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Risk/Needs Assessment Project

Interim Report 3

Factors that Predict Recidivism for Various Types of Offenders

2011



Risk/Needs Assessment Project

Interim Report 3

Factors that Predict Recidivism for Various Types of Offenders

Highlights

This report presents findings from a series of analyses examining predictors of recidivism for four offense types: personal, property, personal, and firearms. There were four major findings:

- While offenders do commit a variety of offenses, there is a tendency for offenders to specialize in the type of crime they commit.
- The most consistent predictors of recidivism were age and number of prior arrests. Younger offenders, and offenders with a greater number of prior arrests, were more likely to recidivate.
- Less consistent predictors of recidivism were race, gender, county, and offense gravity score. Black offenders were more likely than white offenders to recidivate; males were more likely than females to recidivate, and offenders from Philadelphia were more likely to recidivate, especially compared to offenders from rural counties. Offenders with lower offense gravity scores were more likely to recidivate.
- Prior convictions and type of sentence were not found to predict recidivism.

The findings raised three policy questions to answer in the utilization of these factors in a risk assessment instrument:

- What demographic factors are appropriate to consider [age, race, gender, county]?
- Is it appropriate to consider factors that are linked to those already considered by the guidelines [e.g., number of prior arrests if some of those arrests result in convictions used by the guidelines]?
- Is the risk of committing certain types of crime more serious than other types of crime [personal, property, drug etc.]?



Background. The correctional reform legislation enacted in 2008 [Acts 81, 82, 83 and 84 of 2008] requires the Commission to develop and adopt new guidelines for parole (county and state) and re-parole, as well as for re-sentencing following revocation probation, CIP and SIP. In developing guidelines for parole, Act 81 of 2008 mandates that the guidelines consider validated risk assessment tools, and take into account available research relating to the risk of recidivism. Additionally, Act 95 of 2010, which was signed by Governor Rendell on October 27, 2010, mandated the Commission to develop a risk assessment instrument to assist the court at sentencing. Specifically, Act 95 mandated that the Commission undertake the following:

- Have the guidelines adopt a risk assessment instrument to be used at sentencing
- Consider the risk of re-offense and threat to public safety
- Help determine if offender is a candidate for alternative sentencing programs [RRRI, CIP, SIP, BC]
- Develop an empirically based worksheet using factors predicting recidivism

Interim Reports. To address these new mandates, the Commission has undertaken the Risk Assessment Project. Stage I of the project, which was started during the summer of 2010, was directed toward obtaining information on the current utilization of risk assessment instruments in other jurisdictions, the identification of risk factors used by other instruments, and the availability of information contained in pre-sentence investigations in a sample of 25 counties. Interim Report 1 on the findings from that stage was provided to the Commission in October 2010.

Stage II of the project is the initial recidivism study utilizing primarily criminal justice factors, and limited demographic factors, to determine what factors best predict recidivism for various types of offenders. Stage III of the project will be an expansion of the recidivism study to determine the impact that other factors [e.g., drug use, employment status, education] have on risk of recidivism. Interim Report 2 was provided to the Commission in June 2011 and provided recidivism rates with respect to:

- Overall recidivism rates after one year, two year, and three year tracking periods
- Recidivism by OGS and PRS
- Recidivism by guideline cell
- Recidivism by sentence type
- Recidivism by offense type
- Recidivism by specific offenses within each guideline cell

This report presents the findings from a series of analyses conducted to determine which factors are the best predictors of recidivism for offenders convicted of various types of offenses.

Recidivism Study. In order to develop a risk assessment instrument, we are first conducting a study to determine which factors best predict risk of recidivism. The current study is examining risk factors for offenders convicted of offenses at Level 3 and Level 4 of the sentencing guidelines, along with a limited number of Level 5 offenders [OGS/PRS of 9/0; 9/1; 9/2]. These levels were chosen for three reasons: 1) the offenses at these levels encompass a wide variety of offense seriousness [OGS ranging from 2 to 8 depending upon prior record]; 2) the sentence recommendations provide for a variety of sentence types [prison, SIP, BC, jail, probation, IP]; and 3) we can use a sample sentenced during 2004, 2005, and 2006 [SGS Web data years], which allows for a three year tracking period for most offenders.

Measuring Recidivism. We used re-arrest and re-incarceration on a technical violation for offenders sentenced to state prison as our measures of recidivism. We obtained arrest information from the criminal history records maintained by the State Police. In determining exposure time, we used date of



sentence for probation cases, expiration of minimum sentence for county jail sentences,¹ and date of release for state prison sentences. The Department of Corrections provided the date of release, as well as information on technical violations that resulted in return to prison, which we took into account for the recidivism of offenders sentenced to prison.

Study Sample: Development and Validation Samples. We decided to examine DUI offenders separately because they differ from non-DUI offenders on several dimensions. Thus, our total sample consisted of 41,563 non-DUI offenders.² The next step involved randomly splitting the sample into two sub-samples; one, a development sample to be used for the development of the risk assessment tool, the other, a validation sample to test the predictive capability of the tool. This split resulted in a sample of 20,812 for the development sample. The final step was to select out only those offenders with ‘solitary convictions’ to assess better the recidivism of certain types of offenses, without the ‘noise’ of the myriad combinations of multiple offenses. Thus, our initial analysis includes 10,486 offenders who were convicted of only one offense. Subsequent analysis will add those offenders with multiple convictions. For this report, we are examining offenders who were tracked for a minimum of three years. Thus, we removed 948 offenders who did not meet this criterion, which resulted in 9,538 offenders included in the analysis.

Sample Description. As shown in Table 1, Most of the offenders were male [84%], were from an urban county [83%], and had a mean age of 32. Almost half, 47%, were Black; 42% were white, and about 9% were Hispanic. The average Offense Gravity Score was 5 [based on a scale of 1- 9 used for this sample], with the largest number of offenders being convicted of a drug offense [43%], followed by property [28%], personal [18%], firearms [5%], and other [7%] offenses. The majority [86%] of offenders had at least one prior arrest, and had a previous arrest for a personal [68%], property [69%], and/or drug [56%] offense. Most of the offenders had prior convictions [72%], with a mean PRS of 3 [on a scale of 0 to 6]. The most common sentence imposed was jail [58%], with the remaining offenders receiving prison [10%], probation [22%], and county intermediate punishment [9%].

¹For county jail sentences, date of release was unavailable. Since the judge has paroling authority in these cases, offenders can be released prior to the expiration of the minimum. Findings from another study the Commission has underway indicate that about a third of the offenders are released prior to their minimum, about a third at the expiration of their minimum, and about a third post minimum sentence. Further, most offenders in our study had served their maximum sentence for the two and three year recidivism analysis. Thus, we decided that expiration of minimum sentence was the best measure to use to determine exposure time.

² The sample began with 58, 696 offenders based upon separate judicial proceedings. Cases were removed due to SID not being found [n=124]; lack of match with state police criminal history records [n=886]; ‘sample offense’ not located in criminal history records [n=3,677]; cases entered as separate judicial proceeding but should have been entered as single judicial proceeding [n=3,075]; offender appeared twice in same year [6,417]; offender had less than one year follow-up [n=1,409]; no match with DOC data [n=346]; offender still in prison [n=913]; offender transferred to state hospital [n=53]; offender escaped [n=135], or offender had died during study period [n=98].



Pennsylvania Commission on Sentencing

Table 1. Descriptive statistics for development sample, solitary offenders (N = 9,536).

	N	%		N	%
Race			Offense type		
White	4,097	43.0	Personal-- Felony	867	9.1
Black	4,529	47.5	Personal-- Misdemeanor	618	6.5
Hispanic	811	8.5	Sex offense-- Felony	152	1.6
Other	99	1.0	Sex offense-- Misdemeanor	52	0.6
			Drug-- Felony (PWID)	3,372	35.4
Gender			Drug-- Misdemeanor (Possession)	681	7.1
Male	8,203	86.0	Burglary	429	4.5
Female	1,333	14.0	Other property offense	2,208	23.2
			Firearms/other weapons	465	4.9
Age			Other offense	692	7.3
< 21	1,591	16.7			
21 - 24	1,631	17.1	Prior Arrest		
25-29	1,460	15.3	Yes	8,204	86.0
30-34	1,210	12.7	No	1,332	14.0
35-39	1,207	12.7			
40-44	1,104	11.6	Type of Prior Arrest [not mutually exclusive]		
45-49	740	7.8	Personal	6,493	68.1
> 50	593	6.2	Property	6,571	68.9
Mean	31.75		Drug	5,293	55.5
			Firearms	1,763	18.5
County			Other	6,694	70.2
Philadelphia	2,375	24.9			
Allegheny	1,256	13.2	PRS		
Other urban	4,343	45.5	0	2,690	28.2
Rural	1,562	16.4	1	1,069	11.2
			2	1,104	11.6
OGS			3	644	6.8
1	143	1.5	4	1,211	12.7
2	497	5.2	5	2,206	23.1
3	2,071	21.7	RFEL	612	6.4
4	197	2.1	Mean	2.60	
5	1,678	17.6			
6	2,582	27.1	Type of sentence		
7	1,598	16.8	Prison	939	9.9
8	587	6.2	SIP	9	0.1
9	183	1.9	Jail	5,557	58.3
Mean	5.20		CIP	896	9.4
			Probation	2,090	21.9
			Other	45	0.5

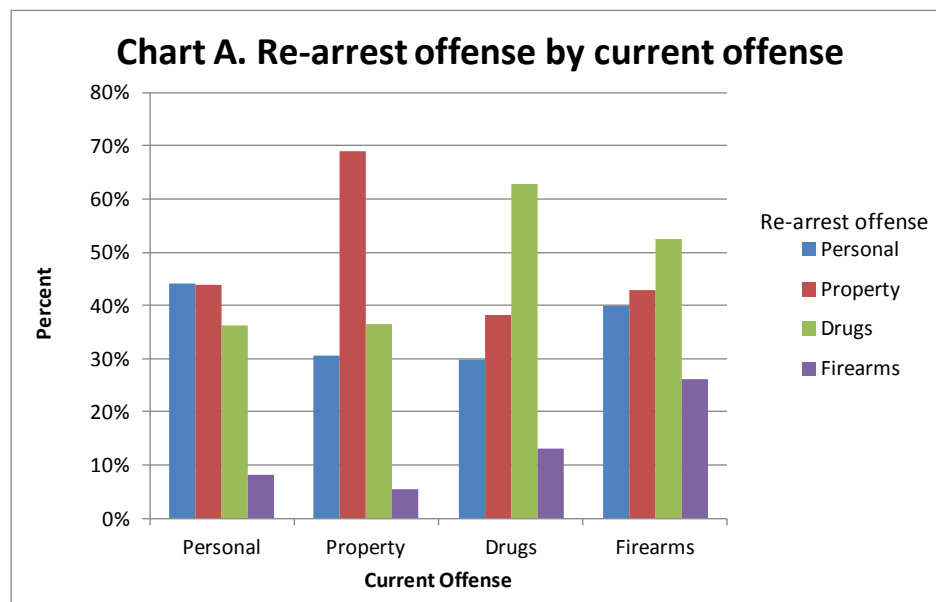


Stages to the analyses. The recidivism analyses proceeded in three stages. We first looked at whether offenders were likely to specialize in crime type or engage in a variety of offenses. Second, we conducted a bivariate analysis to determine the relationship between recidivism and the factors included in the study. Third, we conducted a series of multivariate analyses to examine what factors overall predicted recidivism; whether the same factors or different factors predicted recidivism for offenders convicted of personal, property, drug, and firearm offenses; and whether the same factors or different factors predicted the type of re-offense.

Stage 1: Do offenders specialize in crime type? Table 2 shows the percentage of offenders who were re-arrested for a personal, property, drugs, or firearms offense by conviction offense. Overall, while offenders do engage in a variety of criminal activities, offenders also have a tendency to specialize in crime. For example, among offenders convicted of a personal offense, 44% were re-arrested for another personal offense. Offenders were less likely to be re-arrested for a personal offense if their current conviction was for a property [30%], drug [30%] or firearms [40%] offense. [See Table 1A in the Appendix for the flowchart that provides more detail on the number and percentage of offenders by current offense and re-offense type.]

Table 2. Re-arrest offense type by current offense type.

Current offense	Re-arrest offense			
	Personal	Property	Drugs	Firearms
Personal	44%	44%	36%	8%
Property	30%	69%	36%	5%
Drugs	30%	38%	63%	13%
Firearms	40%	43%	52%	26%





Stage 2. Bivariate Analysis: factors related to recidivism. Table 3 shows the results of the bivariate analysis examining the relationship between recidivism and the factors included in the study. After a three year tracking period, factors significantly related to recidivism were gender, race, age, county, offense seriousness, prior convictions, prior arrests, and offense type. The only factor that was not significantly related to recidivism was type of sentence imposed. Offenders with the following characteristics were significantly more likely to recidivate than offenders who did not have these characteristics:

- ✦ Male
- ✦ Non-white
- ✦ Younger
- ✦ From an urban county
- ✦ Convicted of a property, drug, or firearms offense rather than a personal offense
- ✦ Convicted of a less serious offense [offense gravity score]
- ✦ Had a more serious conviction record [prior record score]
- ✦ Had a greater number of prior arrests
- ✦ Had a prior arrest for a property, drug, or firearms offense; not significant if had prior personal

Stage 3: Multivariate Analyses: predictors of recidivism. In order to determine whether the relationships discussed above are real and important, we conducted additional analyses to control for the simultaneous influence of all of the factors. We first conducted multivariate analyses on the entire sample. For the most part, the findings were consistent with the bivariate analysis after controlling for all of the factors [Table 4]. The exception was prior convictions, which was no longer significant when also controlling for prior arrests, indicating that arrest is a better predictor than conviction for re-arrest. Offenders who had an arrest for a prior property or drug offense had a greater chance of recidivating; while offenders who had prior arrests for personal offenses had a decreased chance of recidivating. [See Table 2A in Appendix for results of logistic regression model.]

The second series of multivariate analyses were conducted to determine whether the same factors or different factors predicted recidivism for various types of offenders [Table 5]. Four offense types were examined: personal, property, drug, and firearms. [See Table 3A in Appendix for results of logistic regression model.] For all four offense types, age was a consistent predictor of recidivism. The number of prior arrests was significant for all but the firearms offenses. Additionally having a prior arrest for drug and property crimes, but not for personal or firearms offenses, increased the odds of re-arrest. For drug and property offenses, a lower Offense Gravity Score was associated with greater odds of being re-arrested. Gender and race were significant predictors for drug offenders, with males and black offenders having increased odds of recidivating. Offenders from rural counties had decreased odds of recidivating, compared to offenders from Philadelphia.

We conducted some additional analyses to see whether the findings would hold based upon whether the current offense [among personal, property, and drug offenders] was a felony or misdemeanor [See Table 4A in Appendix for results of logistic regression model.] While the findings were similar, we also found some differences depending upon whether the current offense was a misdemeanor or felony. We again found age and number of prior arrests to be the most consistent predictors among all offense categories. The one exception was for felony property offenses [defined as burglary], for which number of prior arrests did not predict recidivism. Again prior arrests for a drug or property offense increased the odds of recidivism. However, among offenders convicted of a personal offense, a prior property offense was predictive only when the current personal offense was a felony, not a misdemeanor, while among property offenders, a prior property offense was predictive when the current property offense was a misdemeanor, but not a felony.



Table 3 Recidivism rates for variables used in bivariate analysis. [N=,9536]

	Percent		Number	
	Success	Failure	Success	Failure
Overall	47.9	52.1	4570	4866
Race ***				
White	56.2	43.8	2,301	1,796
Black	40.3	59.7	1,826	2,703
Hispanic	49.0	51.1	414	397
Other	46.5	53.5	46	53
Gender ***				
Male	46.0	54.0	3,777	3,777
Female	59.5	40.5	793	540
Age ***				
< 21	39.7	60.3	632	959
21 - 24	43.2	56.8	704	927
25-29	46.9	53.2	684	776
30-34	49.2	50.8	595	615
35-39	49.1	51.0	592	615
40-44	50.5	49.5	558	546
45-49	54.7	45.3	405	335
> 50	67.5	32.6	400	193
Mean	33.2	30.4		
County ***				
Philadelphia	38.2	61.8	908	1,467
Allegheny	39.5	60.5	496	760
Other urban	50.8	49.2	2,208	2,135
Rural	61.3	38.7	958	604
OGS ***				
1	44.8	55.2	64	79
2	37.8	62.2	188	309
3	42.2	57.9	873	1,198
4	48.7	51.3	96	101
5	45.2	54.8	758	920
6	48.7	51.3	1,258	1,324
7	54.3	45.7	867	731
8	63.9	36.1	375	212
9	49.7	50.3	91	92
Mean ***	5.4	5.0		

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level



Table 3 [cont.] Recidivism rates for variables used in analysis. [N=,9536]

PRS ***

0	57.4	42.6	1,544	1,146
1	52.3	47.7	559	510
2	43.8	56.2	484	620
3	45.5	54.5	293	351
4	43.7	56.3	529	682
5	40.8	59.2	901	1,305
RFEL	42.5	57.5	260	352
Mean ***	2.3	2.9		

Prior Arrests***

4.5 7.3

Offense type ***

Personal-- Felony	51.0	49.0	442	425
Personal-- Misdemeanor	52.9	47.1	327	291
Sex offense-- Felony	65.8	34.2	100	52
Sex offense-- Misdemeanor	59.6	40.4	31	21
Drug-- Felony (PWID)	50.4	49.6	1,699	1,673
Drug-- Misdemeanor (Possession)	39.8	60.2	271	410
Burglary	50.8	49.2	218	211
Other property offense	43.6	56.4	963	1,245
Firearms/other weapons	43.4	56.6	202	263
Other offense	45.8	54.2	375	375

Type of sentence

Prison/SIP	48.5	51.5	460	488
Jail	46.5	53.5	2,583	2,974
CIP	52.0	48.0	466	430
Probation/Other	49.7	50.3	1,061	1,074

Type of Prior Offense

Personal	47.34	52.66	3,074	3,419
Property ***	40.88	59.12	2,686	3,885
Drug ***	38.75	61.25	2,051	3,242
Firearms ***	34.60	65.40	610	1,153
Other	40.95	59.05	2,741	3,953

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level



Table 4. Predictors of recidivism for entire sample after three years tracking;

[N=9,536]¹

Variables	Significant predictor	Findings
Race	YES *** YES *	The odds of black offenders recidivating were about 35% greater than for white offenders The odds of hispanic offenders recidivating were about 19% greater than for white offenders
Gender	YES ***	The odds of males recidivating were about 33% greater than for females.
Age	YES ***	For each year increase in age there was about a 5% decrease in the odds of recidivism.
County	YES *** YES ***	The odds of offenders from Philadelphia recidivating were: about 57% greater than for offenders from rural counties about 27% greater than for offenders from other urban counties no difference for offenders from Allegheny county
OGS	YES ***	For each level decrease in OGS , the odds of recidivating were decreased by 8%.
PRS	NO	
Prior Arrests	YES ***	For each additional prior arrest , there was a 6% increase in the odds of recidivating
Prior Personal	YES *	Relative to offenders who did not have a prior arrest for a personal offense, the odds of recidivism were about 10% <i>lower</i> among offenders who had a prior arrest for a personal offense
Prior Property	YES ***	Relative to offenders who did not have a prior arrest for a property offense, the odds of recidivism were about 40% <i>higher</i> among offenders who had a prior arrest for a property offense
Prior Drug	YES ***	Relative to offenders who did not have a prior arrest for a drug offense, the odds of recidivism were about 37% <i>higher</i> among offenders who had a prior arrest for a drug offense
Prior Firearms	NO	
Prior Other	YES ***	Relative to offenders who did not have a prior arrest for an other offense, the odds of recidivism were about 34% <i>higher</i> among offenders who had a prior arrest for an other offense
Current Offense	YES *	Relative to offenders whose current conviction was for a drug crime, the odds of recidivism were about 14% higher among offenders whose current conviction was for a property crime.
Type of sentence	NO	

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level

¹ development sample; solitary offenses



Table 5. Summary of findings for predictors of recidivism for various models.

Predictors	Entire Sample Bivariate		By Current Offense						Re-arrest offense by current offense																			
			person			property			drug			Among personal only re-arrest offense:			Among property only re-arrest offense:			Among drug only re-arrest offense:			Among firearms only re-arrest offense:							
			person prop.	drug	firearm	Misd. Felony	1,019	Misd. Felony	2208	420	Misd. Felony	681	3372	349	347	285	65	444	1005	530	78	621	798	1308	275	105	113	138
			1689	2637	4053	465	***	*	***	***	*	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Race	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Black		*																										
hispanic																												
other																												
Gender	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Age	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
County	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
rural	***	***	*	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
urban	***	***	*	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
other	***	***	*	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
alleg	***	***	*	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
OGS	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
PRS	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Prior Arrests	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Prior Personal	*																											
Prior Property	[less likely]	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Prior Drugs	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Prior Firearms	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Prior Other	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Offense type	*																											
Sentence type	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level

Note: The grey shaded areas indicate that offenders tend to specialize in certain types of crime.



Since we had found that there is some relationship between current offense type and re-arrest offense type, the third series of analyses involved examining factors that predicted type of re-arrest among personal, property, drug, and firearm offenders [See Tables 5A – 8A in Appendix for results of logistic regression models.] Again, we found age to be the most consistent predictor of re-arrest for all types of re-arrest, regardless of current conviction offense.

The number and type of prior arrests were also fairly consistent predictors of recidivism, though it varied somewhat depending upon the type of crime. We did find further support for our earlier finding that offenders have a tendency to specialize in certain types of crime. For example, among personal offenders, those who had a prior personal offense were significantly more likely to be rearrested for another personal offense [and less likely to be re-arrested for a property offense]; those who had a prior property offense were more likely to be re-arrested for a property offense; those with a prior drug offense were more likely to be re-arrested for another drug offense, and those with a prior firearms offense were more likely to be re-arrested for a firearms offense. [See grey shaded areas of Table 5.]

The Offense Gravity Score was a moderate predictor of recidivism, with its predictive value being greater for property and drug offenders than for personal offenders. For these offenders, a lower offense gravity score increased the odds of recidivism.

Race and gender were predictors of recidivism among drug offenders, and increased the odds of recidivism for all types of re-arrests except for property offenses. It should be noted that for several of the analyses involving firearms there were no females, so that gender was not able to be considered in those models.

Summary

This report summarizes the findings from a series of analyses conducted to determine what factors best predict recidivism for various types of offenders. Overall, we found that age and the number of prior arrests are the most consistent predictors of recidivism for all types of offenders. Younger offenders and offenders with a greater number of prior arrests were more likely to recidivate. Further, we found that, while offenders do engage in a variety of offenses, there is a higher likelihood that they will recommit the same types of crimes as they have in the past. The extent of prior convictions [as measured by the Prior Record Score] was, overall, not found to be a predictive factor once prior arrests were included in the analyses. Type of sentence imposed also was found not to predict recidivism.

The seriousness of the current offense [as measured by Offense Gravity Score] was of moderate predictive value but only for certain types of offenders. Among property and drug offenders, those offenders committing less serious offenses had a higher probability of reoffending, particularly for another property or drug offense.

In addition to age, we looked at three other demographic factors: race, gender, and county. Black offenders and male offenders were found to have a higher probability of recidivating. Offenders from Philadelphia had the greatest chance of recidivism, particularly when compared to offenders from rural counties.

Policy Issues Concerning Risk Assessment Factors

The next step for the project is to determine which factors should be included in the risk assessment scale. While the research can help inform us about what increases the risk of recidivism, some of the decision-



making is a matter of policy. There are three primary policy issues to be determined. First, to what extent is it appropriate to consider demographic factors in a risk assessment instrument? We found that race, gender, county, and age have predictive value for determining risk, though to varying degrees. However, all four may not be appropriate factors for inclusion in a risk assessment scale that will be used by judges to assist in determining whether an offender will receive a different [more lenient or harsh] sentence.

While most assessments consider age to be an appropriate factor, most do not consider race to be appropriate. Rather, race is usually considered to be a factor closely linked to other underlying factors, such as social inequities, that are responsible for criminal activity.³

Second, is it appropriate to consider factors that are closely linked to those already considered by the guidelines? The number and type of prior arrests were found to be predictive of future criminality, while prior convictions were not. The issue for utilizing prior arrests is primarily whether counting both prior arrests and prior convictions would be considered ‘double dipping’ and potentially punishing an offender twice for the same conduct (i.e., a prior arrest and prior conviction for the same crime).

Third, is the risk of committing certain types of crime more serious than others? We found that offenders who commit certain types of crimes are at greater risk for committing those crimes again. Is the risk of committing a personal offense more serious than the risk of committing a property or drug offense?

Should the risk of committing a felony count more than the risk committing a misdemeanor?

These questions raise policy issues that are important to determine to help guide what and how predictive factors will be utilized in a risk assessment scale (e.g., how much certain factors should be weighted).

³ The effect of race on predictions of future risk can be explicitly omitted from the model [by controlling for its influence in the analyses] or its effect can appear indirectly through other factors.

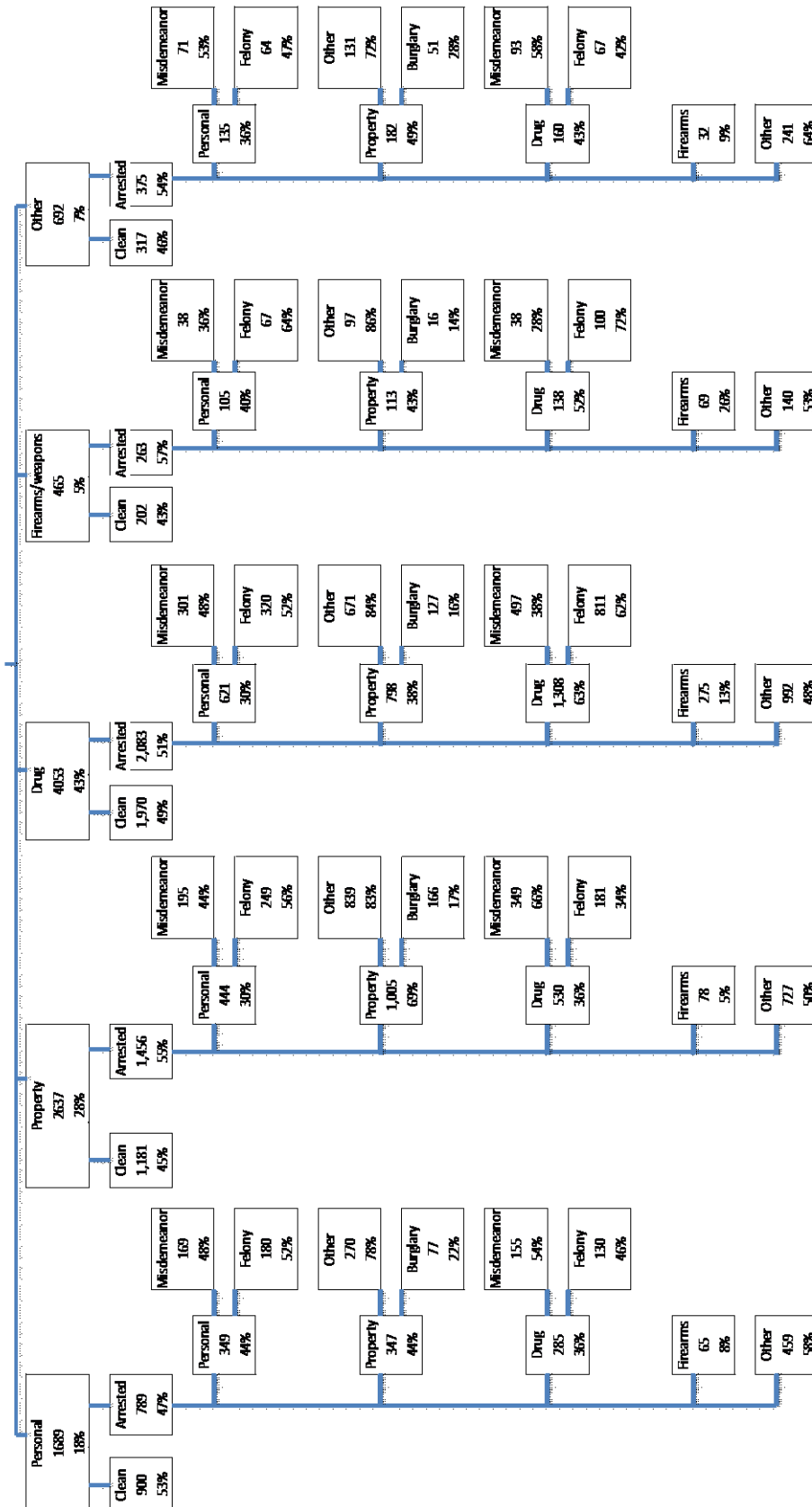


Appendix Tables



Pennsylvania Commission on Sentencing

Table 1A. Flowchart showing the type of re-arrest by current offense
[N=9,336]



Note: At each level, percentages sum to 100.



Table 2A. Results of Logistic Regression Model Predicting Recidivism for Entire Sample [N=9,536]

	Odds Ratio	Std. Err.	z	Sig.
Offense Gravity Score	0.923	0.018	-4.02	0.000
Prior Record Score	0.999	0.018	-0.07	0.943
Number of prior arrests	1.058	0.006	10.13	0.000
Prior arrest for personal off.	0.902	0.045	-2.05	0.041
Prior arrest for property off	1.456	0.085	6.46	0.000
Prior arrest for drug off.	1.365	0.071	5.96	0.000
Prior arrest for firearms off	1.002	0.064	0.03	0.979
Prior arrest for other offense	1.339	0.078	5.01	0.000
Current offense [compared to drug]				
personal	1.046	0.069	0.69	0.493
property	1.141	0.071	2.14	0.033
firearms	0.924	0.101	-0.73	0.467
other	1.067	0.100	0.69	0.490
Type of Sentence				
prison	0.975	0.077	-0.32	0.748
IP	0.917	0.073	-1.08	0.278
probation; fines	0.989	0.058	-0.19	0.849
Age	0.953	0.002	-19.28	0.000
Gender	0.751	0.050	-4.32	0.000
Race [compared to white]				
black	1.354	0.072	5.72	0.000
Hispanic	1.195	0.104	2.05	0.041
other	1.081	0.241	0.35	0.726
County [compared to Philadelphia]				
Allegheny	0.921	0.074	-1.02	0.306
otherurban	0.799	0.050	-3.58	0.000
rural	0.636	0.052	-5.52	0.000

* This model was run for all offense types; this model shows the outcome when the reference category was drug offense.



Table 3A. Logistic regression predicting 3-year recidivism, by original offense type, among solitary offenders, development sample (N = 9,536). ¹

	Personal (N = 1,689)	Property (N = 2,637)	Drug (N = 4,053)	Firearms/ weapons (N = 465)	Other offenders (N = 692)
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
OGS	1.035	0.899*	0.881***	0.867	0.91
PRS	1.056	0.944	1.023	0.867	1.017
Total prior arrests	1.072***	1.057***	1.058***	1.066	1.044*
Prior personal arrest	0.923	1.001	0.865	0.728	0.752
Prior property arrest	1.446**	1.424**	1.391***	2.644***	1.58
Prior drug arrest	1.557***	1.397***	1.346***	0.848	1.324
Prior firearms/weapons arrest	0.81	0.873	1.12	0.96	1.042
Prior other arrest	1.138	1.717***	1.194*	1.873*	1.223
Prison ²	0.935	0.993	0.957	1.861	0.857
IP ²	1.345	0.811	0.922	0.758	1.413
Other sanction ²	0.865	1.087	0.933	1.099	0.962
Age (date of sentencing)	0.958***	0.957***	0.946***	0.950***	0.957***
Female	0.893	0.831	0.661***	1.178	0.719
Black ³	1.252	1.192	1.392***	2.037*	1.754**
Hispanic ³	0.992	1.349	1.22	1.117	1.241
Other race ³	0.431	0.572	1.551	⁵	5.053
Allegheny County ⁴	0.94	1.16	0.790*	0.957	1.014
Other urban county ⁴	0.672*	0.834	0.780**	1.389	0.982
Rural county ⁴	0.523***	0.664*	0.645***	1.422	0.733
N	1689	2637	4053	465	692
Pseudo R2	0.107	0.106	0.113	0.136	0.096
AIC	2125.4	3283.4	5020.4	588.2	902.8
BIC	2234.1	3401	5146.5	666.9	993.6

* p < .05 ** p < .01 *** p < .001

Note. Variables in bold are significant at p < .05.

¹ Does not include offenders whose first failure was a technical violation (n = 268).

² Reference is jail

³ Reference is white

⁴ Reference is Philadelphia County

⁵ There were no offenders of other races whose original offense was a firearms/weapons offense.



Table 4A. Logistic regression predicting 3-year recidivism, by original offense type and severity, among solitary offenders, development sample (N = 9,536).¹

	Personal		Property		Drug	
	Misdemeanor (N = 670)	Felony (N = 1,019)	Other types of property (N = 2, 208)	Burglary (N = 429)	Misdemeanor (N = 681)	Felony (N = 3,372)
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
OGS	0.747*	0.963	0.911	0.908	0.909	0.853**
PRS	0.917	1.117	0.96	0.891	0.911	1.035
Total prior arrests	1.079***	1.080**	1.059***	1.034	1.051**	1.057***
Prior personal arrest	1.125	0.853	0.955	1.242	0.889	0.858
Prior property arrest	1.013	1.654**	1.562**	1.288	1.673*	1.365***
Prior drug arrest	1.456*	1.631**	1.300*	2.138**	1.613*	1.297**
Prior firearms/weapons arrest	0.8	0.835	0.938	0.485	1.165	1.103
Prior other arrest	1.303	1.015	1.814***	1.402	1.225	1.197
Prison ²	1.154	0.811	0.864	1.945	1.165	0.954
IP ²	1.427	1.384	0.736	1.521	0.745	0.95
Other sanction ²	0.866	0.958	1.069	1.278	0.915	0.951
Age (date of sentencing)	0.953***	0.961***	0.958***	0.945***	0.955***	0.945***
Female	0.846	0.919	0.777	1.171	1.02	0.613***
Black ³	1.244	1.241	1.127	1.879*	1.353	1.412***
Hispanic ³	1.261	0.935	1.41	1.171	0.667	1.357*
Other race ³	⁵	0.46	0.483	⁶	⁶	1.549
Allegheny County ⁴	1.032	1.201	1.302	0.612	0.575	0.862
Other urban county ⁴	0.719	0.741	0.936	0.482	0.671	0.793*
Rural county ⁴	0.586	0.574*	0.841	0.235***	0.616	0.655**
N	668	1019	2208	427	679	3372
Pseudo R2	0.102	0.125	0.112	0.109	0.089	0.116
AIC	866.7	1272.6	2724.7	565.0	870.6	4172.2
BIC	952.2	1371.1	2838.7	642.0	956.4	4294.7

* p < .05 ** p < .01 *** p < .001

Note. Variables in bold are significant at p < .05.

¹ Does not include offenders whose first failure was a technical violation (n = 268).

² Reference is jail

³ Reference is white

⁴ Reference is Philadelphia County

⁵ There were no personal misdemeanor offenders of other races who were arrested.

⁶ There were no burglary or drug misdemeanor offenders of other races who were not arrested.



Table 5A. Logistic regression predicting 3-year recidivism, by offense type, among PERSONAL, solitary offenders, development sample (N = 1,689). ¹

	Personal	Property	Drug	Firearms/ weapons	Other offenders
N Arrested	349	347	285	65	459
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
OGS	0.931	1.129*	1.065	1.154	0.97
PRS	0.978	1.193**	1.091	0.998	0.996
Total prior arrests	1.043**	1.076***	1.036*	1.029	1.031*
Prior personal arrest	1.799***	0.682*	0.758	1.523	0.96
Prior property arrest	1.605**	1.634**	1.245	1.943	1.478*
Prior drug arrest	1.308	1.043	2.340***	1.821	1.458**
Prior firearms/weapons arrest	1.046	1.03	1.073	2.067*	0.806
Prior other arrest	1.081	0.987	0.921	0.903	1.501*
Prison ²	1.261	0.751	0.998	1.789	0.999
IP ²	1.082	1.224	0.616	1.715	0.945
Other sanction ²	1.045	0.886	0.918	1.525	0.859
Age (date of sentencing)	0.965***	0.952***	0.943***	0.935***	0.968***
Female	0.968	0.868	0.948	⁵	0.999
Black ³	1.535**	1.132	1.549**	3.115**	0.91
Hispanic ³	0.934	0.651	1.26	1.157	0.871
Other race ³	1.22	0.245	0.816	⁶	0.23
Allegheny County ⁴	1.167	0.88	1.058	1.03	2.085***
Other urban county ⁴	0.846	0.726	0.705	0.709	1.11
Rural county ⁴	0.771	0.572*	0.464**	0.366	0.87
N	1689	1689	1689	1448	1689
Pseudo R2	0.084	0.098	0.121	0.178	0.068
AIC	1616.8	1587.9	1388.2	471.9	1882.3
BIC	1725.5	1696.5	1496.8	566.9	1990.9

* p < .05 ** p < .01 *** p < .001

Note. Variables in bold are significant at p < .05.

¹ Does not include offenders whose first failure was a technical violation (n = 36).

² Reference is jail

³ Reference is white

⁴ Reference is Philadelphia County

⁵ There were no female personal offenders who were arrested for a firearms/weapons offense.

⁶ There were no personal offenders of other races who were arrested for a firearms/weapons offense.



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Table 6A. Logistic regression predicting 3-year recidivism, by offense type, among PROPERTY, solitary offenders, development sample (N = 2,637). ¹

	Personal	Property	Drug	Firearms/ weapons	Other offenders
# Arrested	444	1,005	530	78	727
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
OGS	0.869*	0.864**	0.895*	0.898	0.916
PRS	0.974	0.95	0.904*	0.848	0.949
Total prior arrests	1.007	1.070***	1.008	0.97	1.016*
Prior personal arrest	1.781***	0.879	1.081	1.997*	1.225
Prior property arrest	1.39	1.305	1.176	2.674*	1.504**
Prior drug arrest	1.280*	1.097	2.580***	2.055*	1.205
Prior firearms/weapons arrest	1.001	0.806	0.953	1.896*	0.842
Prior other arrest	1.864***	1.301*	1.697**	1.348	2.052***
Prison ²	0.728	1.142	1.237	1.219	0.957
IP ²	0.851	0.946	0.753	0.562	0.7
Other sanction ²	1.029	1.07	0.859	0.731	0.931
Age (date of sentencing)	0.950***	0.961***	0.967***	0.917***	0.966***
Female	0.500***	0.987	0.73	⁵	0.863
Black ³	1.284*	1.136	1.214	2.275**	1.03
Hispanic ³	1.438	1.103	1.475	1.386	0.716
Other race ³	0.426	0.845	0.484	3.131	0.973
Allegheny County ⁴	1.131	1.263	1.959***	1.005	1.26
Other urban county ⁴	0.718*	0.878	1.112	0.523*	0.826
Rural county ⁴	0.602*	0.679*	0.726	0.711	0.514***
N	2637	2637	2637	2221	2637
Pseudo R2	0.091	0.085	0.087	0.154	0.067
AIC	2214	3246.1	2456.2	609.8	2937.6
BIC	2331.6	3363.7	2573.7	718.2	3055.2

* p < .05 ** p < .01 *** p < .001

Note. Variables in bold are significant at p < .05.

¹ Does not include offenders whose first failure was a technical violation (n = 66).

² Reference is jail

³ Reference is white

⁴ Reference is Philadelphia County

⁵ There were no female property offenders who were arrested for a firearms/weapons offense.



Table 7A. Logistic regression predicting 3-year recidivism, by offense type, among DRUG, solitary offenders, development sample (N = 4,053). ¹

	Personal	Property	Drug	Firearms/ weapons	Other offenders
# Arrested	621	798	1,308	275	992
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
OGS	0.926	0.869***	0.922*	1.021	0.919*
PRS	1.037	1.02	1.01	1.034	0.994
Total prior arrests	1.036**	1.073***	1.060***	1.056**	1.056***
Prior personal arrest	1.539***	0.917	0.782**	0.732*	1.044
Prior property arrest	1.238	1.572***	1.084	1.078	1.074
Prior drug arrest	1.098	1.142	1.586***	0.82	1.305**
Prior firearms/weapons arres	1.107	1.055	1.025	2.157***	0.98
Prior other arrest	1.455**	1.029	1.094	1.201	1.389**
Prison ²	0.899	0.670**	0.866	0.78	0.869
IP ²	0.927	0.85	0.977	0.813	0.91
Other sanction ²	1.081	1.049	1.113	1.162	0.884
Age (date of sentencing)	0.944***	0.956***	0.950***	0.900***	0.954***
Female	0.695*	1.104	0.649***	0.0899***	0.780*
Black ³	1.385**	1.047	1.710***	3.042***	1.09
Hispanic ³	1.111	1.012	1.616***	1.635	0.762
Other race ³	1.995*	1.126	1.27	3.778**	1.33
Allegheny County ⁴	0.998	0.913	0.891	0.839	1.458**
Other urban county ⁴	0.969	0.891	0.810*	0.736	1.400***
Rural county ⁴	0.686	0.749	0.651**	0.668	0.975
N	4053	4053	4053	4053	4053
Pseudo R2	0.084	0.073	0.096	0.174	0.062
AIC	3220.2	3768.1	4648.5	1700.7	4269.1
BIC	3346.4	3894.2	4774.7	1826.9	4395.2

* p < .05 ** p < .01 *** p < .001

Note. Variables in bold are significant at p < .05.

¹ Does not include offenders whose first failure was a technical violation (n = 130).

² Reference is jail

³ Reference is white

⁴ Reference is Philadelphia County



Table 8A. Logistic regression predicting 3-year recidivism, by offense type, among FIREARMS/WEAPONS, solitary offenders, development sample (N = 465). ¹

	Personal	Property	Drug	Firearms/ weapons	Other offenders
# Arrested	105	113	138	69	140
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
OGS	0.851	0.932	0.907	1.038	0.938
PRS	0.852	0.873	1.073	1.097	0.889
Total prior arrests	1.059	1.121*	0.981	0.951	1.044
Prior personal arrest	1.264	0.664	0.846	1.015	0.93
Prior property arrest	2.069	2.822**	1.412	2.815*	1.093
Prior drug arrest	0.796	0.489*	1.72	1.285	1.169
Prior firearms/weapons arrest	1.397	1.054	1.094	1.817	1.456
Prior other arrest	2.192*	1.836	1.325	2.068	1.779
Prison ²	1.862	1.324	3.143**	1.927	0.882
IP ²	1.371	0.574	1.361	0.609	0.826
Other sanction ²	1.574	1.516	0.749	1.211	0.605
Age (date of sentencing)	0.918***	0.942***	0.933***	0.902***	0.976
Female	3.065	1.135	1.19	⁵	2.783
Black ³	0.992	1.578	2.575*	2.307	1.115
Hispanic ³	0.43	1.339	1.784	2.147	0.87
Other race ³	⁶	⁶	⁶	⁶	⁶
Allegheny County ⁴	0.646	1.004	1.574	1.193	1.617
Other urban county ⁴	1.062	1.692	1	0.902	1.437
Rural county ⁴	0.779	0.869	0.494	0.502	2.306
N	465	465	465	453	465
Pseudo R2	0.131	0.115	0.143	0.152	0.064
AIC	469.5	494.5	522.6	363.8	570.4
BIC	548.2	573.2	601.3	437.9	649.1

* p < .05 ** p < .01 *** p < .001

Note. Variables in bold are significant at p < .05.

¹ Does not include offenders whose first failure was a technical violation (n = 12).

² Reference is jail

³ Reference is white

⁴ Reference is Philadelphia County

⁵ There were no female firearms/weapons offenders who were arrested for a firearms/weapons offense.

⁶ There were no firearms/weapons offenders of other races.