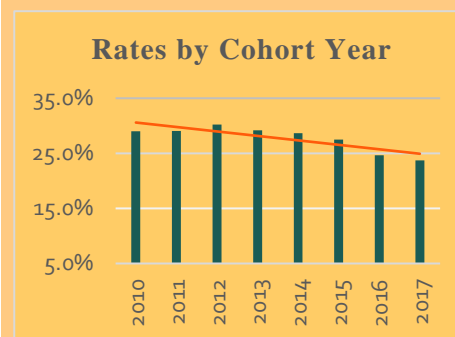


Prison Recidivism®



IN THIS ISSUE: IDENTIFYING RISK FACTORS AND SURVIVAL TIME

RECIDIVISM DECLINES 15.16%

Several factors affect an individual’s decision or compulsion to commit a crime, many of them are unknown or non-quantifiable. An individual’s upbringing, ability to distinguish between right and wrong, support system, values, and negative influences are not always taken into consideration when attempting to quantify criminogenic behavior.

Once incarcerated, the Nevada Department of Corrections has knowledge of the sentencing structures, offense types, the offenders’ demographic characteristics, criminal history, and programming. Although there are confounds, it is possible to assess and predict the probability that an offender will succeed after a period of incarceration.

This newsletter issue presents findings from the analysis of the Year 2017 release cohort that validate former studies that evaluate what inmate characteristics increase or decrease the predictive probability of recidivism, of survival in the community, and time at risk, and it identifies offender groups that are at most risk of returning to custody.

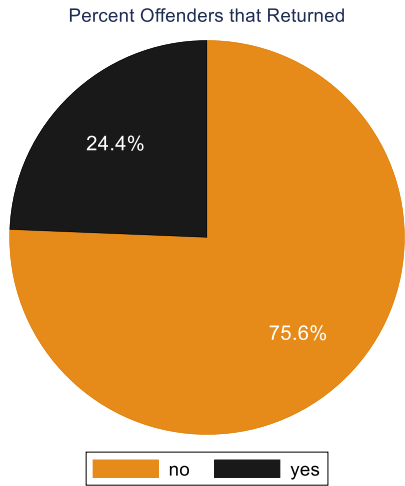
The Counts

During 2017, a total of 5,890 Nevada commitments were released from custody, 934 females and 4,956 males of which 1,435 returned within 36 months of release. Offenders that discharged or released on mandatory parole comprised 57.88% of releases while paroles comprised 42.12%. In all 24.36% of offenders released recidivated.

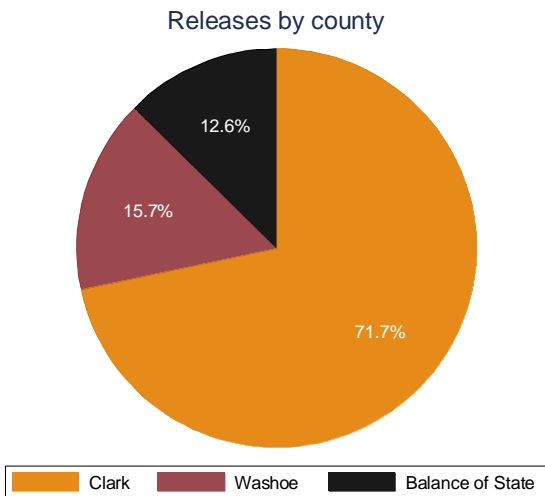
2017 Releases by Release Status		
Release Status	Count	Percent (%)
Discharged	2,238	38.00
Mandatory Parole	1,171	19.88
Parole	2,481	42.12
Total	5,890	100.00

Release Status and Recidivism Status			
Release Status	No	Yes	Total)
Discharged	79.45%	20.55%	100.00%
Mandatory Parole	80.61%	19.39%	100.00%
Parole	69.85%	30.15%	100.00%
Total	75.64%	24.36%	100.00%

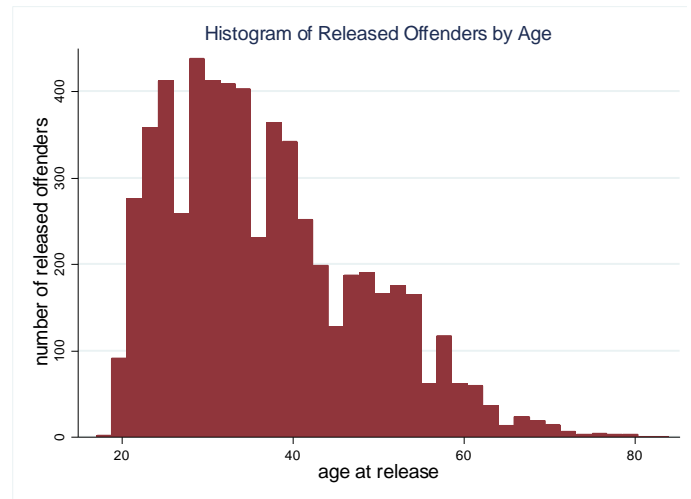
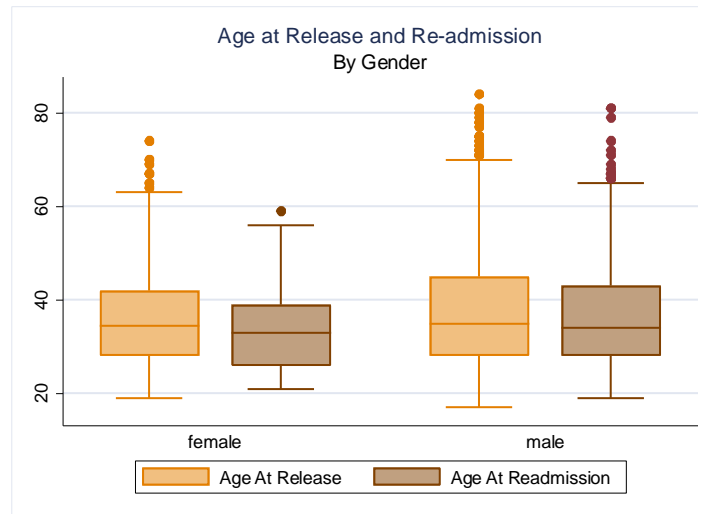
Percent Returned by Re-admission Status	
Imprisonment Status	Percent Returned
New Commitment	46.55%
Mandatory Parole Violator	7.25%
Parole Violator	46.20%
Total	100.00%



Nevada has 17 counties, two of them urban and the remaining 15 rural. Rural counties represent the smallest proportion of offenders committed to serve prison time, given the size of their populations. Thus, for this analysis released offenders were divided into three groups, Clark County, Washoe County, and balance of state as depicted in the chart below.



Females released from custody were between 19 and 74 years of age, with a median age of 34.5, a mean of 35.73, the lower 25th percentile was up to 28 years of age, and the top 25th percentile was 42 and up. Males released were 20 to 84 years of age, with the bottom 25th percentile up to 28 years of age, a median age of 35, a mean of 37.05, and a top 25th percentile of 45 years of age and up. The median and mean ages of offenders that returned were lower than for offenders at time of release. For females, the median age was 33 and the mean 33.46; while for males, the median age was 34 and the mean 36.42. The lower median ages for those that returned can be visualized by the lines inside the boxes, the interquartile ranges by the lines that extend under and over the boxes, and the outliers by the dots outside the top quartile.



The histogram above confirms that the age of offenders released is positively skewed, and this is true also for the concentration of age values of offenders that return. The recidivism rates for offenders released between the ages 17 and 34 was 26.61% to 29.89%, while for the older groups it ranged between 18.15% and 22.76%.

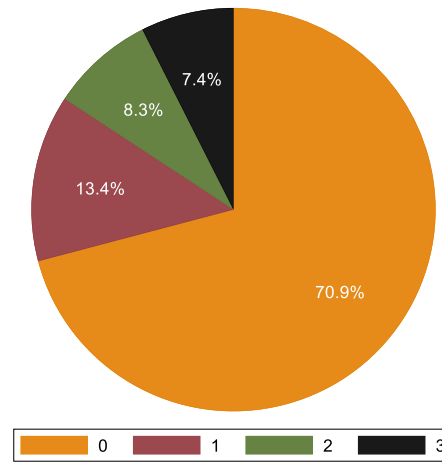
Release Cohort by Offense Characteristics

Other criminogenic and demographic characteristics of importance include the offenders' offense group, category felony, mental health impairment, and habitual status. The relative sizes of these groups provide insight regarding the types of offenders that are commonly represented in Nevada's correctional system.

The most serious offense attributes of the crime for the sentence that is released is of importance in terms of defining the seriousness of the offense and the offender's criminogenic characteristics, and this information is of value for understanding their role in prison returns.

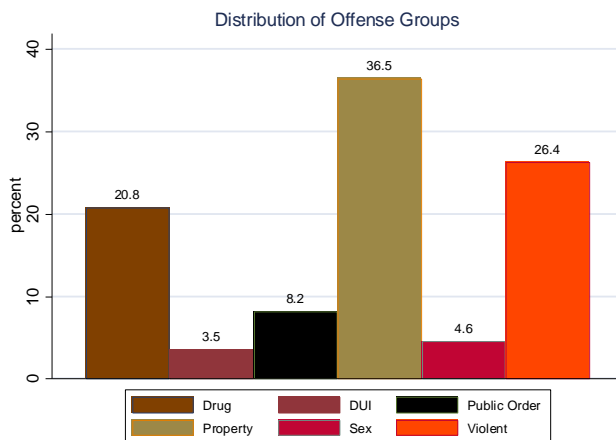
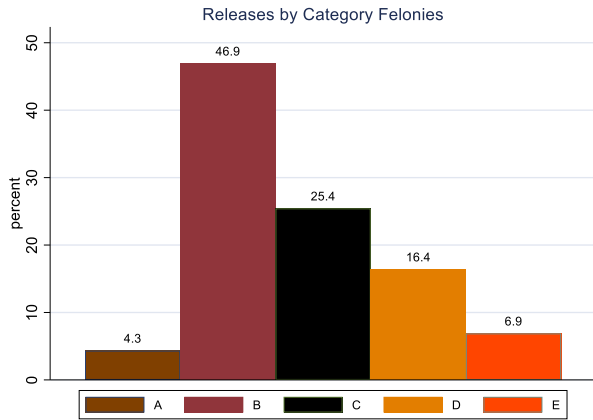
The 2017 cohort of offenders released from the NDOC was largely characterized by category B and category C felons who encompassed 72.36% of them; and drug, property, and violent offenders comprised 83.71% of the cohort. Furthermore, 70.88% had no prior felony convictions and 97.23% were non habitual offenders.

Percent Offenders by Prior Felonies



differed with 42.66% being violent, 17.73% property, and 10.69% drug offenders.

Habitual offenders, as their status suggests, are committed to a state prison multiple times; yet they represented less than 3% of offenders released during 2017. Although the tendency to stereotype criminal behavior with serious mental health conditions, less than 1% offenders released in 2017 suffered from moderate to severe mental health impairments and approximately 14.00% suffered from mild to moderate mental health impairments.



The total population of offenders in custody at year-end 2017 had larger proportions of category A felons (23.09%) and B felons (53.75%) than the 2017 release cohort. The distribution of offenders in custody by offense group also

Repeat Offenders Released

Habitual Status	Population	Percent
Habitual status	163	2.77%
Non habitual	5,727	97.23%
Total	5,890	100.00%

Offenders Released by Mental Health Status

Mental Health Status	Population	Percent
No impairment	5,046	85.67%
Mild impairment	798	13.55%
Moderate impairment	42	0.71%
Severe	4	0.07%
Total	5,890	100.00%

Prison Recidivism on the Decline

Between Calendar Years 2010 and 2017, the Nevada Department of Corrections released between 4,972 and 5,842 felony offenders from within its jurisdiction. The proportion of offenders that returned within 36 months of release was as large as 30.24% for the 2012 release cohort and as low as 23.74% for the 2017 release cohort – the cohort with the largest number of releases in the series. The 2016 release cohort realized the largest year-over-year decrease with the proportion of offenders that returned plummeting 10.55%. The average decline in prisoner returns within the State of Nevada by yearly cohort was 2.74%

The State of Nevada has undertaken several policy initiatives and practices to reduce prison crowding within the state, some which resulted in inmates serving shorter lengths of stay, allowing offenders to serve time on probation, decriminalizing non-violent criminal acts, and reducing the severity of select offenses from felony offense to misdemeanor offense. In addition, coordination with service providers in the community, offering a wide variety of programs of rehabilitation during the incarceration period, and programs supported by the Bureau of Justice Assistance to reduce prison returns are all assumed to have contributed to the slowing down in prison return rates.

Of essence is the level of cost savings realized by the prison system in daily facility rates, nutrition, supplies, clothing, medical care, programming, transportation, and administrative costs, as well as on the reduction of the deterioration of buildings that is caused by overcrowding of aging buildings that require ongoing maintenance. Prisons and camps that are housed at optimal versus above emergency level enable corrections staff to be better manage their prison populations.



Recidivism Series Returns Series				
Cohort	Releases	Returns	Rate %	% Change
2010	5,323	1,545	29.03%	--
2011	5,271	1,533	29.08%	0.17%
2012	5,106	1,544	30.24%	3.99%
2013	4,972	1,452	29.20%	-3.44%
2014	5,260	1,506	28.63%	1.95%
2015	4,996	1,375	27.52%	-3.87%
2016	5,041	1,241	24.62%	-10.55%
2017	5890	1435	24.36%	-1.08%

Most importantly, the change in rates for select periods of time have been statistically significantly different. For example, the differences in rates between 2010 and 2017 and between 2012 and 2017 are highly statistically different.

The probabilistic and survival time models that are discussed in the foregoing sections expand on the relationship between demographic and criminogenic attributes of the correctional population and the propensity to return to custody as well as the predisposition to survive in the community. Parametric and non-parametric models are resourceful for forecasting and comparing rates for current and future cohorts and setting and comparing them against performance targets. When the probability that an offender is likely to return to prison is known conditional on various factors, the rate for offenders that meet the conditions can be estimated forward.

Predicting At-risk Groups

An event-based approach is resourceful for identifying the types of offenders that are most likely to return, which in turn provides insight as to treatment approaches, policy making, post-incarceration supervision, and programming strategies. Knowing what percent of offender groups are most likely to return is useful for forecasting the number of offenders that will return and the need for prison beds in future time periods.

The Effect of Offender Characteristics and Time

Parametric and non-parametric approaches are applicable in predicting the probability that the offender will return to prison within a specified period after release from prison, as well as for predicting the offender’s chances of survival or failure in the community post incarceration at specified points in time.

Findings

The predictive model designed for this study led to the conclusion that Nevada’s population of prison offenders shares many characteristics with the offender populations of other states in that younger males have larger predictive probabilities of returning at least once within thirty-six months of release than females or older individuals.

Increase

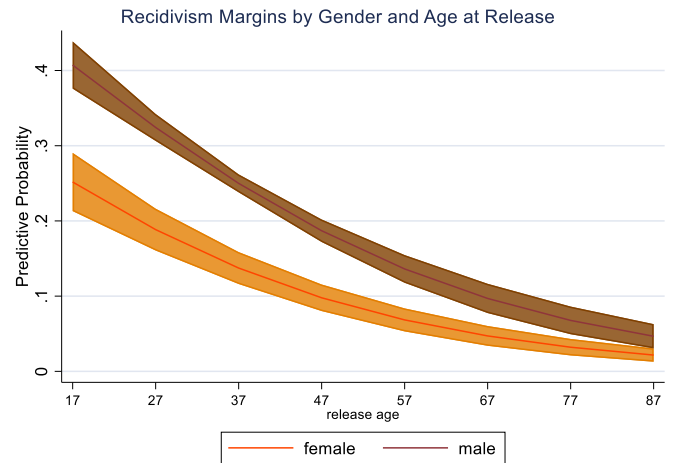
- ✓ Gender ***
- ✓ Washoe County commitments***
- ✓ Mild mental health condition**
- ✓ Property, drug, and public order offenses***
- ✓ Category offense C **
- ✓ Category offense D*
- ✓ At least one prior felony offense ***
- ✓ Parole release***
- ✓ Habitual criminal status**
- ✓ Length of stay in prison***
- ✓ U.S. Citizen***

Decrease

- ✓ Release age***
- ✓ DUI, sex, or violent offenses ***
- ✓ Category offense B***
- ✓ No prior felony convictions***
- ✓ Ninth to twelfth grade*
- ✓ Completion of at least ninth grade*
- ✓ Vocational programs*

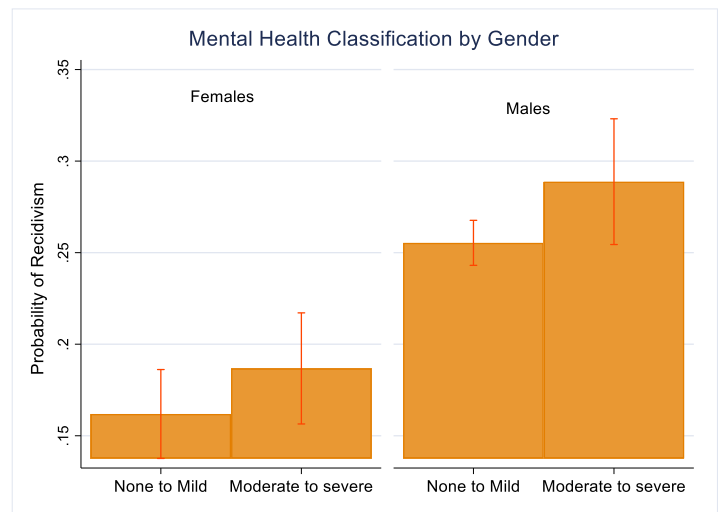
Males and females differ in their likelihood to return to custody. When the offender is a male, the predictive probability increases by 11.15% compared to a female, and for each additional ten years of age, the probability decreases 6.31%. Sex and age at time of release are always significant; however, as age increases, the likelihood of returning decreases. For example, for the 17 to 26 age group, the predictive probability that a female

returns is 25.17%, while for a male the probability is 40.72%. A drastic decline is predicted for the 37 to 46 years of age group, with the probabilities declining to 9.80% for females and to 18.70% for males.



Gender	Predicted Probability	Range	
Female	16.66%	14.27%	19.03%
Male	25.96%	24.77%	27.17%

The NDOC performs mental health assessments of its inmate population at time of intake, and offenders are assigned to treatment programs based on their mental health classification. Offenders in the 2017 release cohort with moderate to severe mental health conditions were 3.88% more likely to return to prison than those without them.

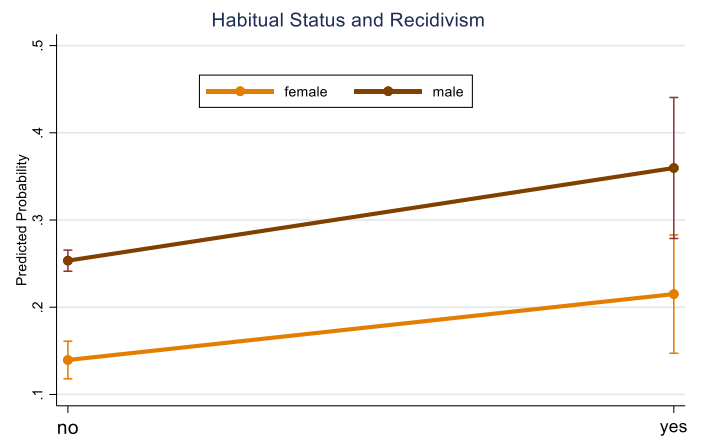
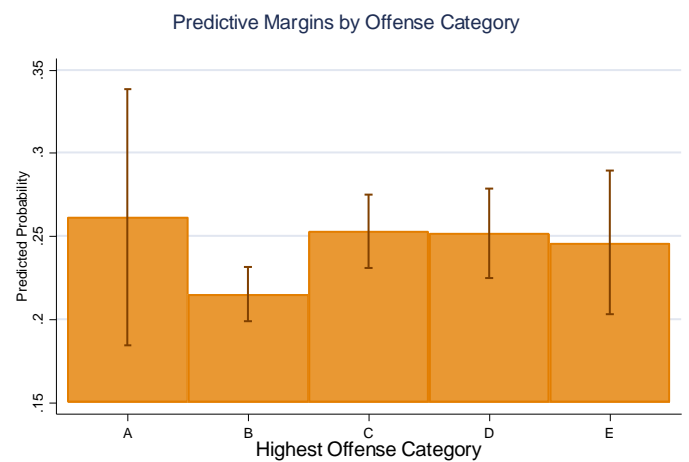
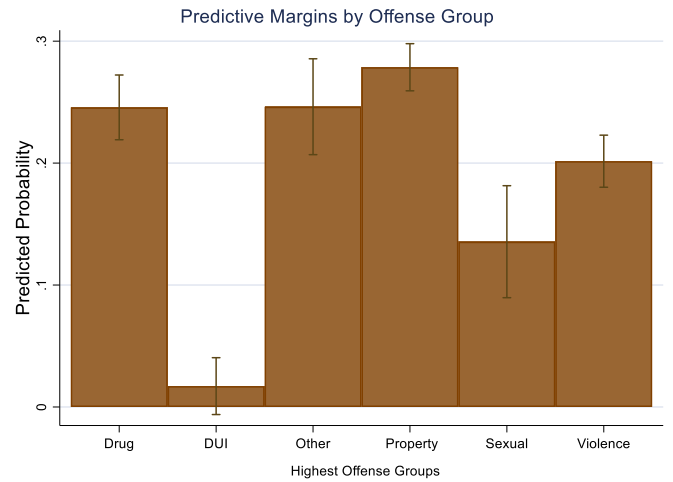


Mental Health Impairments	Predictive Probability	Range %	
Females			
None to Mild	16.35%	13.88%	18.81%
Moderate to Severe	18.50%	15.47%	21.52%
Males			
None to Mild	25.56%	24.32%	26.79%
Moderate to severe	28.43%	24.96%	31.91%

Higher levels of education before incarceration for the 2017 cohort also manifested themselves with lower probability of returning to custody. Offenders that had completed ninth to twelfth grade, for example, were 15.40% less likely to return and offenders who completed some college were 18.11% less likely than offenders who had less than a third grade education. In fact, higher levels of educational attainment are associated with significantly lower returns to prison than programming during the period of incarceration.

Educational Attainment	Predicted Probability	Range	
3 rd Grade or Lower	31.17%	0.06%	56.30%
4 th to 8 th Grade	25.55%	18.98%	32.11%
9 th to 12 th	23.22%	21.41%	25.09%
High School	24.08%	22.56%	25.59%
Some College	20.70%	17.87%	23.52%
College Degree	25.58%	20.23%	30.93%

Consistent with historical cohorts, offenders that don't commit property offenses were less likely to return than non-property offenders. DUI offenders stand out in that the probability of returning to prison is 18.80% lower than for property offenders, seconded by sex offenders whose probability is 12.31% lower. Individuals in the 2017 release cohort that committed category C offenses were 3.18% more likely than category B felons to recidivate.



As expected, individuals with a minimum of three to five felony convictions who are classified as habitual offenders in accordance with NRS 207.012 and 207.014 were 11.92% more likely to recidivate than non-habitual offenders given their recurring offending patterns. Likewise, the more prior felony convictions, the more likely that the offender will return, given that the predictive rates increase by 9.97%, 8.61%, and 19.41% for offenders with one, two, and three or more prior convictions

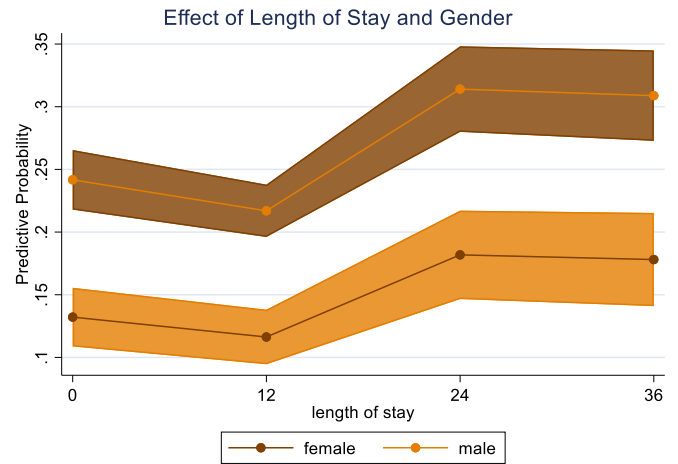
relative to those with zero convictions before the booking that was released.

Gender	Habitual		Prior Felonies			
	No	Yes	0	1	2	3+
Female	16.34%	26.00%	13.96%	21.71%	20.61%	29.71%
Male	25.59%	37.90%	22.36%	32.73%	31.32%	42.38%

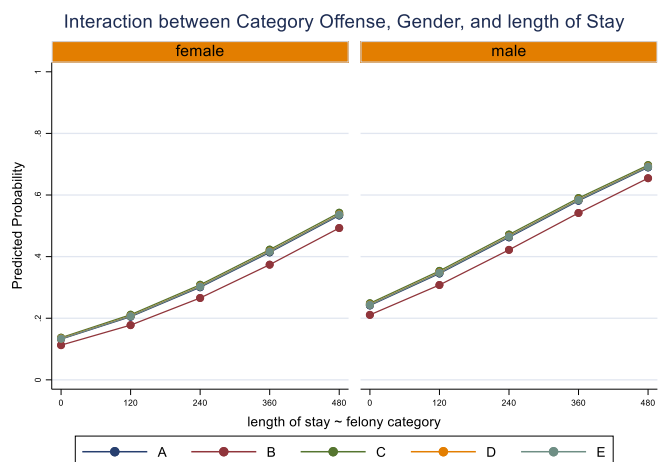
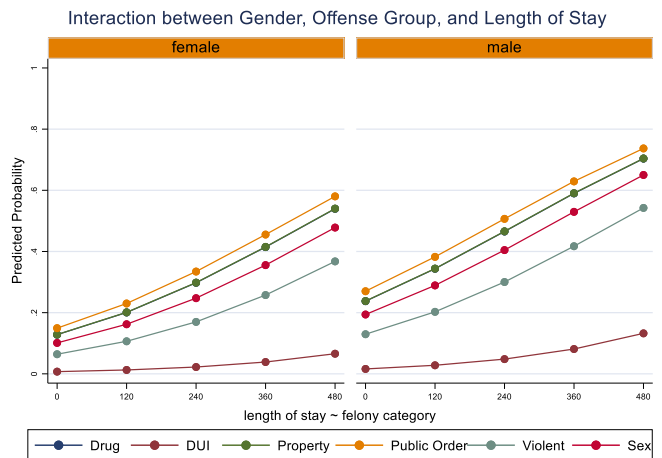
The relationship between length of stay and the probability that the offender will return varies with time. Lengths of stay no more than 12 months are associated with slight decreases in the chances that that the offender will return; however, once the offender has been incarcerated for 24 to 35 months, the predictive probability increases by 7.32%, and for 36 or more months, it increases by 6.78%. Without regard to the interactive effect of various other variables, the predictive probability for women remains below the average of 23.74% regardless of length of stay, declining from 14.42% to 12.90% after 11 months and then rising to 13.46% between 12 and 23 months, to 14.04% and 15.25% when reaching 47 and 48 months or more of stay, respectively. For males, during the first 11 months, the offender is 23.23% less likely to return than if he had no time in prison, and the likelihood increases to 24.08%, 24.95%, and 25.82% with each additional twelve months, and to 26.73% when he serves at least 48 months in prison.

Length of Stay	Females	Males
0 to 11	12.90%	23.23%
12-23	13.46%	24.08%
24-35	14.04%	24.95%
36-47	14.64%	25.82%
48+	15.25%	26.73%

Long lengths of stay may affect the ability to succeed in freedom. This may be attributed to the loss of social skills needed to remain as a member of society, the lack of support systems that may have been present in years past, not having access to select services or networking opportunities to gain employment opportunities, or simply confronting the limitations that come with the aging process. For all offense groups, predictive rates increase with length of stay, except that for DUI offenders, the predictive probability of returning is significantly below the mean rate of 23.74% regardless of time spent in custody. The margins plots depicted in this section demonstrate that time in custody of one year or more, results in incremental increases for both, females, and males. Margins curves become steeper when stay is measured in intervals of 100 months.



Although the decrease in the probability of recidivism declines after serving prison time for up to 12 months, the decrease is not significant; however, after 12 months in prison, the increase in the probability of recidivism is significant. A length of stay of 24 months is associated with a 7.92% increase, and a length of stay of 36 or more months in prison is associated with an increase of 18.88%.

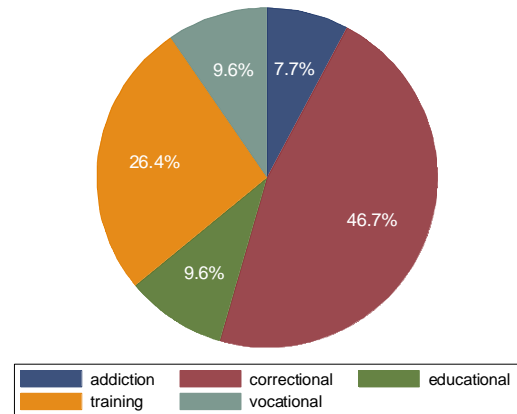


Most likely to return of all three major release statuses are those released on parole, and when interacted with county of commitment, parole offenders still stand out. Least likely to return are those who discharge their sentences, with them being the group of offenders that don't have to adhere to the conditions that parolees must meet, and they are not supervised once in the community. Offenders on parole may fail in the community for a variety of reasons, such as neglecting to report to their parole officers, failing drug tests, or committing new crimes; and being supervised in that fashion makes them more prone to return than offenders that discharged their sentences. The county of commitment for the release booking in 2017 isn't necessarily the county where the person lived post incarceration, though inmates often are released to the same county. Approximately 70% of all commitments are from Clark County, the most populous and urbanized region of the State of Nevada. A model of prison returns within the state is restricted to identifying the predictive probability that an offender who meets select conditions will go back to custody in that state.

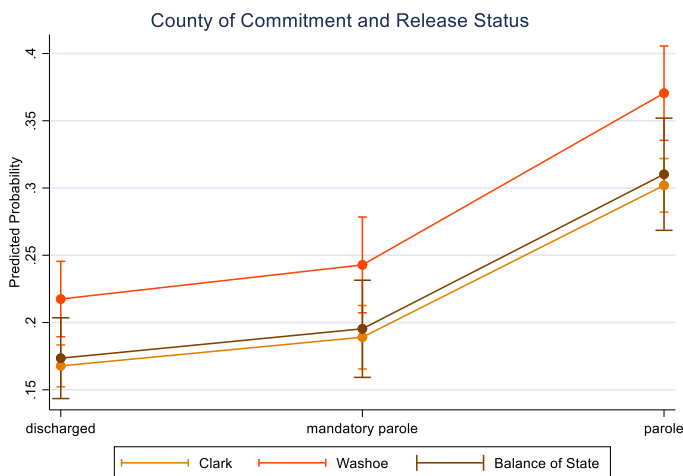
a high school diploma and general education certificate, and learn job training and vocational skills. In general, the average number of programs completed by incarcerated individuals is approximately the same for those who return and that do not return; as depicted in the pie chart below, the proportion of individuals that complete each program type is disproportionately smaller than for offenders that do not complete them except for correctional programs.

Didn't complete Programs	2,317	39.34%
Completed Programs	3,573	60.66%

Percent of Offenders by Program Completion Type



Addiction Program Completions		
Prison Return Status	Average Programs	Counts
No	2.24	334
Yes	2.25	103
Total	2.25	437



Release Status	County		
	Clark %	Washoe %	Balance of State %
Discharged	16.75%	21.74%	17.35%
Mandatory Parole	18.91%	24.28%	19.53%
Parole	30.19%	37.05%	31.02%

Rehabilitation

Offenders are encouraged to complete a variety of treatment programs that are intended to assist them to gain coping and life skills, to overcome addictions, anger, and violent tendencies, earn

Education Program Completions		
Return Status	Average Programs	Counts
No	1.20	405
Yes	1.15	137
Total	1.18	542

Job Training Program Completions		
Return Status	Average Programs	Counts
No	1.42	1119
Yes	1.36	369
Total	1.41	1488

Vocational Program Completions		
Return Status	Average Programs	Counts
No	1.34	430
Yes	1.38	110
Total	1.35	540

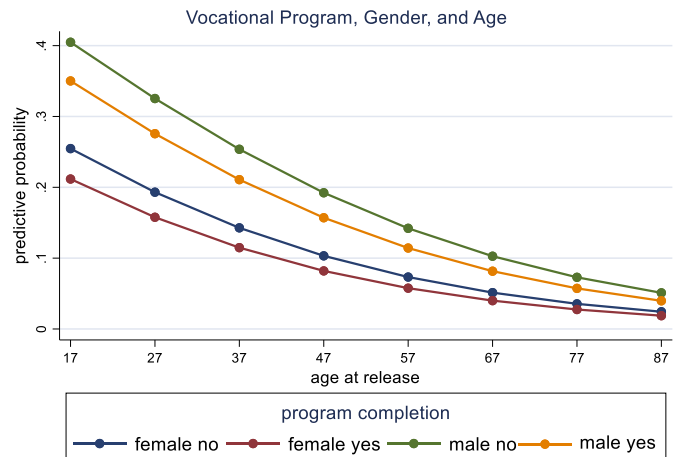
Correctional Program Completions		
Return Status	Average Programs	Counts
No	2.98	2022
Yes	2.87	617
Total	2.96	2,639



The Significance of Recidivism

The events that lead an ex-offender to violate the conditions of parole in the community encompass reasons beyond the scope of this publication. Naturally, individuals have free will and correctional systems cannot be in control of ex-offenders' behaviors post incarceration. Select individuals have a natural pre-disposition to criminogenic behavior, were raised with a variety of values, have mental health conditions that lead them to act compulsively without first evaluating the consequences, or have numb feelings towards other humans and objects. The world outside confinement is also subject to temptation to return to the old lifestyle. It is believed, however, that participation in rehabilitative, educational, and career training programs provides structure for these individuals that set the groundwork for improving their social skills, recovery from substance abuse, reduce anger and abusive behavior, and prepare them to seek gainful employment.

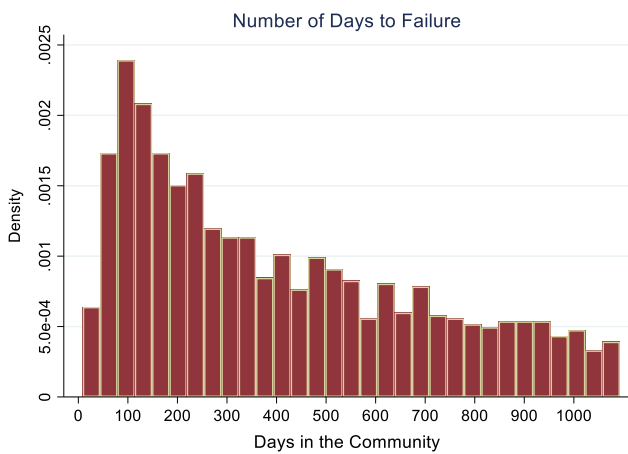
While there is an assumption to believe that there is a relationship between recidivism and prison programming, it can be proven empirically that offenders that completed vocational programs were less likely to return than their counterparts when controlling for length of stay. Furthermore, the interaction of age and sex of the offender influence the effect of completion of programs and future criminogenic and compliant conduct. The charts below depict these relationships. For example, offenders that complete vocational programs have statistically different probabilities that decline with age, and when females reach the age of 67 and males 77, the probability of returning to prison is nearly the same. A male offender that completes vocational programs and is released at the age of at least 37 is expected to have a lower chance of returning that is below the average of 25.56% for all male offenders while this is not the expected for a male who doesn't complete them. A female that completes vocational programs while incarcerated has an overall 11.84% chance of returning, while her counterpart has a 14.70% chance, and these overall probabilities are achieved once she is at least 37 years of age at time of release.



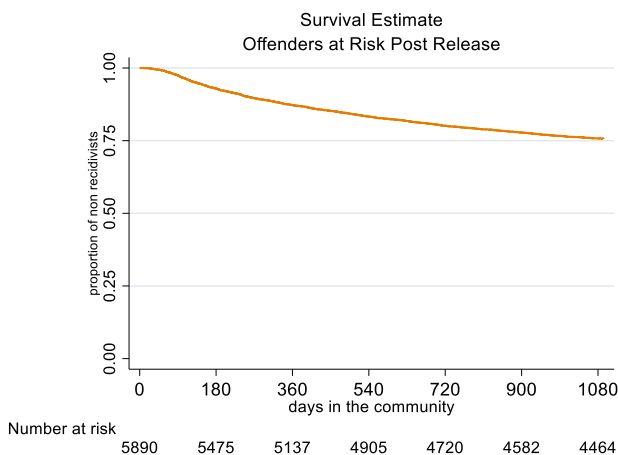
Time to Failure and Survival time

Knowing how soon after release from prison the average recidivist is likely to return is fundamental for crafting policies of supervision, programming, and support services in the community. Becoming cognizant of time at risk and which offender groups are also at most need of rehabilitation and support services post incarceration provides for more efficient planning and coordination of services.

The study period for NDOC’s prison returns analysis is 9 days or 0.29 months to 1093 days or 35.9 months, and a histogram of time in the community before returning to prison reveals that the concentration of returns occurs within the first 407 days or 13 months, which incites the desire to examine if this is the period when the average ex-prisoner is at most risk.



It can be observed from the graph above that time in the community is not normally distributed and time at risk and survival in the community can be further analyzed with the use of the Kaplan-Meier survivorship function to derive the mean survival rate for ex-prisoners. This curve shows that time at risk begins when individuals exit the correctional system; with fewer of them remaining in the community as the study period progresses, the function has a mean survival rate of 78.60%, and a mean failure rate 24.36%.



The ability to succeed post incarceration varies for different types of offender groups; however, select individuals possess little to no risk of returning while others tend to be at great risk. When it comes to survival, ex-offenders with larger predictive probabilities of returning to custody also have lower survival rates, and for select groups, the survival curves are significantly different.

Survival Rates and Time in Freedom

The tabulations below delineate the number of offenders living in freedom, the number that failed, and the survival rates in six-month intervals demonstrating that once the typical offender is free in the community for 180 days, the chance of survival is 92.92%, after 365 days 87.11%, and after 1093 days (32.9 months) the survival rate drops to 75.64 %, and this translates into a cumulative failure rate of 24.36%.

Time (days)	Offender Counts	Failures	Survival Rate
180	5475	417	92.92%
365	5133	342	87.11%
547	4900	234	83.14%
729	4710	188	79.95%
911	4575	135	77.66%
1093	4458	119	75.64%

Now that it is known how many failed every 180 days, it is also known that failures continue to occur at a declining rate, affirming that the months following immediately after release to freedom is when the offender is at most risk of returning to custody.

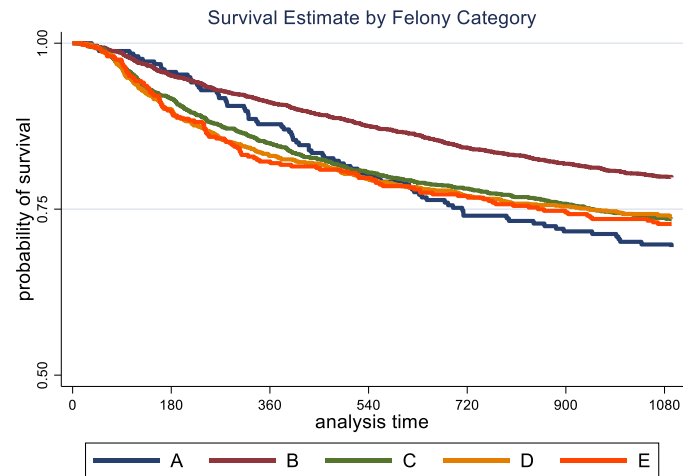
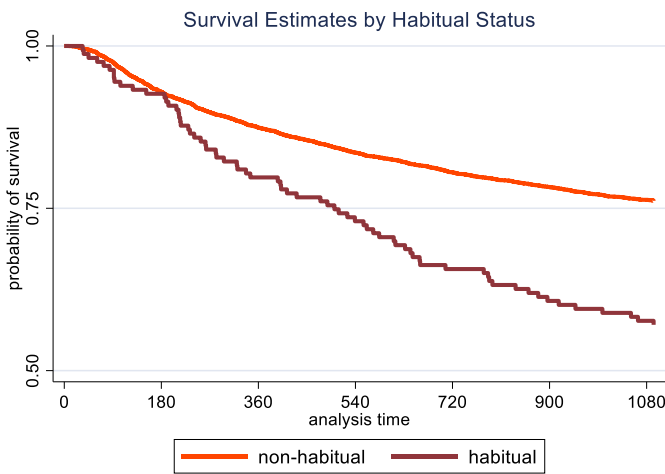
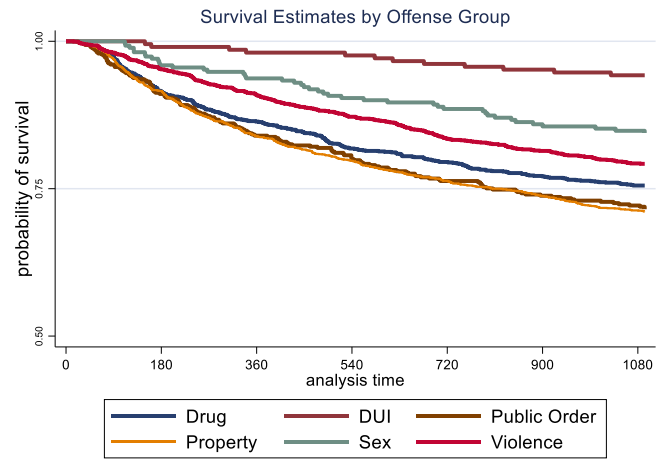
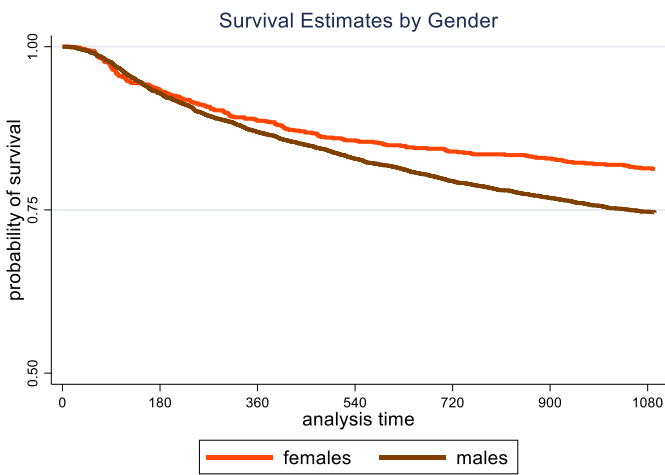
Survival Rates by Offender Types

If one was interested in determining if community supervision, therapeutic treatment, or any other rehabilitation needs to be provided more intensively immediately after release or over the long run, survival curves can provide evidence of which types of individuals need the most support and when, although, non-parametrically. For example, habitual offenders are likely to remain free 65.64% of the time by the 547th day (two years) while non-habitual offenders are 78.14% likely. The survival rate for habitual offenders, however, drops to 57.06% at the end of the study period, while for non-habitual offenders it drops to just 76.17%.

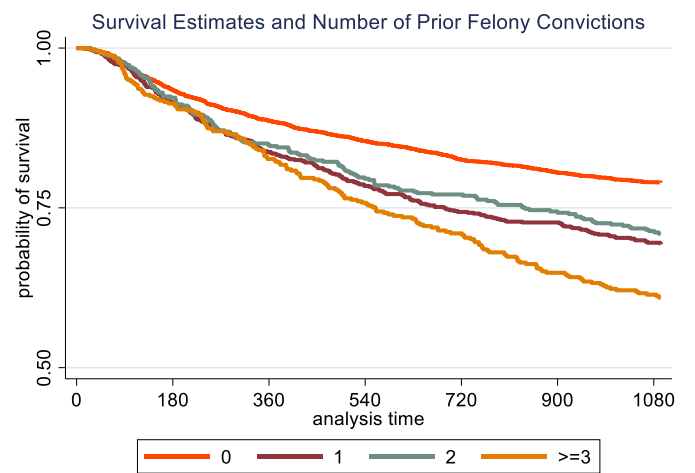
For males and females, during the first 180 days, survival rates are in the low 90s. Survival for women declines gradually to 89.41% on the 365th day and to 82.86% by the 1093rd day. The rate for males declines from 86.93% on the 365th day to 82.71% at 547 days, to 79.20% at 729 days, and to 74.58% by the 1093rd day. Similarly to the relationship between prison returns and offense groups, survival functions reveal that 94.23% of DUI offenders can remain free, followed in rank by sex offenders with 84.44% of them surviving through the end of the study period. Survival rates decline from the low 80th percentile to the low 70th percentile for public order and property offenders between the 365th and 1093rd day in freedom (two to three years); for drug and violent offenders survival rates decline from the low 80th percentile by

the 547th day (18 months) to the mid-70th percentile by the 1093rd day; and 90.73% of violent offenders remain free through the 365th day, then survival declines steadily to 81.40% by the 911th day and to 79.21% through the 1093rd day.

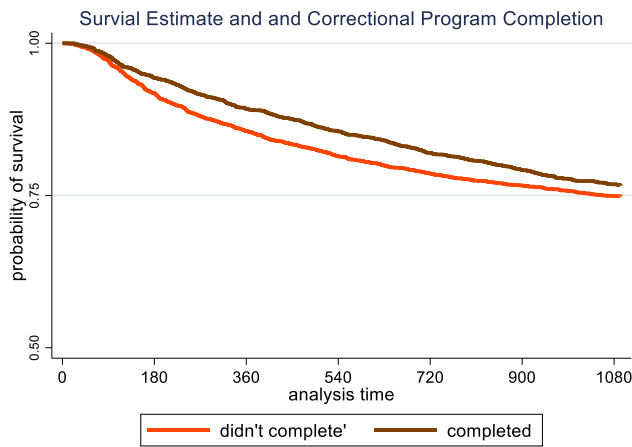
1093rd day, and the ones without prior felonies survive approximately 79.00% of the time.



Tantamount to the relationship between offense category and return to prison, there is also an association between offense category and the size of the survival functions. Category A felons take the lead with 95.31% remaining in the community the first 180 days after release, seconded by Category B felons with 94.93% surviving. Nevertheless, the survival rate of Category A felons declines to 87.50% by the 365th day and to 68.75% by the 1093rd day. The survival curve for B felons decreases gradually to 90.56% by the 365th day and to 78.84% having the tallest Kaplan-Meier curve of all category felonies by the end of the study period. Conversely, the survival functions of Category C, D, and E felons diminish more rapidly with both at over 89.00% within the first six months, then declining to approximately 82.00% to 85.00% by the end of the first twelve months, and then settling in the range of 72.00% to 73.00% by the end of three years. As expected, the survival functions of offenders with one or more prior felony conviction decline more swiftly than for offenders without prior felonies as all of them stay in the low 90th percentile within the first 180 days, those with at least one prior felony tumble to between 61.00% and 70.00% by the



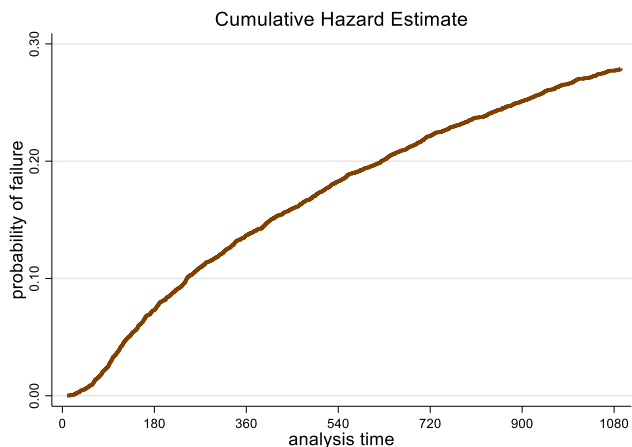
Worth mentioning is that offenders that complete vocational training and correctional programs have a survival function that is statistically different and moderately above the function of individuals that had not completed these programs.



Survival curves provide good visualization of the fact that offender groups have approximately the same chance of survival in the community at first, and these chances spread apart with time. In addition to the visualization features available with survival curves, survival functions provide specific information as to what percentage of individuals survive after a given number of days in the community.

Time at Risk and Failure Rates

Every survival model has a survival and a hazard function. Hazard functions model which periods have the highest or lowest chances of failure events, and the cumulative hazard function is the total number of expected events. The hazard rate is the failure rate, and it can be constant, increase, or decrease. Now instead of calculating survival rates, it will be demonstrated with the Nelson-Aalen failure function how many remained in the community and how many failed in six-month intervals. The intent remains the same, to gain insight regarding time at risk for specific offender groups.



The tables below display the extent to which failure and cumulative hazard functions increase as time increases. The Kaplan-Meir failure function shows that, during the first 12 months of release, 753 or 52.57% of 1435 recidivists failed. Similarly, the Nelson-Aalen cumulative hazard function

demonstrates that 753 or 48.98% of total recidivists reached a cumulative hazard rate of 13.67%. Although failure rates continue to increase in each of the six-month intervals presented in this analysis, the rate of increase falls from 5.70% between the seventh to twelfth month post release, and the six-month average declines to 2.31% thereafter. Comparably, the hazard rate for the first six months in freedom is 7.34% and 6.33% for the following six months, and then it declines to a six-month average of 2.85% through the end of the study period. Thus, both types of functions confirm that the first 12 to 13 months are the most at risk for prison recidivism confirming that this is the period when support services are needed the most to help ex-prisoners to improve the chances of succeeding in society. Though, confounds such as parole supervision need to be taken into consideration.

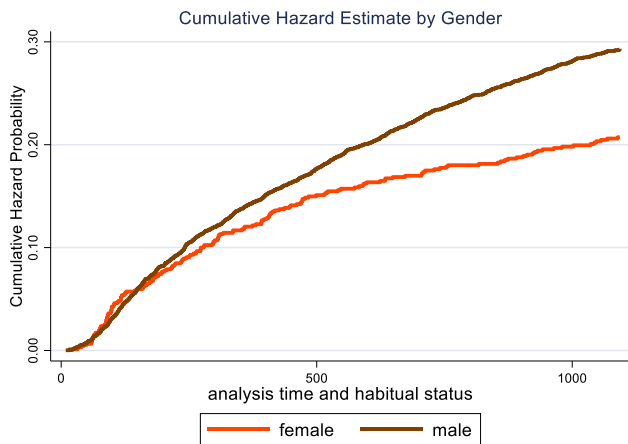
Time	Beginning Counts	Failures	Failure Function
180	5,475	417	7.08%
360	5,139	336	12.78%
540	4,908	232	16.72%
720	4,721	185	19.86%
900	4,582	139	22.20%
1080	4,465	117	24.21%
1260	4,458	9	24.31%

Time	Beginning Counts	Failures	Cumulative Hazard Function
180	5,475	417	7.34%
360	5,139	336	13.67%
540	4,908	232	18.29%
720	4,721	185	22.14%
900	4,582	139	25.13%
1080	4,465	117	27.71%
1260	4,458	9	27.91%

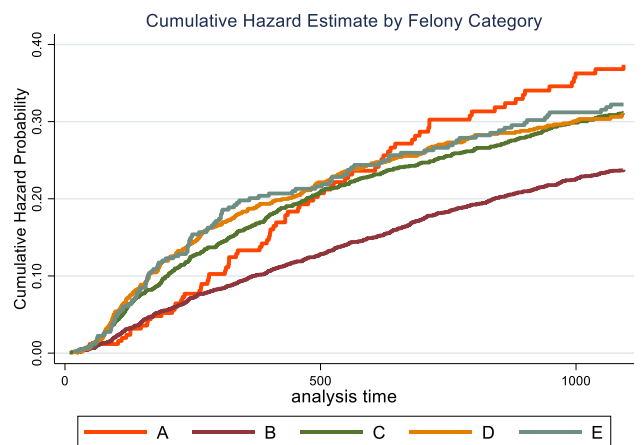
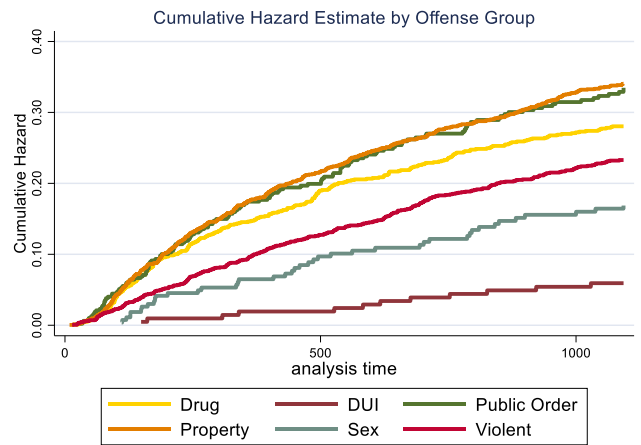
Cumulative hazard functions also vary by individual demographic and criminogenic offender characteristics and provide insight regarding hazard rates at specific time intervals as time increases. The hazard rate for DUI

offenders, for example, is less than 1.00% the first 17 ½ months in the community and then for drug offenders, the hazard rate before the 12th month post release is 7.31% and thereafter declines to a six-month average of 3.35% until it reaches a cumulative hazard rate of 28.04%. Property offenders stand out among all offense groups with an average hazard rate of 8.76% within the first 12 months, and the six-month average thereafter declines to 4.06% until reaching a cumulative rate of 33.79% by the 35th and a ½ month.

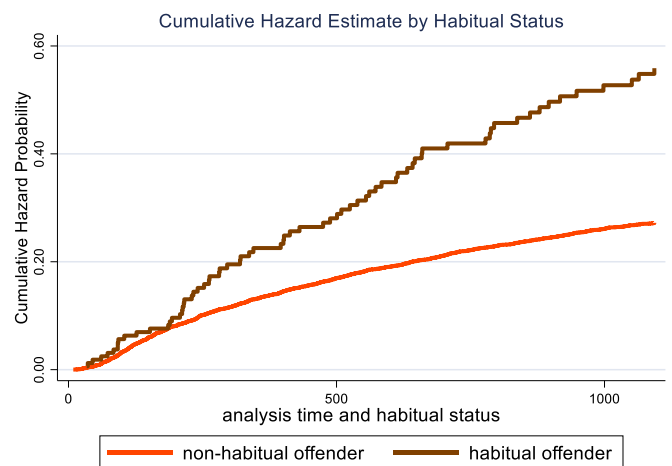
As it is the case with the probability of recidivism and survival, women and men have statistically significantly different cumulative hazard functions. As depicted below, shortly after the period of risk begins, the curves touch; then the six-month average rate for females the first 12 months is 6.02% and increases at a rapidly decreasing rate below the function for males at a six-month average of 2.72% the following 12 months, and then to an average of 1.55% the last 12 months until reaching 20.6%. The function for males increases by 6.99% every six months the first 12 months, then at a six-month average of 4.53% the subsequent 12 months, and then at an average of 1.53% the last 12 months until reaching 26.11%.



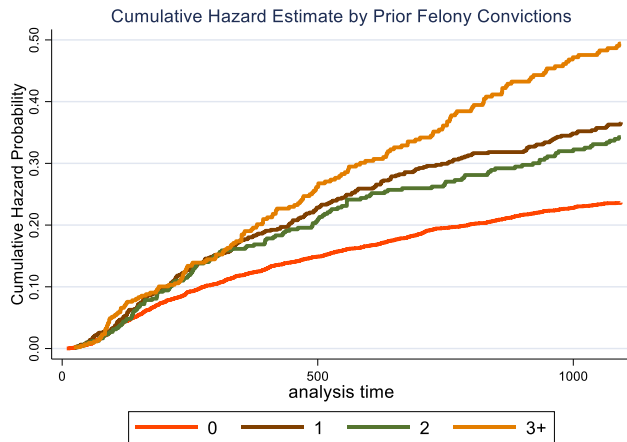
Cumulative hazard functions for offenders by offense category reflect hazard rates that support the findings of the probabilistic model in that Category B felons cumulative hazard reaches 23.64% by the 35th ½ month, which is below the mean rate of 24.31%, and rates increase smoothly from a 23rd 1/2-month rate of 4.46% to a declining six-month mean rate of 2.89% through the end of the study period. In contrast, Category A and E felons have cumulative hazard rates of 36.81% and 32.22%, respectively. The six-month mean rate for Category A felons is 7.57% before 24 months are up and the six-month mean rate thereafter declines to 3.27% while rising above the functions of all the other category felonies. The largest average six-month rate within the first 12 months of freedom is accumulated by Category E felons at 8.61%, which suddenly declines to a six-month mean rate of 3.11% through the 35th ½ month.



Habitual offenders clearly exhibit a larger cumulative hazard function than non-habitual offenders which rises to 54.82% by the end of the study period, with a six-month average rate of 11.27% by the end of the first year in freedom and then declines to a six-month average rate of 8.07% thereafter. Non-habitual offenders exhibit a cumulative hazard function that rises to 27.04% by the 35th ½ month, beginning with a six-month mean rate of 6.75% by the end of the first year in freedom, and a declining average six-month rate of 3.40%.



The cumulative hazard function for offenders who carried 3 or more prior felony convictions before the booking released in 2017 is much more above than the function for offenders that carried no prior convictions. The hazard function for the former increases by an average of 8.11% every six months until it rises to 48.66% by the end of the 36th month period; and for the latter the six-month average rate is 3.92% until reaching 23.55% by the end of the period.



The cumulative hazard functions displayed in this section show that for select offender types, the functions either touch or are close except for offenders convicted of DUI or sex offenses. As time at risk increases, these functions sometimes spread apart, and if the distances are significant, it is a sign that different types of offenders need to be subjected to different strategies of supervision and programming in the community.

The Unknowns

Binomial probability and survival analysis methods are applicable for determining the association between the factors that result in recidivism being more likely and time at risk. While possessing an understanding of this concept is insightful for anticipating what an individual might do after release to freedom and knowing the individual predictions may be useful for mapping rehabilitative programs for the offender while in custody, one must be aware that confounds murk the underlying knowledge that affect whether the individual will be successful in society and the reasons for select groups being more susceptible to recidivism. Factors such as a support system, the activity types that influence how the person will control his or her actions when tempted to commit other crimes, the use of illicit substances, the level of educational attainment, where he or she is positioned in society, access to medical and mental health care, or financial and housing needs, and whether the person is on parole supervision may all play a role in the chances of staying out of trouble with the law.

The analysis provided in this issue concluded that male offenders are at more risk of relapsing, and that it is more probable that an individual that is younger than 37 years of age will return to prison than an individual that is 37 to 46 years or older.



Repeat offenders, property, drug, and public order offenders are predicted to have higher chances of recidivism, but DUI offenders are less likely to return, have high chances of surviving in freedom, and have minimally low cumulative hazard functions. In all, it is possible for any ex-inmate to return to custody, and offender groups with predictive probabilities and hazard rates that are statistically significantly above the mean rates are the ones that need more targeted rehabilitation strategies.

Completing programs while serving a prison sentence may prove worthwhile and allow the individual to earn coping skills, and vocational programs are the most constructive given the association between these types of programs and lower recidivism rates. Sixty-three percent of offenders in the 2017 release cohort had completed high school or had attended college before incarceration and 9.20% earned a high school diploma or general education equivalence in prison. This study concluded that when the offender has at least attended high school, the predictive probability of returning to custody declines below the mean rate of 24.36%. Thus, investing in education proves a valuable strategy towards preventing repeat criminogenic behavior and it might be a fruitful strategy for reducing crime.





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