Mecklenburg County Sheriff's Office
Recidivism Analysis
August 2007

Jim Pendergraph, Sheriff

Overview

This analysis examines the recidivism rate of individuals incarcerated at the Mecklenburg County detention facilities. A cohort of 1,200 inmates[1] was randomly selected between the dates of July 1, 2005, and June 30, 2006 and tracked for a twelve month period from the date of their release. A person was deemed a recidivist if he or she returned to jail on a new charge, probation violation, or bond termination.

Federal prisoners were excluded from the analysis, as were inmates transferred to other jurisdictions or those serving multiple weekends (i.e., "weekenders").[2] Any arrests that occurred outside of Mecklenburg County were beyond the purview of the study.

Presented in the chart below are some of the key findings from the analysis.

Summary of Findings
➢ 76% of cohort had a previous arrest in Mecklenburg County.
➢ Nearly half (49%) of released inmates were rearrested within a year.
➢ Youthful offenders had a higher recidivism rate (55%) and a higher percentage of felony charges compared with other age groups (34% versus 22%, respectively).
➢ Offenders with property and drug charges had the highest recidivism rates (59% and 58%, respectively).
➢ Offenders were likely to be rearrested with the same level and type of offenses.
➢ The two most significant variables that predict the risk of recidivism were prior arrest history and level of classification.
➢ Half the recidivists were rearrested within three months (average: 118 days).
➢ Property-related offenders had the shortest survival time in the community.

I. Characteristics of the Cohort

Table 1 displays the demographic and incarceration reasons for the cohort. As shown, the cohort ranged in age from 16 to 78 years old with an average age of 31. A vast majority was male (82%) and African-American (62%). Nearly three-fourths (76%) of the cohort had a previous arrest resulting in incarceration at the Mecklenburg County jail.

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[1] Approximately 4% of the total population (95% confidence level with a 3% confidence interval).

[2] Of 36,746 inmates released from OMS during the study period, approximately 8,000 were excluded for the reasons stated.

A majority of the individuals were brought into custody through a visual arrest (65%), typically on a misdemeanor or non-DWI traffic offense (55% and 13%, respectively). The most common offenses were person and drug related (20% each) followed by property (19%). The average length of stay in jail was 13 days, but half of the inmates were released within 1.5 days. Many (49%) were released on secured bond.

Table 1: Demographics and Incarceration Reasons (n = 1,206)		
Age	**%**	**Mean = 31.4, Median = 29, Range = 16–78**
21 and under	20%	Youthful Offender = 5.5%
22–31	35%	
32–41	26%	
42 and above	19%	Age 52 and above = 4%
Gender		
Male	82%	
Female	18%	
Ethnicity		
African-American	62%	Mean age = 31.5
Caucasian	26%	Mean age = 33
Hispanic	12%	Mean age = 26.6
Prior Arrest		
Yes	76%	
Type for Arrest		**Average number of charges per arrest = 2.0**
ORD (Visual Arrest)	65%	
OFA	22%	
Warrant	13%	
Most Serious Level of Charge		
Traffic (Non-DWI)	13%	
DWI	10%	
Misdemeanor	55%	
Felony	22%	
Most Serious Type of Charge		**Common Charges in the Category**
Person	20%	Domestic violence, Assaults, Robbery, Weapon
Drug	20%	Possession, selling, Trafficking drugs
Property	19%	Burglary, Larceny, Trespassing
Technical	6%	Probation violation, Bond termination
Traffic (including DWI)	23%	DWI, License revoked, No insurance
Others	12%	Resisting arrest, Disturbance, Prostitution
Release Reasons		**Mean jail days = 13**
		Median jail days = 1.5
Secured Bond	49%	Average days in jail = 4.9
Unsecured Bond	20%	Average days in jail = 9.5
Time Served	19%	Average days in jail = 30.2
Dismissed	4%	Average days in jail = 48.0

II. General Recidivism Rate

Overall, the one-year recidivism rate for the cohort was 49%. Many of those who returned to jail were charged with a new crime[3] (35% of the total), while others came back due to existing charges (e.g., failure to appear in court, probation violation) or a crime committed before the previous confinement (14%). Figure 1 illustrates the one-year recidivism rate and disposition status of released inmates.

Figure 1: One-Year Recidivism Rate and Disposition Status


III. Recidivism Rate by Categories

As shown in the chart below, the overall recidivism rate had two age peaks: one at an early age (i.e., youthful offenders) and the other at middle age (i.e., ages 41–45).

Demographics	Recidivism
Age	
Youthful Offender	55%
18-21	49%
22-25	47%
26-30	45%
31-35	47%
36-40	49%
41-45	58%
46 and above	48%
Gender	
Male	50%
Female	41%
Ethnicity	
African-American	56%
Caucasian	39%
Latino	32%

The most common offenses for youthful offender were property-related and, as shown in the bar graph below, felony level crimes. The highest recidivism was observed for persons between the ages of 41 and 45, but their offense level was typically less serious than those of the youthful offenders. Specifically, misdemeanor drug-related charges (e.g., possession of minor drugs) were common in this age group.

Figure 2: Level of Most Serious Offense by Age Group

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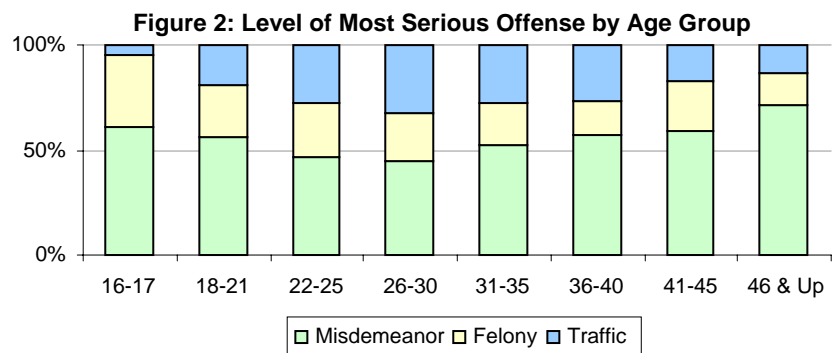
[3] New crime was defined as any offenses except for probation violation and bond termination committed after the release date.

Males had a significantly higher recidivism rate than females. However, females had a slightly larger percentage of felony charges at rearrest than males (23% and 22%, respectively). The most common charges among males were traffic-related, whereas females had more person-related charges.

African-Americans had the highest recidivism rate (56%) among the ethnicity category. Latinos, on the other hand, had the lowest (32%). Drug charges were common among African-Americans while Latinos were more likely to have traffic offenses. *(For more information about recidivism rate by categories see Appendix A.)*

Persons charged with misdemeanors had the highest recidivism rate (54%) followed closely by those charged with felonies (51%). Looking at the type of offenses revealed that individuals incarcerated for property and drug crimes were likely to return (59% and 58%, respectively). Somewhat surprisingly, DWI offenders had the lowest recidivism rate (28%).

Prior Charges	Recidivism
Most Serious Level	
Felony	51%
Misdemeanor	54%
DWI	28%
Traffic (non-DWI)	40%
Most Serious Type	
Person	46%
Drug	58%
Property	59%
Technical	36%
Traffic (including DWI)	34%
Others	44%

A more detailed offense-based analysis indicated that recidivism was great among those charged with prostitution (72%), disturbance (68%), and resisting arrest (59%).

IV. Comparison of Prior and New Offenses

Figure 3: Comparison by Level of Charge
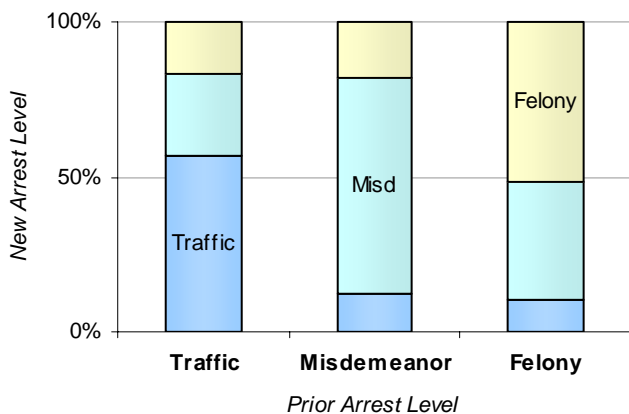
Figures 3 and 4 display a comparison of prior and new charges by offense level and type. A majority of individuals were rearrested for the same level of offense. Indeed, 57% of traffic, 70% of misdemeanor, and 52% of felony offenders were arrested again on the same level of offense.

Similarly, persons tended to be rearrested with the same type of charge. Nearly half of person, drug and property, and traffic offenders were rearrested for the same type of offense as the original charge that placed them in the cohort.

Figure 4: Comparison by Type of Charge
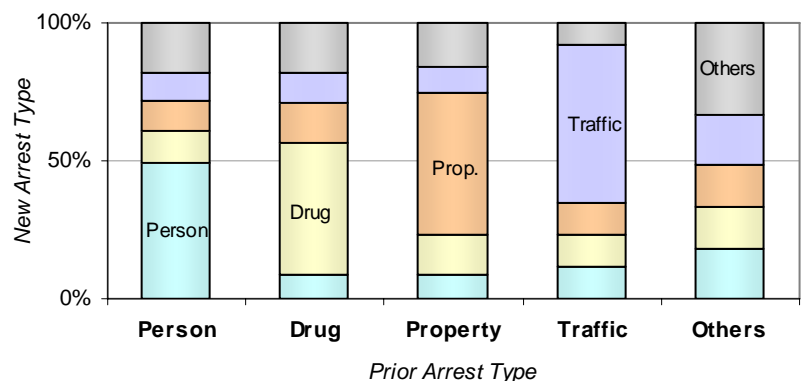
V. Regression Analysis of Recidivism

Two statistical models, logistic regression and Cox regression, were used to analyze the cohort. Both models are considered the standard for analyzing recidivism data in the social sciences and are used to predict the likelihood that one variable (e.g., sex, offense level, race, etc.) causes an outcome by statistically controlling for other factors.

For our research, the logistical model determines the likelihood that an individual will be rearrested within twelve months of release and indicates which variables, or factors, are the most important in predicting rearrest. The Cox regression, also known as survival analysis, is used to identify if rearrest is likely to occur and predicts the time frame it which it will happen given the personal and criminal factors influencing the individual.

a. Predictors of Recidivism

A total of 20 variables that are commonly found in the literature as good predictors of recidivism were tested to statistically indicate the probability of future arrests in Mecklenburg County. The variables shown in Table 2 represent the statistically significant groups most likely (or less likely) to be rearrested based on our data.[4]

The listed groups match well with existing research on recidivism[5] with two notable exceptions as both youth offenders (age) and minorities (race) were not found to be reliable predictors. In regard to young offenders, this group was clearly offset in our data by a significant number of 41 to 45 year olds in Mecklenburg County who are repeatedly rearrested for low level crimes (see the February 2007 Chronic Offender Study). Likewise, high recidivism among minorities is offset, in all likelihood, by aggressive immigration enforcement in Mecklenburg County which causes many illegal immigrant Latinos to be deported.

The beta coefficient (B), the first column of Table 2, shows the directional relationship between the independent variables and the dependent variable (rearrest).[6] The positive direction indicates that males having a prior arrest record, property and prostitution offenders, those with drug/alcohol problems and those arrested by ORD were more likely to be rearrested within 12 months after release. Persons with a higher level of classification score have a higher risk of rearrest than those with a lower score.[7] The negative direction in jail days showed that persons detained in jail for longer periods were slightly less likely to be re-incarcerated (-.007). The same was found for those that had multiple charges (-.113).

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[4] Variables included in the equation but omitted from the table as failing the statistical significant test were "Ethnicity," "Logged Age," "Youthful Offender," "Domestic Violence," "DWI," "Non-DWI traffic," "Probation Violation," "Disturbance," "Resisting Arrest," "Felony," and "Sentenced."

[5] For example, Gottfredson (1999) noted that factors empirically validated as a risk of any new arrests were age (younger), long arrest record, race (non-White), any heroin or barbiturate use in the past 2 years, number of prior probation sentences, alcohol use as problem drinker, less serious offense, number of prior jail sentences, property crime, and sale of drugs (Effects of Judges' Sentencing Decisions on Criminal Careers in National Institute of Justice Research in Brief).

[6] The natural logarithm of the odds that the subject will be rearrested.

[7] The level of classification was coded from 0 (minimum) to 8 (maximum).

The Wald statistic noted in Table 2 identifies the importance of the contribution made by each variable in the model. The high value of Wald in prior arrest (33.25) and classification score (29.62) indicates that these are the two most important predictors tied to rearrest in the model. The importance of classification score in the model indirectly affirms that the classification tool utilized by the MCSO is a good risk assessment instrument.

The logistic regression model, mentioned above, produces an odds ratio that assesses which group (e.g., male versus female, person with criminal history versus first-time arrestee) is more prone to recidivism. The odds ratio is shown as e^B in Table 2.[8]

Prostitutes, persons with prior arrests, and males were the most likely to be rearrested based on the odds ratio. Prostitutes had a 4:1 probability of rearrest, which means that a prostitute was four times more likely to be rearrested than other offenders. The ratios for prior arrests (compared to first time offenders) and males were 3.7:1 and 2:1, respectively. Persons with an indication of drug/alcohol problems[9] were 1.7 times more likely to be rearrested than those without such problems.

Table 2: Estimates of the Logistic Regression Model[10]

Independent Variables	B	Wald	e^B
Gender (Male)	.649*	9.224	1.913
Had Prior Arrest	1.303**	33.253	3.679
Property Offenders	.453*	3.836	1.573
Prostitution Offenders	1.380*	4.564	3.975
Drug/Alcohol Problem	.539*	6.731	1.714
Arrested by ORD	.376*	4.749	1.456
Classification	.340**	29.621	1.405
Jail Days	-.007*	7.837	.993
Number of Charges	-.113*	3.809	.893
Constant	-2.754**	33.459	.064

Note: *P<.05, **P<.001,

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[8] e^B = $\dfrac{\text{Probability of rearrest occurring}}{\text{Probability of rearrest not occurring}}$

[9] Arrestees with minor drug charges (i.e., possession of marijuana or paraphernalia) were assumed to have some drug use problems, and with "intoxicated and disruptive" or "open container" charges were presumed to have some alcohol issues. Note that offenders with felony drug charges (mostly selling/trafficking cocaine) had no statistically significant difference in the probability of rearrest.

10 Dependent Variable (rearrested = 1); Model Statistics: X2 = 150.019; p < .001; -2LL = 940.624; Nagelkrke R2 = .23.

b. Survival Time in the Community

In the cohort, the average recidivist was rearrested about four months after release (118 mean days) and nearly half were rearrested in less than three months (88 median days). Misdemeanants had the shortest time period between release and rearrest (mean: 110 days; median: 79 days in the community), followed closely by felons (mean: 117 days; median: 88 days in the community)

Property-related recidivists had the shortest survival period (87 days on average) with half rearrested within two months. In contrast, traffic offenders[11] had the longest time between release and rearrest (average 151 days and median 135 days).

Domestic violence recidivists had a shorter time between release and rearrest compared with those with other person-related charges (average 124 days and 99 median days for domestic violence offenders).

	Average Days	Median Days
All Recidivists	**118**	**88**
Level of Offense		
Traffic (DWI included)	151	135
Misdemeanor	110	79
Felony	117	88
Type of Offense		
Person	133	112
Drug	117	98
Property	87	60
Technical	148	117
Traffic (DWI included)	151	135
Others	104	62

The Cox regression model was used to estimate the survival rate of the individuals in the community without rearrest by offense level and type.

Survival Function for patterns 1 - 3
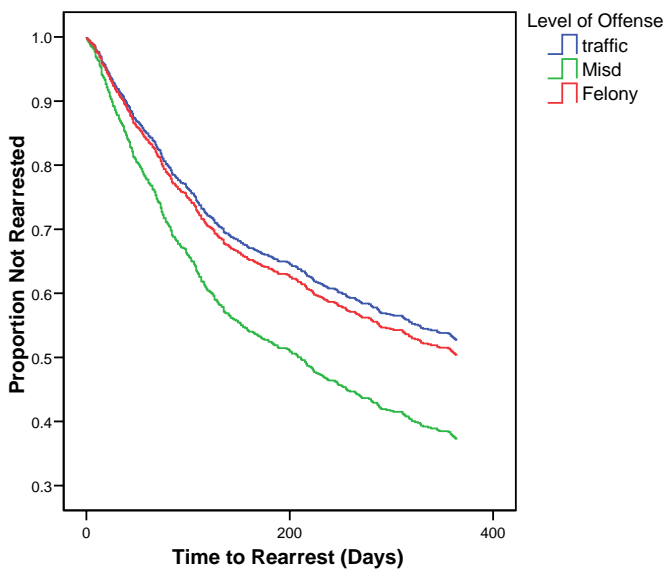
The graph at the left shows how the proportion of individuals surviving in the community without rearrest decreases differently by level of offense over time.

Controlling for demographic and background factors, misdemeanor offenders had a steeper inclination of the survival rate compared with other groups (i.e., they were rearrested faster).[12]

The graph illustrates that roughly 200 days after release from jail nearly half of the misdemeanor offenders were rearrested, whereas approximately 65% of other groups were still in the community without rearrest.

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11 The survival time of DWI offenders was 193 days on average with a median of 215 days.
12 Model Statistics: -2LL = 5612.139; P<.001

Survival Function for patterns 1 - 6
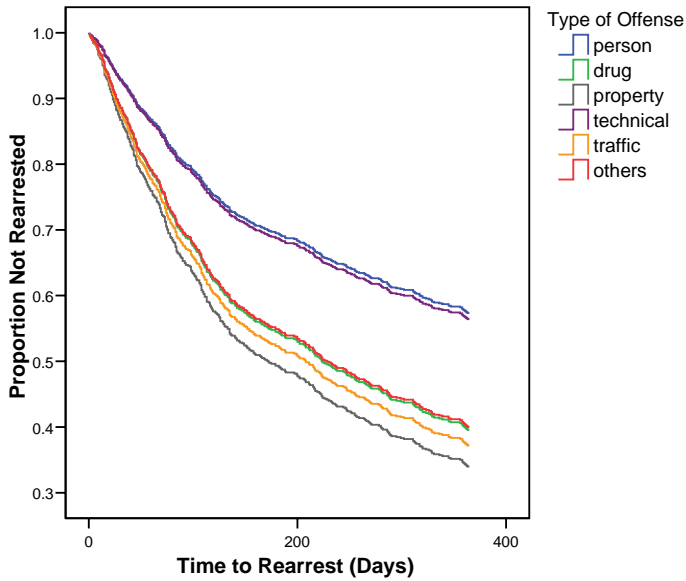
The next graph shows the survival curve for six offense categories. Of the offenses, technical and person-related offenders were the most likely to survive in the community without rearrest.
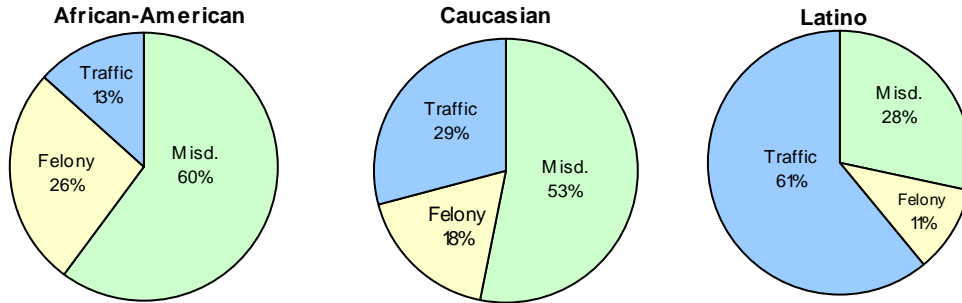
Those with property charges had the worst survival rate of the six offense categories, which was consistent with the logistic regression analysis. Hence, property charges were statistically related to the probability of rearrest as well as the timing of future arrests.

(For more information about variables in the equation, see Appendix B.)

## *Appendix A: Type and Seriousness of Offense by Category*

Seriousness of Charge by Ethnicity

African-American

Traffic 13%
Misd. 60%
Felony 26%

Caucasian

Traffic 29%
Misd. 53%
Felony 18%

Latino

Misd. 28%
Traffic 61%
Felony 11%

Type of Charge by Ethnicity

	African-American (%)	Caucasian (%)	Latino (%)
Person	23.9	16.7	8.0
Drug	24.3	15.7	8.7
Property	21.4	16.7	14.5
Technical	6.3	7.5	0.7
Traffic	13.2	28.9	60.9
Others	10.9	14.4	7.2
	100.0	100.0	100.0

Seriousness of Charge by Gender

Male

Traffic 25%
Misd. 53%
Felony 22%

Female

Traffic 13%
Felony 23%
Misd. 64%
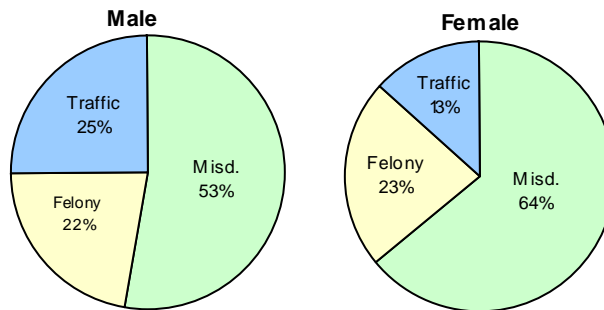
Type of Charge by Gender

	Male (%)	Female (%)
Person	19.4	23.4
Drug	19.8	21.1
Property	18.8	21.6
Technical	5.7	6.9
Traffic	25.4	12.8
Others	11.0	14.2
	100.0	100.0

Appendix B: Estimates of Variables in Cox Regression

Variables[13]	Exp (B)	B (SE)	Wald	P
Gender	1.296	.259 (.134)	3.737	.053
Ethnicity (Reference) Caucasian			12.684	.002
Ethnicity (1) African-American	1.279	.246 (.120)	4.191	.041
Ethnicity (2) Latino/Others	.701	-.355 (.207)	2.929	.087
Logged Age	1.747	.558 (.361)	2.385	.122
Youthful Offender	1.184	.169 (.217)	.607	.436
Prior Arrest	2.499	.916 (.153)	35.648	.000
Classification	1.287	.252 (.034)	45.188	.000
Days in Jail	.996	-.004 (.037)	5.436	.020
Number of Charges	.986	-.014 (.033)	.168	.389
Drug/Alcohol Problem	1.249	.222 (.137)	2.618	.107
ORD	1.195	.178 (.101)	3.106	.078
Level (Reference) Traffic			7.457	.024
Level (1) Misdemeanor	1.541	.432 (.768)	.317	.574
Level (2) Felony	1.071	.068 (.777)	.008	.930
Type (Reference) Person			24.281	.000
Type (1) Drug	1.667	.511 (.183)	7.819	.005
Type (2) Property	1.940	.663 (.148)	19.924	.000
Type (3) Technical	1.029	.029 (.245)	.014	.906
Type (4) Traffic	1.779	.576 (.771)	.558	.455
Type (5) Others	1.646	.499 (.174)	8.199	.004

Hazard Function at mean of covariates