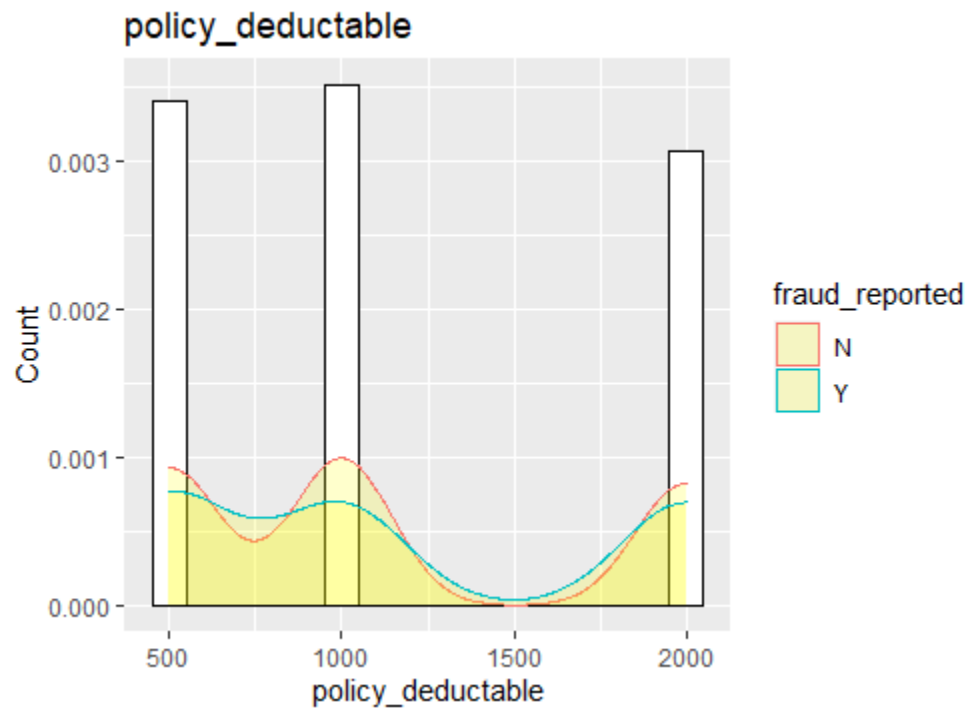


```
# Histogram of the policy_annual_premium variable with normal curve
ggplot(claims, aes(x=policy_annual_premium)) +
  geom_histogram(binwidth = 100, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="policy_annual_premium", x="policy_annual_premium", y = "Count")
```



```
# Histogram of the policy deductible variable with normal curve
```

```
ggplot(claims, aes(x=policy_deductible)) +  
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +  
  geom_density(alpha=.2, fill="yellow") +  
  labs(title=" policy_deductible ", x=" policy_deductible ", y = "Count")
```



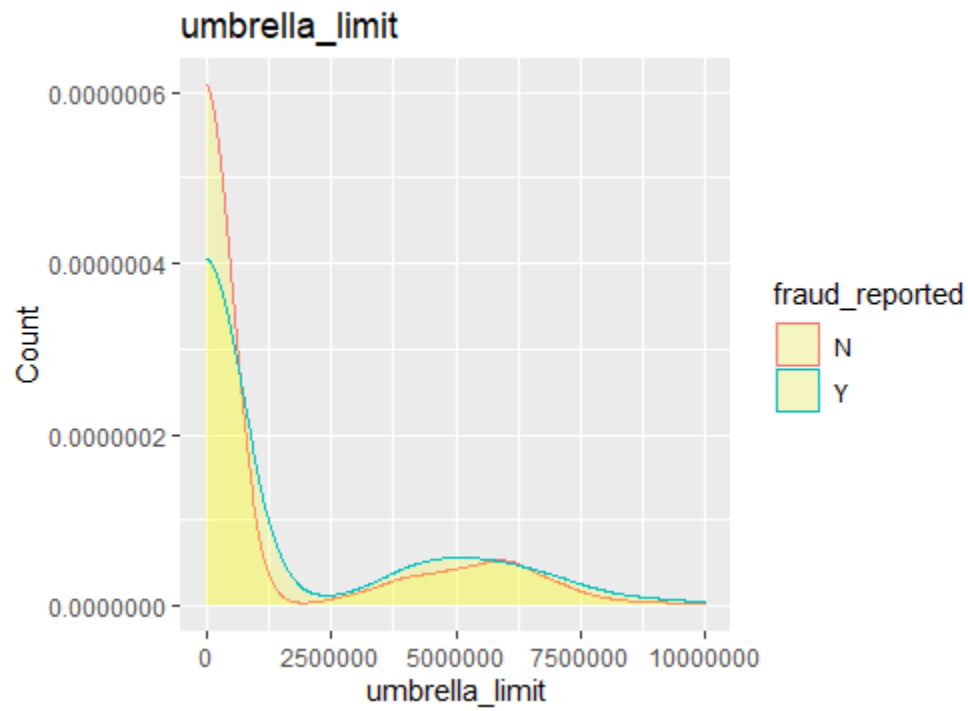
```
# Histogram of the umbrella_limit variable with normal curve
```

```
ggplot(claims, aes(x=umbrella_limit)) +
```

```
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
```

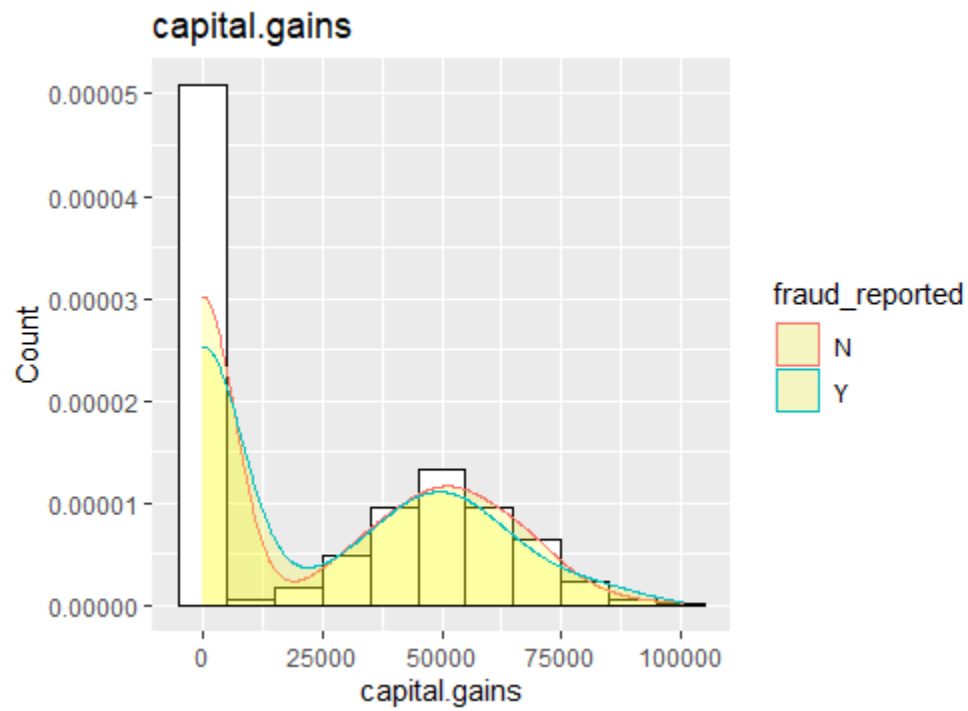
```
  geom_density(alpha=.2, fill="yellow") +
```

```
  labs(title="umbrella_limit", x="umbrella_limit", y = "Count")
```



```
# Histogram of the capital.gains variable with normal curve
```

```
ggplot(claims, aes(x=capital.gains)) +  
  geom_histogram(binwidth = 1000, aes(y=..density..), colour="black", fill="white") +  
  geom_density(alpha=.2, fill="yellow") +  
  labs(title="capital.gains", x="capital.gains", y = "Count")
```



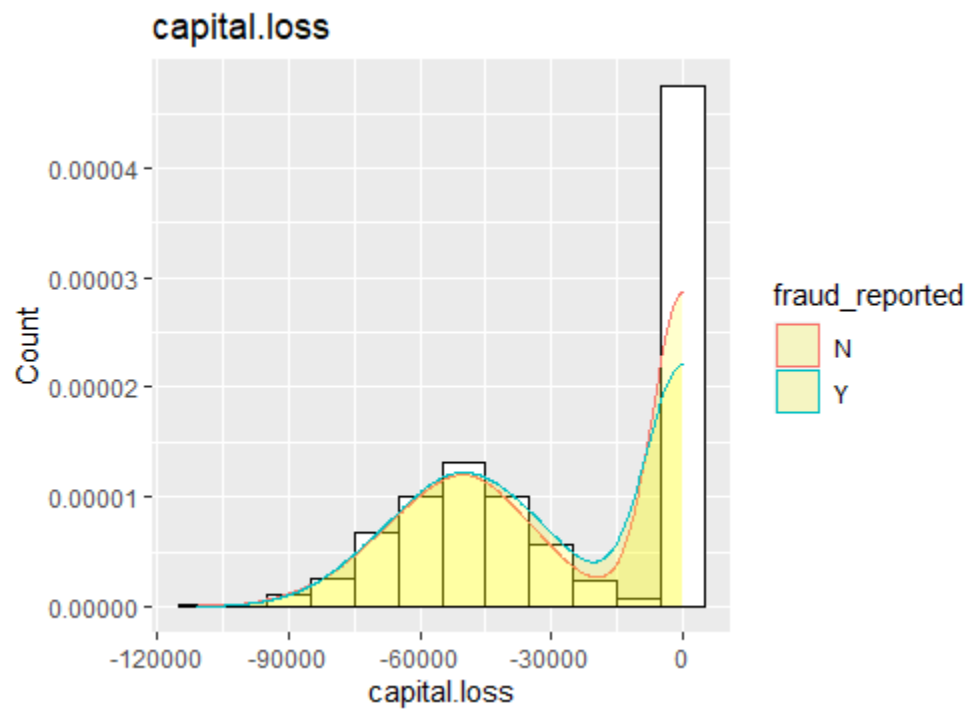
```
# Histogram of the capital.loss variable with normal curve
```

```
ggplot(claims, aes(x=capital.loss)) +
```

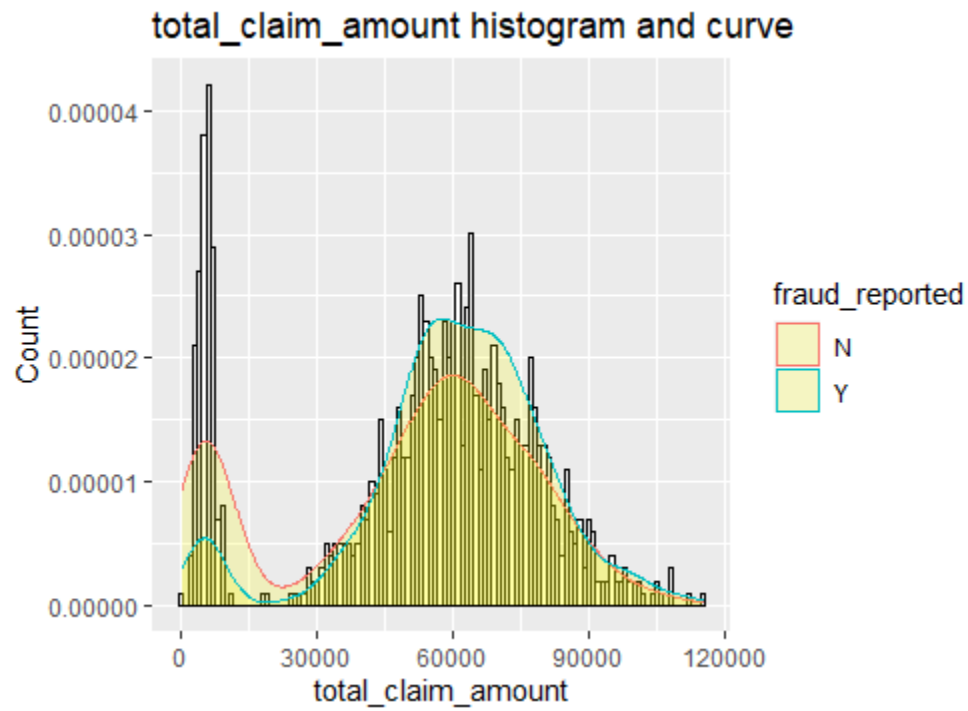
```
  geom_histogram(binwidth = 1000, aes(y=..density..), colour="black", fill="white") +
```

```
  geom_density(alpha=.2, fill="yellow") +
```

```
  labs(title="capital.loss", x="capital.loss", y = "Count")
```




```
# Histogram of the total_claim_amount variable with normal curve
ggplot(claims, aes(x=total_claim_amount)) +
  geom_histogram(binwidth = 100, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="total_claim_amount histogram and curve", x="total_claim_amount", y = "Count")
```



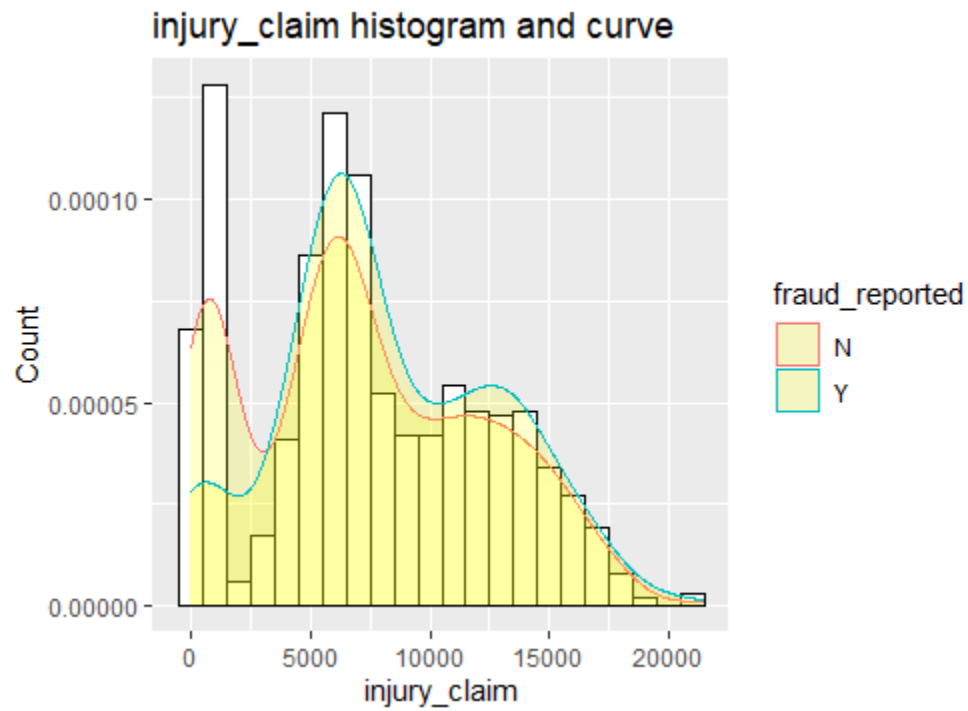
```
# Histogram of the injury_claim variable with normal curve
```

```
ggplot(claims, aes(x=injury_claim)) +
```

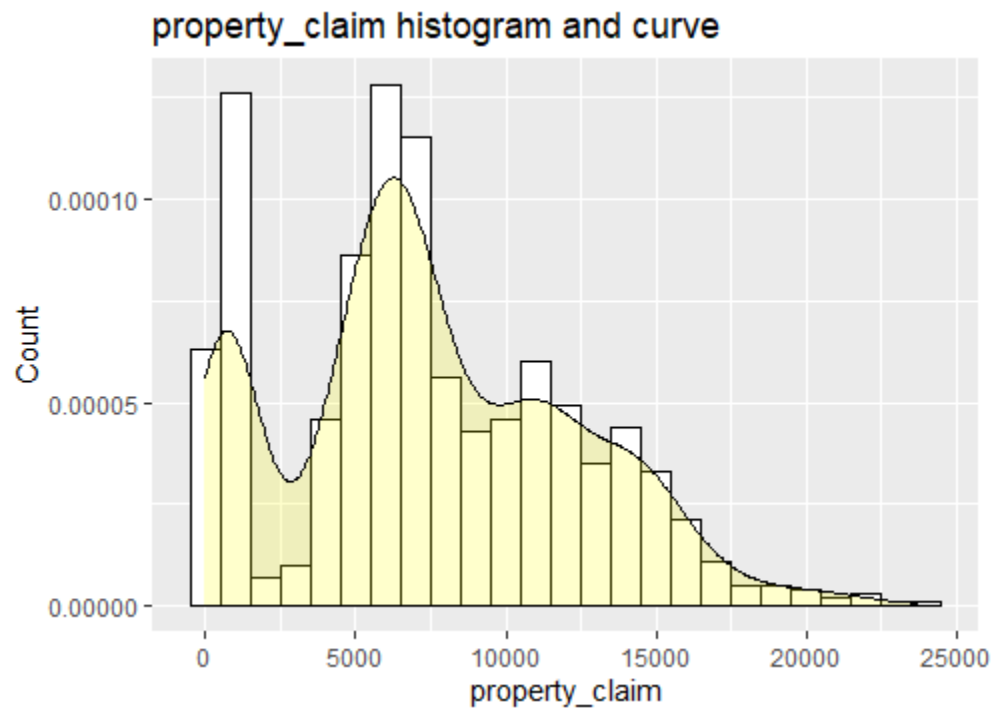
```
  geom_histogram(binwidth = 1000, aes(y=..density..), colour="black", fill="white") +
```

```
  geom_density(alpha=.2, fill="yellow") +
```

```
  labs(title="injury_claim histogram and curve", x="injury_claim", y = "Count")
```



```
# Histogram of the property_claim variable with normal curve  
ggplot(claims, aes(x=property_claim)) +  
  geom_histogram(binwidth = 1000, aes(y=..density..), colour="black", fill="white") +  
  geom_density(alpha=.2, fill="yellow") +  
  labs(title="property_claim histogram and curve", x="property_claim", y = "Count")
```



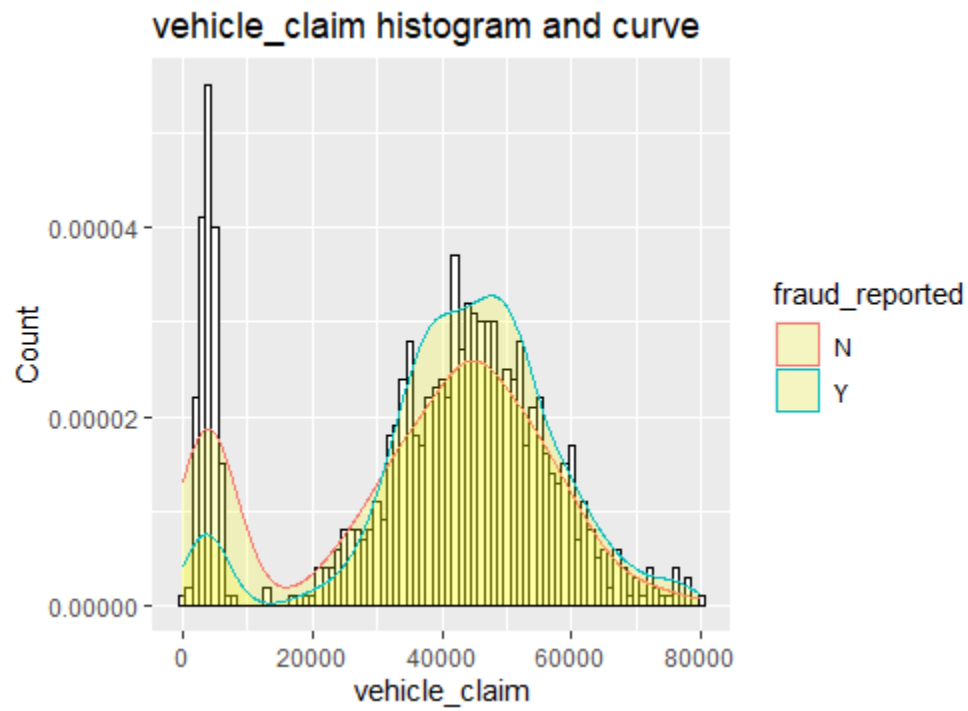
```
# Histogram of the vehicle_claim variable with normal curve
```

```
ggplot(claims, aes(x=vehicle_claim)) +
```

```
  geom_histogram(binwidth = 1000, aes(y=..density..), colour="black", fill="white") +
```

```
  geom_density(alpha=.2, fill="yellow") +
```

```
  labs(title="vehicle_claim histogram and curve", x="vehicle_claim", y = "Count")
```



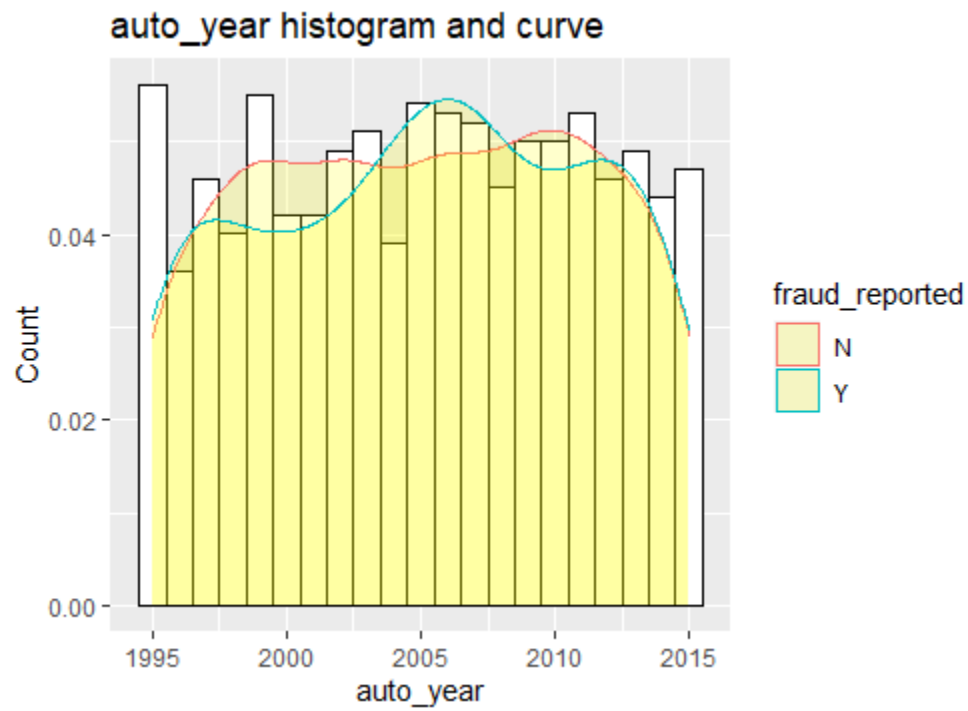
```
# Histogram of the auto_year variable with normal curve
```

```
ggplot(claims, aes(x=auto_year)) +
```

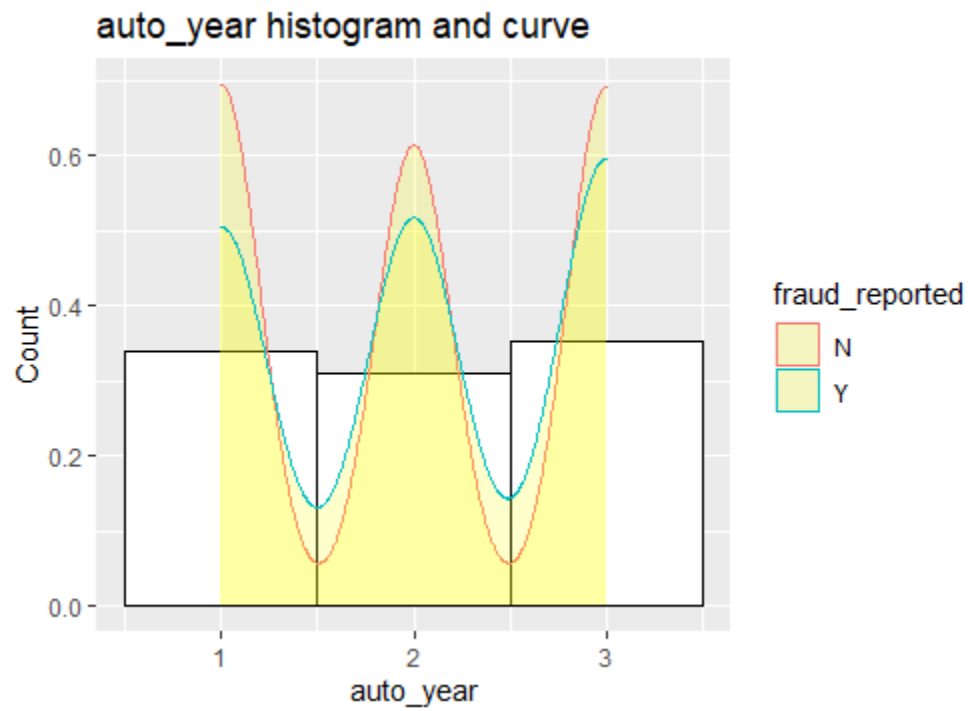
```
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
```

```
  geom_density(alpha=.2, fill="yellow") +
```

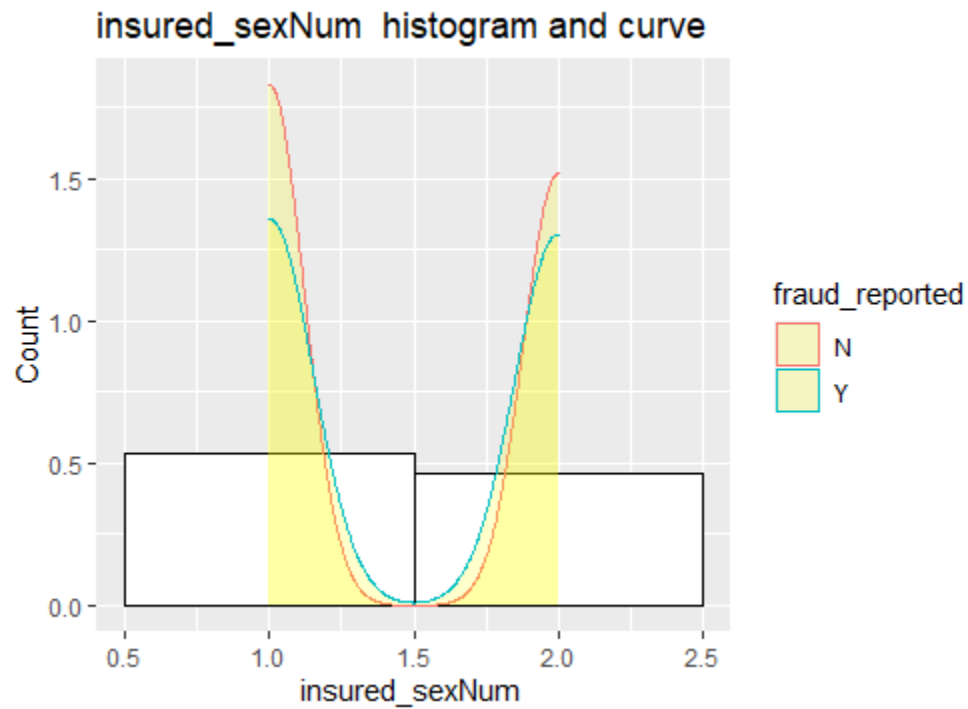
```
  labs(title="auto_year histogram and curve", x="auto_year", y = "Count")
```



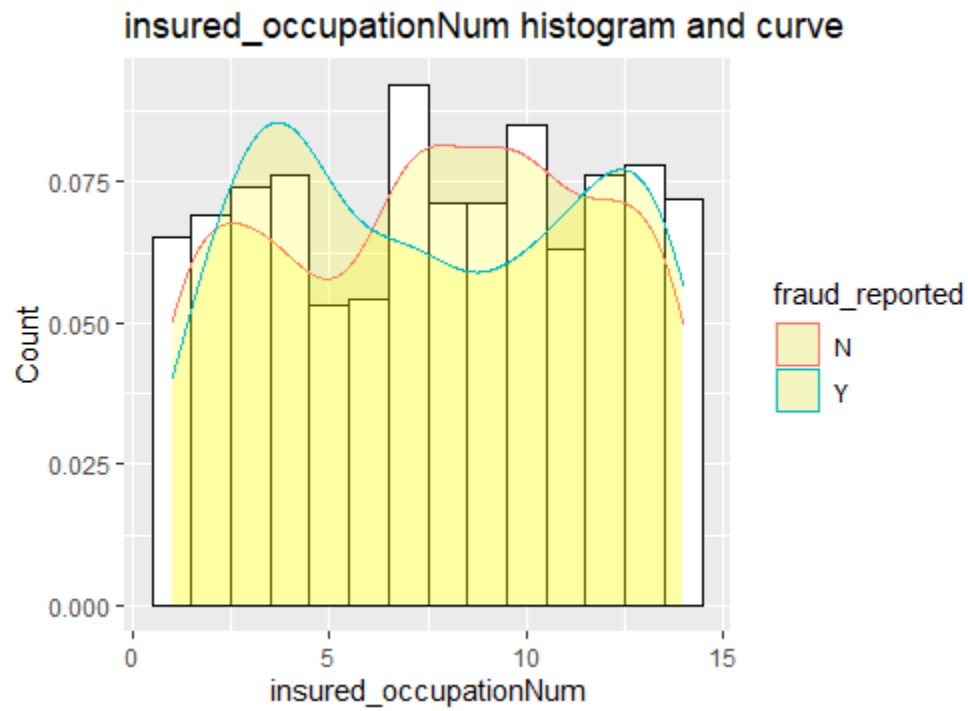
```
# Histogram of the auto_year variable with normal curve
ggplot(claims, aes(x= auto_year, col = fraud_reported)) +
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title=" auto_year histogram and curve", x=" auto_year ", y = "Count")
```



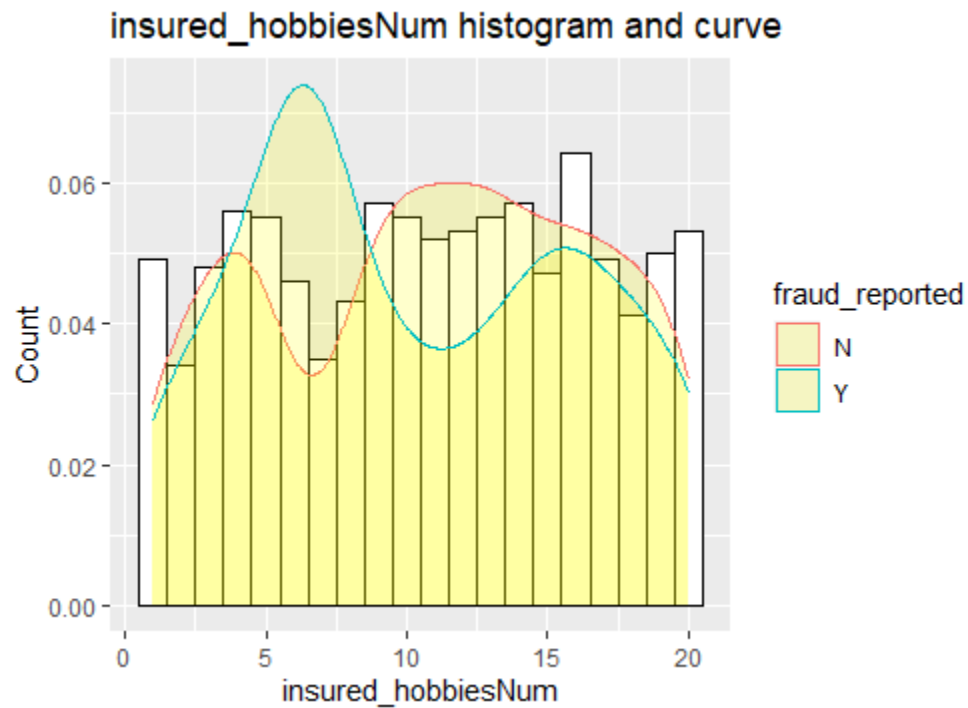
```
# Histogram of the insured_sexNum variable with normal curve
ggplot(claims, aes(x=insured_sexNum , col = fraud_reported)) +
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="insured_sexNum histogram and curve", x="insured_sexNum ", y = "Count")
```



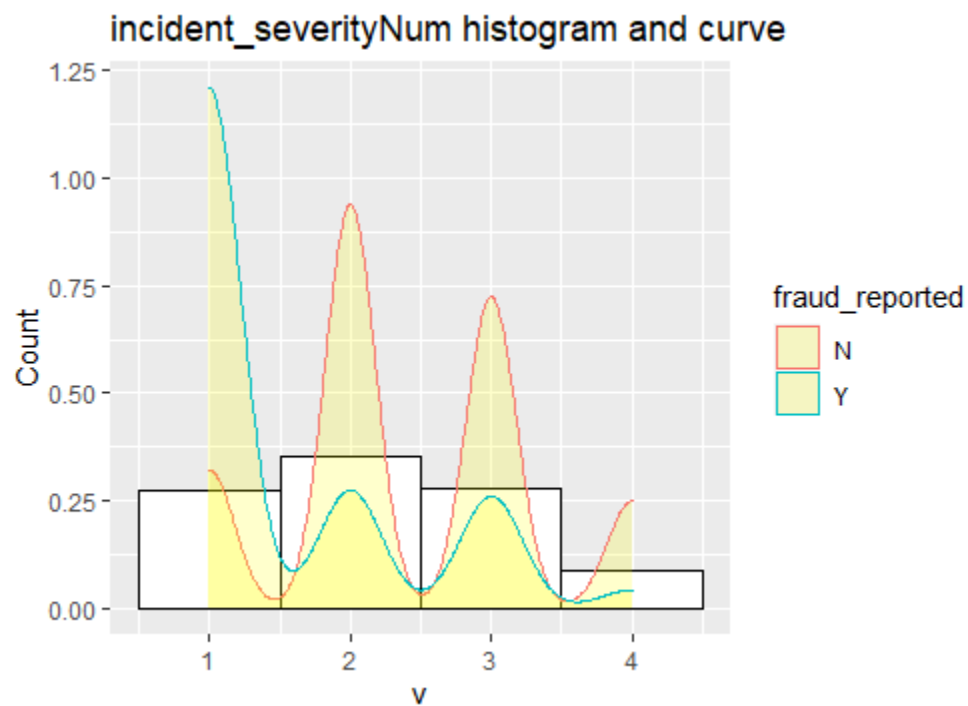
```
# Histogram of the insured_occupationNum variable with normal curve
ggplot(claims, aes(x=insured_occupationNum , col = fraud_reported)) +
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="insured_occupationNum histogram and curve", x="insured_occupationNum ", y = "Count")
```




```
# Histogram of the insured_hobbiesNum variable with normal curve
ggplot(claims, aes(x=insured_hobbiesNum , col = fraud_reported)) +
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="insured_hobbiesNum histogram and curve", x="insured_hobbiesNum ", y = "Count")
```



```
# Histogram of the incident_severityNum variable with normal curve
ggplot(claims, aes(x=incident_severityNum , col = fraud_reported)) +
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="incident_severityNum histogram and curve", x="incident_severityNum ", y = "Count")
```



```
# Histogram of the witnessesNum variable with normal curve
ggplot(claims, aes(x=witnessesNum , col = fraud_reported)) +
  geom_histogram(binwidth = 1, aes(y=..density..), colour="black", fill="white") +
  geom_density(alpha=.2, fill="yellow") +
  labs(title="witnessesNum histogram and curve", x="witnessesNum ", y = "Count")
```

