

Benchmarking Pennsylvania's Juvenile Recidivism Rate

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Final Report

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Edward P. Mulvey, Ph.D.
Carol A. Schubert, M.P.H.
Samuel Hawes, Ph.D.
University of Pittsburgh

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EXECUTIVE SUMMARY

This current project examines previous recidivism findings in Pennsylvania in light of the possible effects of shifts in the characteristics of the adolescents in the juvenile justice system over the time periods covered in the data examined. The analyses reported here use a method for “adjusting” recidivism figures to account for the types of adolescents that were involved with the juvenile justice system (e.g., in that particular year, in adolescents coming out of institutional placement). The project examines whether the observed statewide recidivism figures, when analyzed in this more stringent fashion introducing controls for case characteristics, can provide findings with implications for practice and policy. In the course of addressing this primary aim, this project also examined several regularities in the statewide data base regarding the processing of adolescents in the juvenile justice system and recidivism and reports these findings as well.

- The major findings of these analyses are: The profile of cases seen between 2007 and 2011 did not shift dramatically; characteristics of youth in the system have remained rather stable when analyzed as composite classes according to case characteristics.
- An acceptably valid indicator of the likelihood of recidivism for individual cases can be generated combining available variables in the Pennsylvania Juvenile Case Management System.
- Comparing the estimated likelihood of recidivism and the observed recidivism across these years indicates that the overall system has performed as well as or better than might be expected for the years 2010 and 2011. The recidivism rate for 2011 was significantly lower than might be expected, given the characteristics of the adolescents in the system that year.
- Examined across all years, the observed recidivism rates for shorter placements (six months or less) were better than might be expected, given the characteristics of the adolescents receiving these placements. Conversely, the recidivism rates for longer placements (longer than six months) were worse (higher) than expected, based on the characteristics of the adolescents receiving these placements.
- Although limited to two years of select data, initial analyses on the use of the Youth Level of Service (YLS) instrument are encouraging. The consistency of scoring and the relation to observed recidivism fit expected patterns. In addition, the YLS adds unique information to the prediction of recidivism beyond currently available information.

The current results provide evidence that the statewide juvenile justice system is reducing recidivism below expected levels, given the characteristics of the adolescents in the system. It also finds that longer institutional placement stays increase the level of recidivism above expected levels, indicating a need to examine the procedures used to rely on such extended institutional placements. Finally, the report provides a positive assessment of the potential data systems to serve as platforms for more sophisticated and informative analyses of juvenile justice trends in Pennsylvania.

I. BACKGROUND

Measuring recidivism is a vexing problem for juvenile justice administrators, researchers, and policy makers. There are a variety of ways that these figures can be generated, and the specific methods used are often poorly described or unspecified. Moreover, a large number of factors can affect reoffending rates, making comparisons of recidivism figures difficult among locales or over time. The utility of recidivism figures as valid indicators of system performance is often questionable.

The juvenile justice systems in all states nonetheless rely on these figures to gauge how well they are doing. Therefore, it is incumbent on the agencies generating statewide recidivism calculations to let providers, justice officials, and policy makers know how the numbers were generated and what they do or do not mean. If a state can devise a method for generating valid and understandable recidivism figures that reflect the impact of juvenile justice system involvement, they can take a giant step toward monitoring and improving practice, thus benefiting the adolescents in juvenile justice as well as using resources more effectively.

Getting valid and consistent numbers presents one of the most basic challenges. Recidivism has to have a consistent definition of outcome (e.g., conviction for a new offense, appearance in juvenile or adult court) over a consistent and relevant follow-up period (e.g., within a set time period after case closure by the court, within a given time after institutional placement) for each of the periods or locales examined. It is difficult to assess shifts in recidivism if this outcome is measured in a variety of ways across different locales or across different years.

Interpreting recidivism figures presents an additional set of challenges. Even if the numbers are collected systematically and are well defined, the reasons for large shifts, either up or down, are rarely self-evident. Careful analyses of ancillary data about juvenile justice system operations are needed to determine the most likely reasons for a rise or drop in recidivism.

Over the last decade, the state of Pennsylvania has expended considerable effort to build a consistent and valid system for tracking service involvement and recidivism of adolescents who come in contact with the juvenile justice system statewide. This has taken cooperation and collaboration among state officials, county probation departments, and state agencies, and has produced usable data sets that provide a picture of how the state overall and individual counties are performing in terms of recidivism of juveniles in the system. The Pennsylvania Juvenile Court Judges' Commission (JCJC) regularly publishes a report regarding the two-year recidivism rates for juveniles with cases closed in the previous year. In 2014, JCJC published a report presenting the recidivism rates for the years 2007 through 2010. This in-depth report contains descriptive information about trends in recidivism rates overall and by county and also looks at differences in recidivism rates based on demographic characteristics, crime type and disposition. While useful for understanding general trends, the report leaves open a number of questions that can be explored for a more thorough understanding of how current policies and practices in Pennsylvania might influence these rates.

The “case mix” of the juveniles involved with the system in different locales or in different years is one of the important factors not addressed in the current analyses of statewide recidivism. By case mix, we mean the distributions of characteristics that might be related to continued offending among the adolescents being served by a particular court at a particular time. What the adolescents look like in a certain place at a certain time obviously matters when assessing recidivism. For example, a higher recidivism rate might be expected in a locale that, on the whole, serves serious offending adolescents with more extensive criminal records in neighborhoods with more criminal opportunities. Saying that a locale with an “easier situation” in terms of the characteristics of the adolescents served is doing a “better” job because they have a lower recidivism rate seems a bit misleading. Similarly, saying that the system across the state has done a “worse” job in one year compared to the previous year without considering whether more crime-prone adolescents came in one year or the other does not seem to be a fully informed assessment. A higher or lower rate of recidivism alone may not adequately reflect poorer or better performance by the system; it depends somewhat on the characteristics of the offenders in the system in the locales examined during the time periods examined.

The current project is an effort to examine previous recidivism findings in Pennsylvania in light of the possible effects of shifts in the characteristics of the adolescents in the juvenile justice system over the time periods covered in these reports. For this purpose, the definition of recidivism is consistent with the definition used in the 2014 report: *a subsequent adjudication of delinquency or criminal conviction within two years of case closure*. The current project attempts to devise a method for “adjusting” recidivism figures to account for the types of adolescents that were involved with the juvenile justice system reflected in particular recidivism figures (e.g., in a certain year, regarding adolescents coming out of institutional placement). This project examines whether more stringent analyses of the recidivism figure currently collected statewide (i.e., introducing controls for case characteristics) can provide a picture of the recidivism process with implications for practice and policy. In the course of addressing this primary aim, this project also examines several regularities in the statewide data base regarding the processing of adolescents in the juvenile justice system and recidivism. We report those findings here as well.

Our intention here is not to present a thick set of specific statistical comparisons, but instead to provide a broad picture of the findings from the analyses. When reporting findings, therefore, we do not present details regarding the statistical tests used or the values and significance levels of the statistics obtained. We would gladly provide this information to any readers if it would be useful. When we use the term “statistically significant,” it indicates that we have conducted statistical tests to ascertain the validity of the statement made.

II. GOALS OF THE STUDY

The project uses existing data obtained from the JCJC to introduce “corrections” into recidivism calculations and to assess changes in recidivism over the years 2007 through 2011. Additional analytic features are introduced to account for differences in the characteristics of the adolescents in the system over the years examined. A team of investigators from the University of Pittsburgh collaborated with JCJC to conduct analyses to address the following questions:

1) As cases coming into the PA juvenile system decrease, does the profile of youth in the system change? Are there identifiable differences in the characteristics of the cases under juvenile justice supervision in the years from 2007 through 2011?

2) Do those changes produce changes in expected recidivism rates? Do existing differences in case characteristics affect what we might have expected to see as recidivism rates in these years?

3) Can the individual characteristics identified as predictors of recidivism be used to adjust our assessments of the observed recidivism rates to account for shifts in the population in the system during the time period considered? In other words, is it possible to calculate and consider what the “expected” recidivism rate would be, in light of the characteristics of the adolescents in the system? How does actual recidivism compare to expected recidivism?

4) Have there been more or less adolescents placed over this time period and have the characteristics of the placed youth changed during this time? Are the recidivism rates of placed adolescents above or below what we might have expected, given the characteristics of the adolescents who were sent to placement during these years?

5) How is the length of time in placement related to recidivism? Do longer placements reduce the chances of recidivism?

6) Has the introduction of the Youth Level of Services (YLS) provided useful data for assessing likely risk of re-offense?

Each of the above questions was addressed in order to give a picture of how the juvenile system appears to be performing statewide. When taken as a whole, the information provided in the answers to these questions gives us a more refined view of how to interpret the recidivism figures for these years.

III. DATA

III.A. Data sources

The data set used for the current project is a slightly expanded version of the data set used by the Pennsylvania Juvenile Court Judges’ Commission (JCJC) in producing their 2014 report of statewide and county specific recidivism rates. The sample used in these analyses contains 90,858 unique youths with case closures from 2007 through 2011. The variables contained in the data set were from the Pennsylvania Juvenile Case Management System (PaJCMS), the centralized data system used by counties throughout the state to record actions on cases. Some additional variables from the PaJCMS were added to the data set used in these analyses, but the majority of variables used for the original recidivism report were also used to address questions specific to this project. The size and care taken in the construction of the data set by JCJC provides a valuable resource for Pennsylvania.

The PaJCMS system was designed to be a case management tool, not a data collection system, and only a subset of data fields are mandated by JCJC to be completed. The remaining fields are available for case management purposes and are completed at the discretion of juvenile justice personnel in each locale. In this context, the completeness, reliability, and validity of the variables tracked in the case management system varies. Unfortunately, this reality narrows the range of cases characteristics that can be considered to address the goals of the current project as well as the sophistication of some of the analytic approaches that can be employed. This is worth noting to highlight the inherent interconnection between data quality and analytic potential. The reliability and comprehensiveness of the available data predetermines the potential of the analytic approaches that can be applied and the extent of the knowledge that can be generated.

The data set used in these analyses was constructed to provide a picture of a) the characteristics of the adolescents supervised by courts statewide, b) the placements that they received while under court supervision, and c) the recidivism outcomes (defined as above) two years after the court closed the case. The cases included in each year are those that had their court supervision closed out in that year (i.e., the cases in the data set indicated as being 2007 cases are ones that left the court supervision that year). The amount of time that these adolescents had been under court supervision varies considerably, depending on when they came under court supervision for their most recent offense and their behaviors while under supervision. In addition, these adolescents may have received a wide array of services; some may have had regular probation supervision while others had extended institutional placements. The analyses done here have not been directed toward assessing the impact of the wide array of services that might have been provided.

The follow-up data on subsequent delinquency adjudication and criminal conviction is an expanded version (includes an additional year) of that used for the 2014 JCJC report, and is a consolidation of information regarding both juvenile and adult records. The intent of the JCJC study of recidivism was to provide a picture of the recidivism rate of adolescents who were under court supervision for the two years after that period of court supervision. Some of these adolescents may not have been released from court supervision until right before their 18th birthday (or in some small number of cases not until before their 21st birthday). It is thus clear that a true two-year estimate of the recidivism for adolescents near the cusp of juvenile court jurisdiction can only be achieved if adult records are included. A consolidation of information from juvenile and adult records is required, and was therefore done in determining the recidivism of these cases.

III.B. Constructing a set of predictor variables

The first two questions posed above focus on 1) whether the characteristics of the cases handled by the system changed from year to year, and 2) whether differences in case characteristics might have changed our expectations for what the recidivism rate might be in each year. The essence of these two questions is whether the same types of adolescents are being seen in each of the years observed.

This matters for two reasons. First, if the cases were particularly more “crime prone” in year A compared to year B, we would expect a higher recidivism rate in year A than in year B, even if the juvenile system were operating with the same level of impact in both years. Knowing how much potential there is for crime in the sample in each year gives us a benchmark for what to expect from the system in that year. Second, if case characteristics were shifting systematically from year to year during this period (e.g., adolescents in each successive year had profiles indicating a higher chance of recidivism), this would indicate something about how the system was filtering adolescents for court involvement as well as the magnitude of the challenge facing the system with each passing year.

In order to address these issues, we needed a set of variables that a) taken together, might indicate the likely chance of recidivism for an adolescent, and b) are collected consistently across the different years. There were a number of variables in the data set with well demonstrated relations to later recidivism. Unfortunately, a sizable proportion of the variables contained in the data set that might have been predictive of later recidivism were not complete because they are not mandated data fields in the PaJCMS. We had to set criteria for choosing potentially relevant variables based on the completeness of the data.

Our first rule was to choose potentially relevant variables that did not have more than 15% of the observations missing in the data set. This provided us with a set of 16 possible variables, listed below in Table 1. The vast majority of these had no missing values in the data set. Gender and race had low amounts of missing data (1% and 1.6%, respectively). Two other variables had also notable levels of missing data: a) juvenile's age at first referral to a juvenile probation department (15% missing), and b) type of offense for the most serious prior charge (1.6%). Because of the importance of these variables to predicting recidivism, though, we wanted to keep them in the data set.

Multiple imputation strategies were used to generate likely values for the missing data for two variables: age at first referral to juvenile probation and type of offense for the most serious charge. Multiple imputation approaches provide a sound statistical strategy to make an informed “guess” about the missing data. Three steps are involved: first patterns in the non-missing data for a case are used to generate the likely values of the missing variable for that case (see Rubin, 1987, <http://www.ats.ucla.edu/stat/sas/library/multipleimputation.pdf>). Next these values are put into several data sets in place of the missing one, and last, the desired analyses are run on these multiple data sets. The multiple imputation approach reduced the levels of missing data for these two variables from 15% to .2% for age at first referral and from .6% to .1% for the type of most serious charge. Imputation was not done for gender and race.

Table 1: Variables used in analysis

Variable name in JCJC or PaJCMS data systems	Variable Description	Amount of Missing Data Original Dataset <i>n</i> (%)	Amount of Missing Data Imputed Dataset <i>n</i> (%)
Background Characteristics			
Gender*		779 (1%)	779 (1%)
Race*	White, Black, Asian, Multi-racial, Other	1485 (1.6%)	1485 (1.6%)

AgeFirstProbRef	Juvenile's age at first referral to a juvenile probation department	1395 (15%)	223 (.2%)
AgeClosure	Juvenile's age at case closure	0	
NumWritAllegClos	Total number of written allegations at case closing	0	
TotalWritAlleg	Interval of total number of written allegations at case closing (1, 2, 3, 4-9, 10+)	0	
EverAdjud	Youth was adjudicated delinquent in the past (binary indicator)	0	
RemovedHome	Was juvenile ever removed from home as result of JJ involvement (binary)	0	
County_Pop	Population of the county based on 2010 census	0	
Chronic	Indicator that juvenile is classified as a chronic offender (binary)	0	
Violent	Indicator that juvenile is classified as a violent offender (binary)	0	
Serious	Indicator that juvenile is classified as a serious offender (binary)	0	
SVC	Indicator that the juvenile is classified as being either chronic, violent or serious	0	
Child	Indicator that juvenile was first adjudicated delinquent under the age of 13	0	
Characteristics of Base Case			
OffType_BC	Type of offense for the most serious alleged charge/most serious substantiated charge (drug, person, property, other)	581 (.6%)	93 (.1%)
Placement_BC	Indicator that juvenile had a dispositional placement on the base case (binary)	0	

*Multiple imputations were not conducted on gender and race

IV. DIFFERENCES IN THE CHARACTERISTICS OF THE CLOSED CASES FROM 2007 THROUGH 2011.

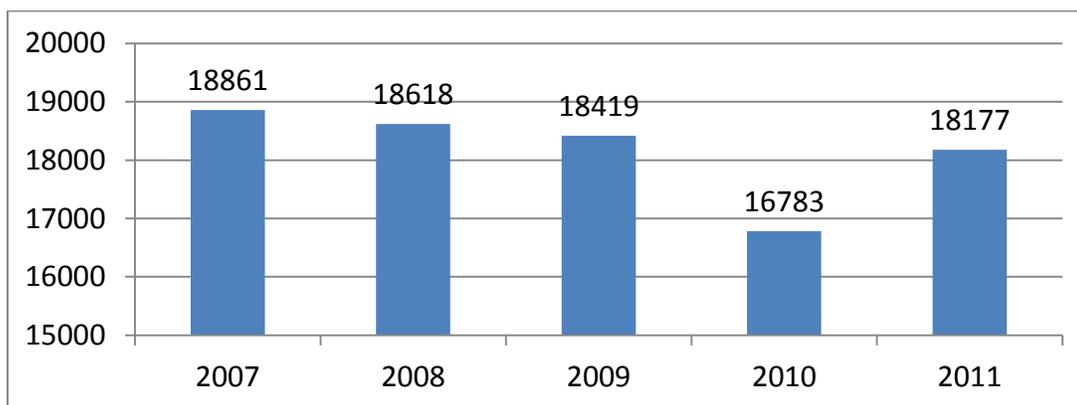
IV.A. Case closures by year

An initial question is whether a comparable number of cases were closed in each year. As seen in Figure 1 below, the number of cases closed in each year is fairly stable across years, with

one notable exception. A statistically significantly lower number of case closures occurred in 2010 compared to each of the other years.

This drop in cases closures accurately represents the datasets provided from JCJC for these analyses. JCJC, however, does not believe that it corresponds to a large drop in cases closed by the court. JCJC staff discovered a problem with the data recording of case closures in 2010 and 2011 and some cases were not included in the dataset as result. JCJC's examination of the included and excluded cases indicates no differences in case characteristics.

Figure 1: Number of case closures by year



IV.B. Case characteristics across years

IV.B.1. Examination of basic case characteristics. Understanding if and how the yearly cohorts differ from one another is important background knowledge for interpreting recidivism rates across years. We examined the characteristics of the cases closed in each year, looking at a variety of variables. Table 2 and Figures 2 through 5 below present some of these comparisons on individual case characteristics.

Table 2: Selected background characteristics by year of case closure

	2007 (n = 18,861)	2008 (n = 18,618)	2009 (n = 18,419)	2010 (n = 16,783)	2011 (n = 18,177)
Average age at case closing (s.d.)	16.69 (1.9)	16.73 (1.9)	16.77 (1.6)	16.84 (2.0)	16.74 (2.1)
Average age at first adjudication of delinquency (s.d.)	15.60 (1.7)	15.35 (1.7)	15.32 (1.7)	15.36 (1.7)	15.36 (1.7)
Total number of written allegations at case closing (s.d.)	2.03 (1.7)	2.00 (1.7)	2.01 (1.7)	2.01 (1.7)	1.9 (1.6)
Median number of days under court supervision at time of case closure	336	352	355	338	335

Five counties with highest proportion of cases (%)	Phila (11.1)	Phila (11.5)	Phila (13.5)	Phila (13.1)	Phila (12.8)
	Alleg (8.5)	Alleg (9.0)	Alleg (8.0)	Alleg (8.6)	Alleg (10.2)
	Mont (5.5)	York (5.5)	Mont (5.4)	Dauphin (5.2)	Mont (5.4)
	York (5.4)	Dauphin (5.3)	Dauphin (5.4)	Lehigh (4.7)	Lehigh (5.2)
	Lehigh (4.8)	Mont (5.2)	Lehigh (5.3)	York (4.7)	York (5.0)

Figure 2: Percent w/in year: Gender, race & prior removal

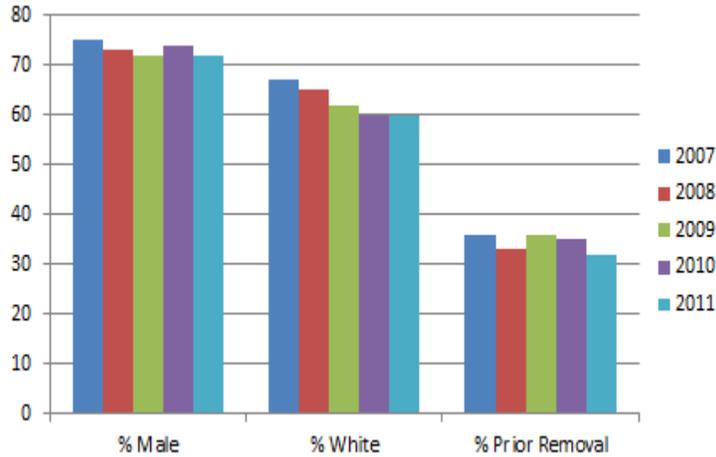


Figure 3: Percent w/in year: Chronic, violent, serious

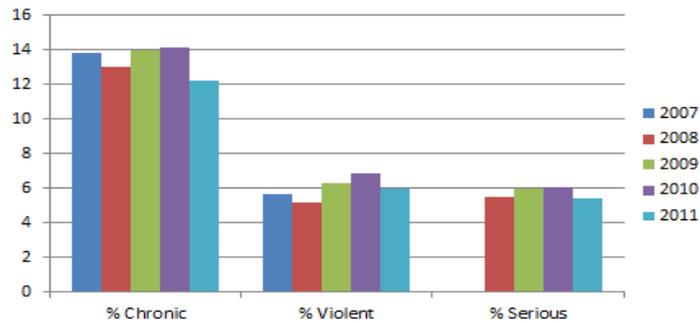
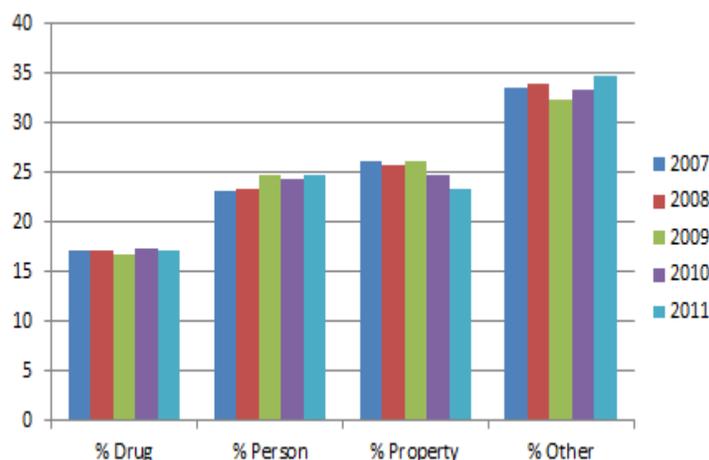


Figure 4: Percent w/in year: Case offense type

A few of the differences shown in Table 2 above reached statistical significance. The statistically significant differences were:

- youth with case closures in 2010 were significantly older than youths in all other years
- youth with case closures in 2011 had fewer written allegations than youth in all other years
- youth with case closures in 2007 were significantly older at the time of their first adjudication than youth in all other years

Statistical significance in this situation, however, can be misleading. When looking at a sample this large, statistically significant differences among groups will be found even with small actual differences between the groups. Thus, it can often then be the case that the amount of difference between the groups, although statistically significant, would not be perceptible or meaningful to individuals working with these adolescents. In other words, these are differences that did not result by chance, but they are differences of a magnitude that don't really matter. Moreover, they do not indicate any great differences in the cases from 2010. A simple examination of the values in the table above indicates that one would be hard pressed to see differences from year to year that would generate concern about a shift in the types of adolescents seen in the juvenile system over this time period.

There are also some statistically significant differences in the figures. These are:

- The race/ethnicity mix has changed systematically across years, with a higher proportion of minority youths in each successive year (percent of white youths decreases by almost 10%; see Figure 2).
- There is slight upward trend over the years in person crimes and a slight downward trend in the proportion with a property offense. Drug offenses are consistently the lowest proportion of offenses across all years (Figure 4).

Again, while notable, none of these trends appears particularly powerful. The general impression from examining this table and figures is that the cases seen across this time period have not varied appreciably in basic background characteristics.

IV.B.2. Latent Class Analyses. The descriptive analyses summarized above highlight some profile changes to youth in the juvenile system over the time period in question, but none of these differences are particularly striking. The difficulty with these analyses is that they examine each particular case characteristic individually. This does not provide a holistic picture of whether particular “types” of cases might be more or less prevalent in the different years. We also conducted latent class analyses to try to get at this latter question.

Latent class analysis is a way to portray an individual case according to a range of variables, rather than just one variable at a time. This procedure allows for identification of groups of cases where particular variables “hang together” particularly well. It identifies unobserved subgroups or subtypes within a sample, using the information about a set of variables. This procedure essentially sorts cases into subgroups or types (called “classes”) that look alike on the set of variables considered, compared to the other cases in the sample.

A latent class analysis was conducted on the whole sample of cases across all the years observed. This provides a general characterization of the case subtypes seen in the overall sample of juvenile offenders (n = 90,858). The background variables identified earlier (see Table 1) were used to characterize the cases and were considered in the latent class analysis.

The results of the latent class analysis of all the cases across the years found three “classes,” or types of cases. The characteristics of these different classes are shown in Table 3 below. As seen from an examination of the mean values and prevalence rates found in these subgroups, these classes appear to represent adolescents at distinguishable levels of risk for future offending. The cases identified as being in Class 3, for example, have appreciably more extensive criminal records and histories of placement.

Table 3: Latent class analysis results: Characteristics of identified Cases

Variable	Class 1 Low Risk (n = 47,843)	Class 2 Medium Risk (n = 30,837)	Class 3 High Risk (n = 12,178)
Gender (% male)	69	77	85
Race (% minority)	32	41	47
Mean AgeFirstProbRef (SE) (age at first probation referral)	15.11(.01)	14.37 (.01)	13.28 (.02)
Mean AgeClosure (SE) (average age at case closure)	16.22(.01)	17.15 (.01)	17.85(.01)
Mean NumWritAllegClos (SE) (average number of written allegations at case closure)	1.00 (.00)	2.22(.00)	5.47 (.02)
TotalWritAlleg			
1 Prior (%)	100	8	0
2 Prior (%)	0	62	0
3+ Prior (%)	0	30	100
EverAdjud (%)	25	64	86

RemovedHome (%)	15	47	78
Mean County_Pop*(SE)	51.75 (.21)	59.65 (.29)	56.76 (.42)
Chronic (%)	0	0	100
Violent (%)	0	11	17
Serious (%)	0	10	16
Child (%)	1	3	8
OffType_BC			
Person (%)	26	24	17
Property (%)	27	25	22
Drug (%)	18	17	15
Other (%)	30	34	46
Placement_BC (%)	6	22	31
*County population is divided by 10,000			

We next examined whether the proportion of cases classified as low, medium, or high risk according to the derived classes varied over the years of observation. If more “serious” cases or less “serious” were more common in later or earlier years, we would expect there to be a higher proportion of the cases across the years. The proportion of low, medium, and high risk cases (i.e., Class 1, 2, and 3 cases) seen in each year are presented below in Figure 5.

Figure 5: Proportion of cases in each year in low, moderate, or high risk group according to a latent class solution

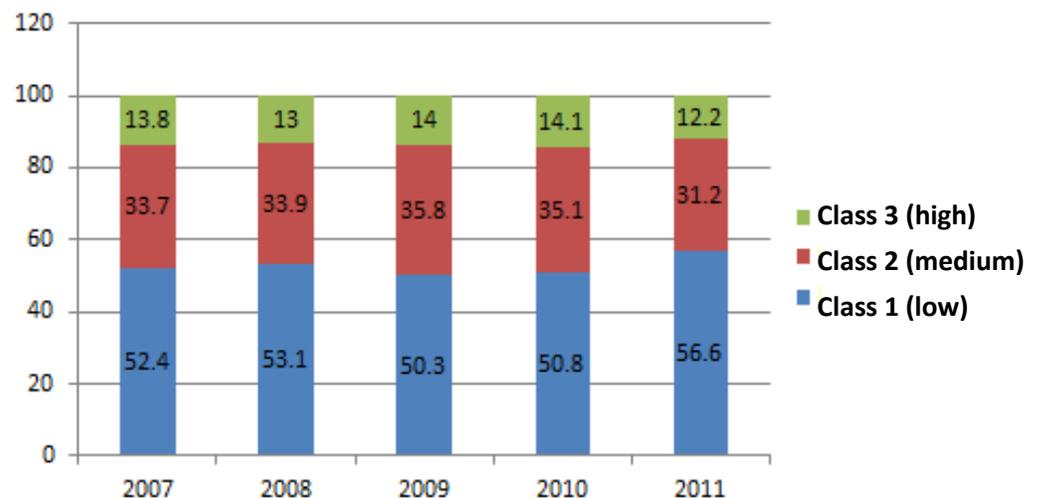


Figure 5 shows that the proportion of each class is substantially unchanged from year to year. There are no dramatic changes from year to year in the mix of low, medium, and high risk cases. The only notable change is in year 2011, when we see a slight upturn in the percent of low risk youth accompanied by a slight reduction in the proportion of moderate and high risk youth.

This section has presented analyses examining the number and type of cases seen statewide in the juvenile justice system from 2007 through 2011. Simple differences in descriptive case characteristics were examined, and a latent class analysis was used to identify three groups with high, medium, and low risk profiles for future offending. Two conclusions emerge from these analyses.

First, the number of case closures in these years was relatively constant. This occurred even though there were reductions in juvenile crime statewide during these years. There were notably fewer cases closed out in 2010 than in the other years, with the number of case closures in 2010 down about 9% from the other years. When the case characteristics were examined across the years, however, there were no apparent differences in the cases seen in that year. We have no obvious explanation for this reduction.

Second, there are no glaring trends in the characteristics of the cases processed in each year during this period. Examination of differences in basic case characteristics showed some statistically significant differences for certain years, but these differences were not of a magnitude to indicate a powerful shift in case identification or processing. There has been some trend toward an increased proportion of minority adolescents, less chronic offenders, and more adolescents with a violence-related charge, but these shifts have not been large.

This conclusion of no major change in the types of adolescents seen over these years was reinforced in a subsequent analysis. A latent class analysis identified three groups with differing patterns of case characteristics, and there was no difference in the proportion of each type of case in the different years. The general profile of cases over these years has not shifted a great deal (e.g., more serious cases becoming much more common over time).

It might seem that there should have been differences in case characteristics across these years, if one posits that decreases in rates of juvenile arrests should have produced a more distilled group of serious offenders being supervised by the courts. It is important to note, however, that the data analyzed here reflects cases *closed* in the years 2007 through 2011, not cases *arrested* in these years. The average time from case referral to case closure for the cases examined was 16 months, meaning that the overwhelming proportion of the adolescents in this sample were arrested between 2005 and 2009. An examination of the statewide arrest rates for this period indicates a relatively flat rate of re-arrest. Case differences may well be observed in subsequent analyses of case closures that would include adolescents arrested after 2009, when juvenile arrest rates drop regularly from year to year.

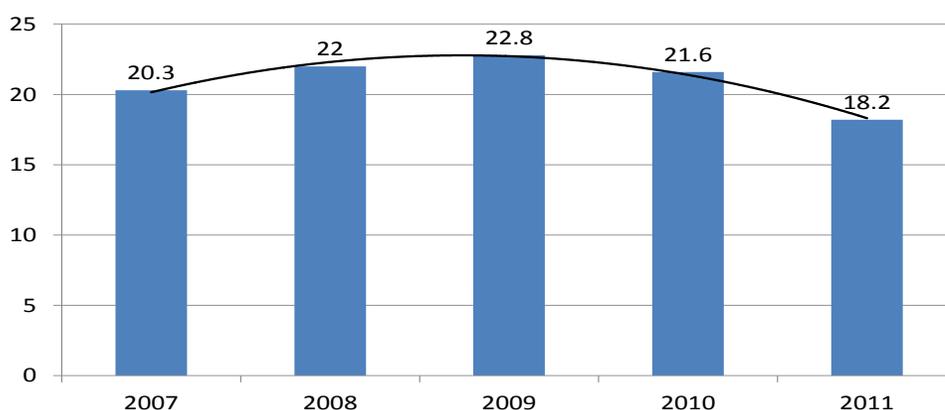
While there appear to be no major shifts in the profile of the adolescents seen in the juvenile system during this period, this does not mean that there might not have still been changes on relevant variables not included in these analyses. These analyses are necessarily limited by the currently available data sets at JCJC. The types of case characteristics used were rather general, and geographic distributions of cases, for example, were not considered. Important variations may have occurred (e.g., the presence of substance use problems) that could indicate new challenges for the juvenile justice system or large variations may have occurred in particular locales. These analyses simply indicate that, at the most general level, case types have remained rather stable statewide for this period.

V. RECIDIVISM RATES

V.A. *The raw recidivism rates*

The analysis of recidivism rates involved several steps. We began by graphing the recidivism rates for the full sample across the five years reported. This analysis examined the proportion of the sample in each year that had a new delinquency adjudication or criminal conviction in the two years after juvenile court case closure. Figure 6 below illustrates these recidivism rates and the trend of the values over the years examined. The vertical axis indicates the percentage of the group with case closures in a given year who recidivated within the two subsequent years. For example, the first bar below indicates that 20% of the cases closed in 2007 recidivated within two years of their case closure date (i.e., before some date two years later in calendar year 2009).

Figure 6: Percent of sample from each year that recidivated within 2 years



V.B. *Generating the likely recidivism rate*

The recidivism rates above show a trend that could be affected by two factors. First, the performance of the juvenile justice system could lower or raise the rate from year to year. Improved probation practices or more effective programming in placements, for example, could have lowered recidivism figures for a particular period. Alternatively, the characteristics of the adolescents seen by the court that year could have raised or lowered the recidivism rate, even if practices had improved or deteriorated. Effective programming might reduce the rate of recidivism substantially, but the rate might still be rather high if the adolescents given that programming had a high chance of reoffending in the first place. Our goal for this set of analyses

is to see if the observed rates for each year were higher or lower than what might be expected, given the criminogenic risk of the adolescents whose cases were closed out that year.

In order to achieve this, we needed a score that reflected the likelihood of each adolescent having a subsequent delinquency adjudication or criminal conviction, based on what is known about that adolescent at the time of case closure. We generated a score to reflect the individual's likelihood of recidivating, using the background characteristics presented earlier in this report (Table 1). This *likelihood score* essentially reflects the chances that an adolescent with these particular features will recidivate in the next two years. The score is calculated by figuring out, based on the background characteristics, how much a particular adolescent looks like other adolescents who recidivated. Each case is assigned a score between 0 and 1 based on whether they have characteristics like the adolescents who recidivated across all the years. An adolescent who has almost all the characteristics of someone who recidivated might have a likelihood score of .8; a youth who looks a lot like someone who did not recidivate might have a likelihood score of .2. If we then take the average likelihood score of the adolescents whose cases were closed in a particular year, we get an estimate of what the likely recidivism is for that particular group of adolescent offenders. We can then compare the observed recidivism rate to this expected recidivism rate for the adolescents whose cases were closed that year.

In order to use the procedure outlined above, we need an acceptably accurate *likelihood score*. We have to have confidence that the score that we generate really discriminates those adolescents who reoffend from those who do not. We are comparing our observed recidivism figure to this projected recidivism figure (which is just the average of these individual likelihood scores), so we have to assure ourselves that we have assigned a reasonable estimate of an individual's likelihood of a subsequent adjudication of delinquency or criminal conviction based on the case characteristics.

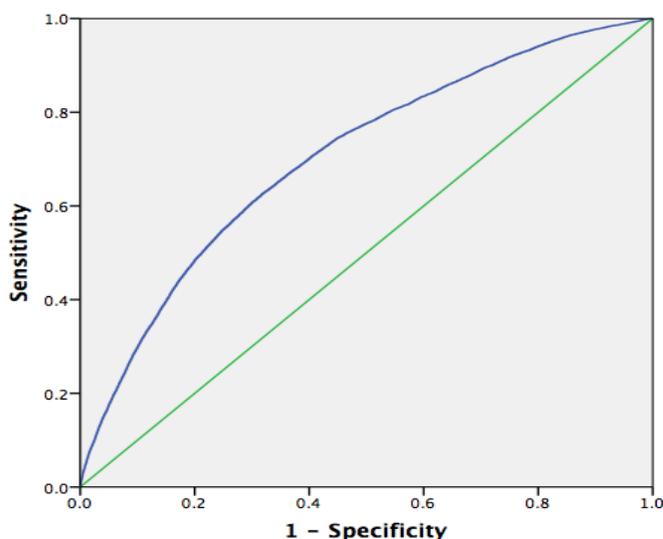
We generated a predicted probability score for each case using a regression approach for the whole sample. In other words, we devised an equation that took the best weighting for each of the case characteristic variables to predict recidivism, and applied this equation to each individual in the sample. This gives each individual a "predicted probability of future recidivism", or our *likelihood score*. We then examine these scores to see how accurately they predict whether that individual actually recidivated or not. If a large number of cases with low likelihood scores recidivated or if a large number of individuals with high likelihood scores don't recidivate, then the predictive equation is not working well.

We look at two metrics to see how well this calculated score performs. First, we examine the overall sensitivity of the scale (how many of the actual recidivists get high scores) and the specificity of the scale (how many of those with high scores actually recidivate). Essentially in this step you are comparing the "true positive rate" against the "false positive rate" at different points on the score and judging the overall performance of the scale accordingly.

These comparisons of sensitivity and specificity are graphed in what is called a Receiver Operating Characteristic curve or "ROC curve." The ROC curve for this equation is shown in Figure 7 below. The overall performance of an instrument for differentiating cases effectively is calculated by the Area under the Curve (AUC) on the ROC graph. The diagonal line in the

middle of the graph is what would be obtained if the score had no ability to discriminate; if it was just flipping a coin. The better the performance of the instrument (in this case, the equation with the background characteristics), the more the line moves away from the diagonal and toward the upper left corner of the graph. As it moves away from what it would do by chance, it then generates a larger area under the curve (AUC) figure; a measure of its overall distance from the chance diagonal line. That is, it shows higher sensitivity and specificity.

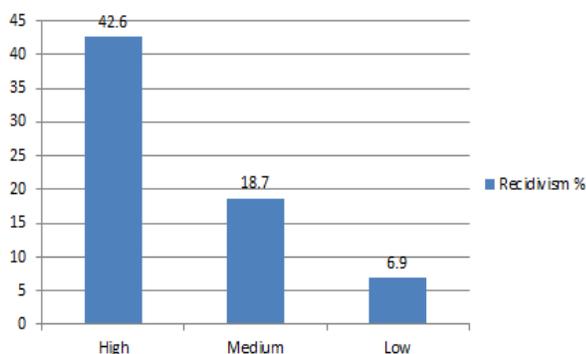
Figure 7. Recidivist vs. non-recidivist ROC Curve for equation predicting recidivism for the whole sample



The area under the curve (AUC) value in the above figure = .70. *This is the same level of accuracy generally obtained in actuarial instruments for assessing the likelihood of future violence in individuals with mental illness or likely re-arrest in criminal populations.* It is also only slightly lower than the level of accuracy obtained with the Youth Level of Service (YLS) in its development research.

Another way to look at the performance of this calculated likelihood score is to see how well low and high scores on the equation relate to actual recidivism rates. We broke the sample up into three groups based on their calculated likelihood scores: a) high scores = top 1/6 of the sample with the highest likelihood scores ($n = 15,571$), b) mid-range scores = 2/3 of the sample with middle value scores ($n = 59,821$), and c) low scores = the 1/6th of the sample with the lowest likelihood scores ($n = 13,029$). If the calculated likelihood score is accurately reflecting risk based on background characteristics, then we should see a difference in recidivism rates for each group. The recidivism rates for these groups are shown in Figure 8 below. The highest group is approximately six times more like to recidivate than the lowest group.

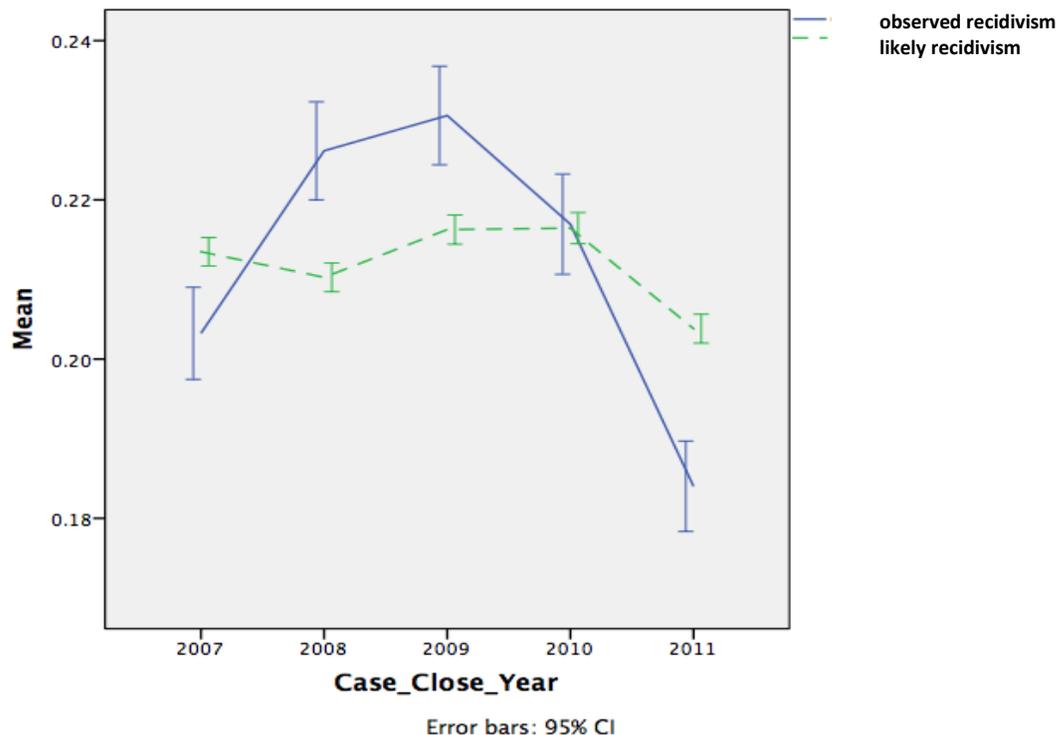
Figure 8: Rates of recidivism in groups with low, medium, and high likelihood scores



The likelihood scores perform as hoped. They provide an acceptably accurate estimate of the chances that a particular adolescent in the sample will recidivate in the next two years. Thus, these scores can be used to estimate the likelihood of recidivating for samples from different years.

V.C. Comparing likely and observed recidivism rates by year

With a reasonably accurate way to gauge the likely recidivism of the closed cases in each year, we can then go on to see how the actual recidivism rate of the sample from each year compares to what we might have expected based on the case characteristics of the adolescents whose cases were closed that year. In Figure 9 (below), we plot the actual (“observed”) recidivism rates for the cases from each year compared to the average likelihood scores for those cases (or the “likely” recidivism rate) for that group. This shows whether the observed rate is higher or lower than one might have expected, based on the characteristics of the cases for that year. If the observed recidivism rate is higher than the predicted recidivism rate, you could wonder what influences, other than case characteristics of the youth being processed, might be driving up the observed rates. If the observed recidivism rates for a year are below what one might have expected from that sample of adolescents (their average likelihood scores), you might wonder what was done to drive the rate down. This picture situates the observed recidivism rate in terms of what might have been expected from that group of adolescents just based on their mix of background characteristics. The bars around the data points are 95% confidence intervals; meaning that 95% of the cases fall between those two bars.

Figure 9: Likely and observed recidivism rates by year

A few observations can be made based on this figure. First, the expected recidivism rate (the dashed line) has not changed that much over the years; as indicated in the earlier analyses of shifts in the types of adolescents seen each year. The only exception is that the expected rate in 2011 is significantly lower (as expected from the earlier analyses showing more low risk adolescents in the system during this year). This means that the background characteristics related to recidivism have not shifted much, except that the adolescents in the 2011 group are less likely to have recidivated. Second, the observed rate of recidivism (the solid line) for 2011 is much (and significantly) lower than the expected rate of recidivism, seeming to indicate a rather successful year of performance for the juvenile justice system. This stands in contrast to the years 2008 and 2009, when the observed recidivism rates were significantly higher than the calculated likely rate.

It is worth noting that the recidivism rate values in this graph may be slightly below the actual recidivism rates, because the method to identify recidivism is missing some incidents of a subsequent delinquency adjudication or criminal conviction (“re-offense”). The method used to identify incidents of reoffending in the original recidivism study (considering both juvenile and adult records within the state of Pennsylvania) could possibly miss the adjudication or criminal conviction of individuals who reoffended outside of the state (particularly youth from counties bordering other states or those who relocated within two years). There are no firm estimates available regarding the percentage of individual who live in one state and commit a crime in another, but our informal consultation with several criminologists and a recent BJS report on prison releases (Durose, Snyder and Cooper, 2015) suggests that this figure is in the 1-2% range. It is important to note, however, that this aspect of the data would not have affected the validity of the comparison above. Both the expected and observed rates were calculated from the same

indicator of recidivism and their relative performance would not be different even if the true prevalence were used.

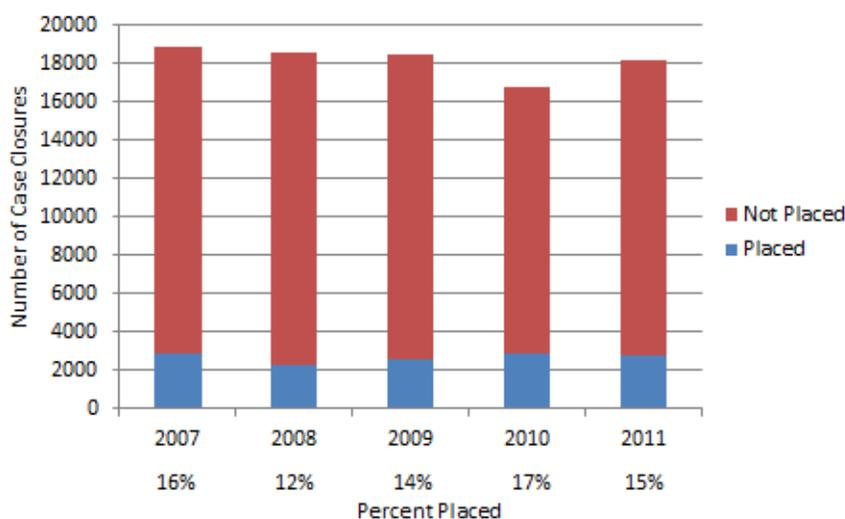
VI. PLACEMENT AND RECIDIVISM

The most expensive form of intervention for the juvenile justice system is placement in an institution. It is generally used for adolescents who have more extensive criminal records and a high level of treatment needs. It is thus important to know if patterns of using institutional care have shifted over this time period and whether the recidivism rate from this important aspect of juvenile justice services has changed during this period. Given the centrality of this question for juvenile justice system operations, we examined the patterns of placement and recidivism across the years 2007 through 2011.

VI.A. Placed cases by year

The initial question is the number and proportion of cases that are placed in each year. A total of 13,447 adolescents were placed at some time between the referral date for the base case and the date their case was closed. This means that about 15% of the adolescents in the juvenile justice system during this period were sent to an institutional placement. As presented earlier, the proportion of adolescents placed across these years has not fluctuated dramatically, but has stayed relatively high over the last two years of this period. These trends are presented below in Figure 10.

Figure 10: Number and percentage of placed cases by closure year



VI.B. Characteristics of placed adolescents

Table 4 and Figures 11 through 13 below illustrate the characteristics of these adolescents by year. As would be expected, the characteristics of these adolescents did not match those of the broader sample. These were generally adolescents with a higher level of risk factors and thus

a higher chance of committing future crime.

Table 4: Background characteristics of placed cases (n = 13,447)

	2007 (n=2,933)	2008 (n=2,290)	2009 (n=2,583)	2010 (n=2,880)	2011 (n=2,761)
Average age at case closing (s.d.)	17.77 (1.59)	17.83 (1.58)	17.91 (1.57)	18.02 (1.52)	18.04 (1.61)
Average age at first adjudication of delinquency (s.d.)	15.55 (1.61)	15.31 (1.62)	15.30 (1.63)	15.30 (1.61)	15.24 (1.69)
Mean number of written allegations at case closing	3.08 (2.21)	2.55 (1.98)	2.56 (1.87)	2.97 (2.11)	3.03 (2.13)
Median number of days under court supervision before case closure	718	719	751	676	743
Five Counties with highest proportion of cases (%)	Phila (17.9) Alleg (12.6) Bucks (6.5) Erie (6.1) Mont (5.7)	Phila (25.5) Bucks (7.3) Alleg (6.1) Dauphin (5.0) Berks (4.2)	Phila (29.5) Bucks (7.3) Dauphin(5.2) Erie (4.8) Mont (4.3)	Phila (23.1) Alleg (8.3) Bucks (6.9) Erie (6.0) Dauphin/Dela (4.8)	Phila (20.6) Alleg (9.2) Bucks (7.2) Delaware (6.0) Mont (5.4)

**Figure 11: Percent w/in year: Gender, race, prior removal
Placed cases**

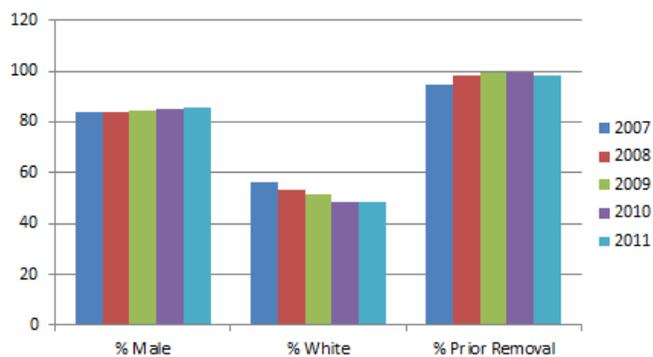


Figure 12: Percent w/in year: Chronic, violent, serious Placed cases

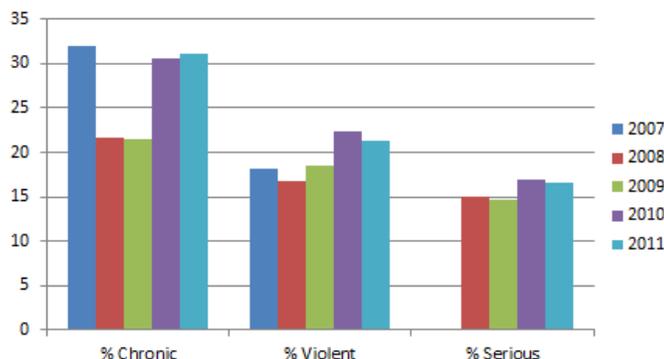
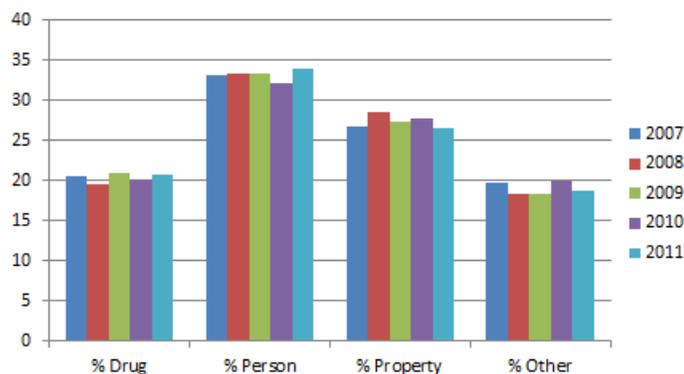


Figure 13: Percent w/in year: Base case offense type Placed cases



There are several notable features of the above table and graphs. There some trends, with the last two years of the series above (2010 and 2011) looking appreciably different from the prior years. The mean age of the youth at the time of case closure is older in 2010 and 2011; youth are, on average, age 18. Across all years, there is an increasingly higher proportion of minority youth in the placed group, with 2010 and 2011 having the highest percentage of any years. It could also be argued that, compared to the earlier years, placed youth with case closures in 2010 and 2011 are more serious offenders based on their background characteristics:

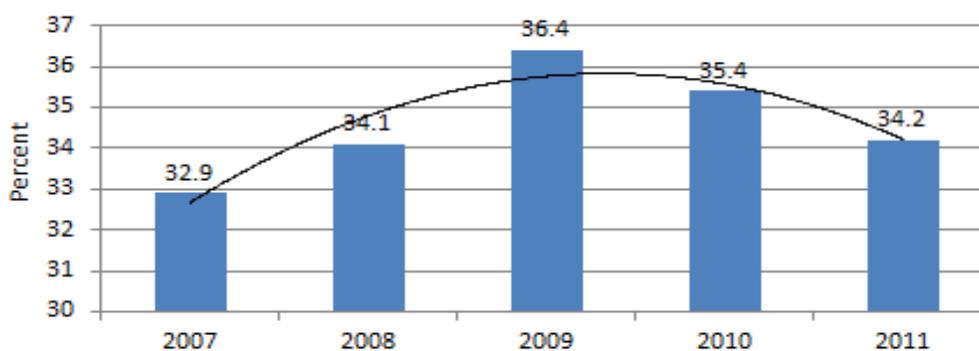
- They have more written allegations
- They were younger at the average age at their first delinquency adjudication
- In 2010 and 2011, there is a substantial increase in the percentage of chronic offenders within the placed group
- Across all years, the percentage of placed youth with a person charge exceeds the percentage with a drug, property or “other” offense and this holds true for 2010 and 2011

Taken together, these patterns arguably demonstrates that the PA juvenile system is targeting placement for the most serious offenders, particularly in the last two years of this observation period.

VI.C. Institutional placement and recidivism

Figure 14 below presents the recidivism rates by year for the cases that were placed. These adolescents showed a generally higher level of recidivism than the sample as a whole. This result is not surprising, given that the profile of placed cases presented above indicates that these adolescents had higher levels of risk for future criminal behavior than the broader sample of adolescents. In addition, the pattern of the recidivism rates for these placed cases reflects the general pattern of recidivism over the years for the broader sample. Rates peaked in the 2009 cohort and started to decrease in the 2010 and 2011 cohorts.

Figure 14: Observed recidivism rate for placed cases by closure year



It is also useful to know how the observed recidivism rates for the placed cases compares to the likely rates of recidivism for these placed cases. It is possible that the higher risk nature of the placed adolescents accentuates or dampens any impact that might be obtained from systems involvement. Figure 15 below illustrates how the expected and observed recidivism rates line up over these years for both the group of adolescents who were placed and those who were not placed.

Figure 15: Observed and expected recidivism rate for non-placed and placed cases by closure year

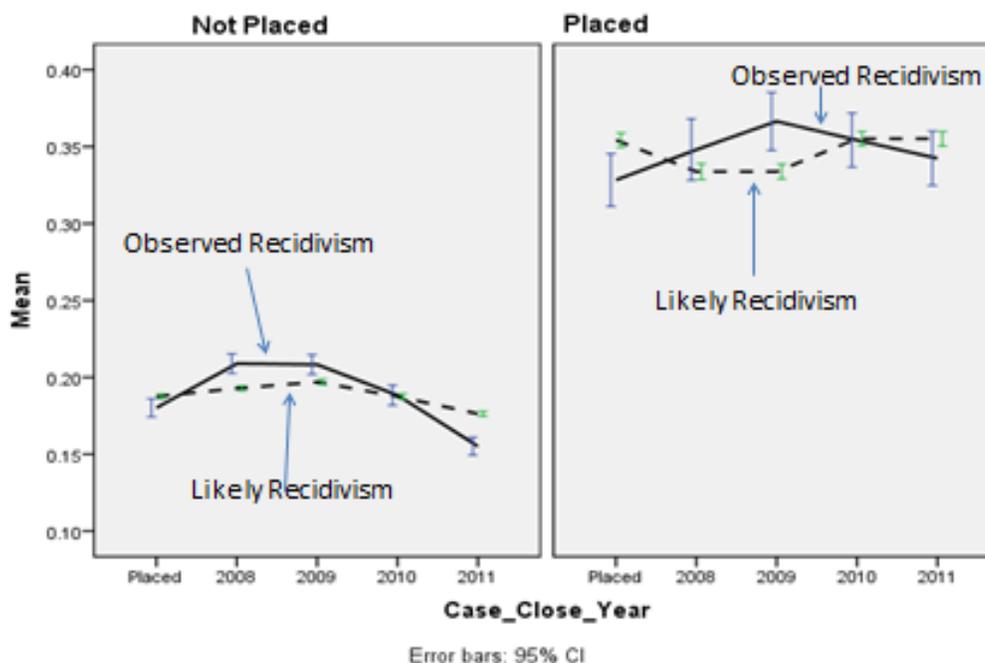


Figure 15 clearly demonstrates the difference between the levels of recidivism (both expected and actual) between the placed and non-placed cases. The expected and actual recidivism values are both about twice as high in the placed group as in the non-placed group. Nonetheless, the pattern of system performance is about the same across the years in both groups. The observed recidivism rates are higher than the expected rates in both groups for 2008 and 2009; significantly so for both years in the non-placed group and only significantly so for the placed group in 2009. The non-placed group then shows a significantly lower rate in 2011; the rate is moving in the same direction for the placed group. Even though the observed recidivism rate for the placed group in 2011 is about the same as the observed rate in 2008, the placed group in 2011 is at significantly higher risk than the group of placed adolescents in the earlier period. The system overall appears to be making progress regarding recidivism in the 2010 and 2011 cohorts with both placed and non-placed adolescents.

VI. D. Time in placement and recidivism

There is much current discussion about the impact of longer institutional stays on recidivism. Some advocates have maintained that even relatively short stays in institutional care damage adolescents and hamper their chances of successful community adjustment and subsequent positive development. Service providers maintain that an adequate time in placement must be allowed for programming to be delivered intensively enough to have a lasting impact. Yet another group of commentators call for regular reviews to justify continued placement after a specified period when programming might be thought to have an effect.

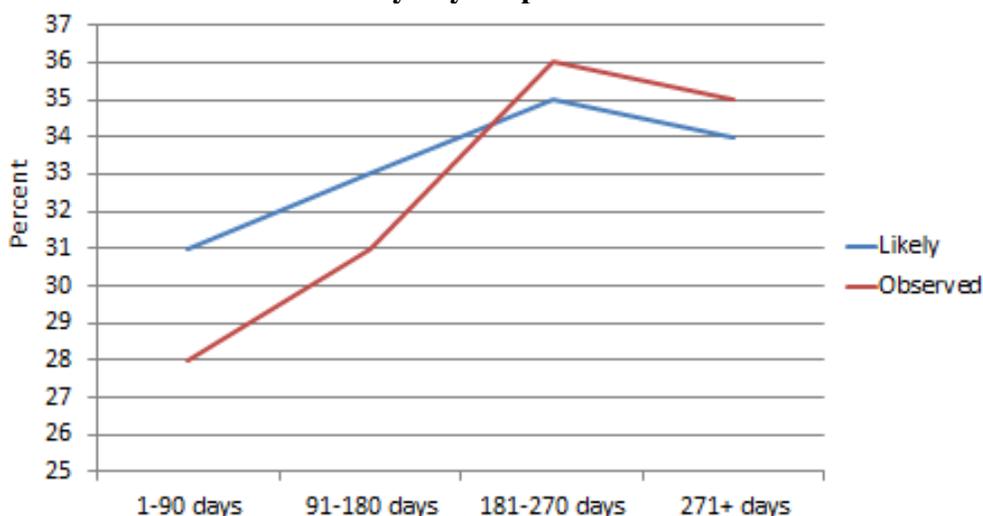
In this data set, as in nearly all others examined in the literature, there is a positive relation between amount of time spent in institutional care and recidivism; adolescents who

spend more time in insitutional care are more likely to recidivate. The problem, of course, is determining what this observed pattern indicates. Two factors could be producing the observed relationship, i.e., the impact of the time spent in the institution or the differences in the characteristics of the adolescents in care a short time or a long time. Adolescents with more criminogenic risks and complicated needs spend more time in institutional care. The fact that they are more likely to reoffend is not surprising, and may not necessarily be attributable to the fact that they had a long institutional stay. It is not easy to disentangle the effects of individual characteristics and increased time in institutional care.

The current data analyses provided an opportunity to examine the relation between amount of institutional care provided and subsequent recidivism, while controlling for adolescent background characteristics. The recidivism rates for groups of placed adolescents who stayed different amounts of time in institutional care during their court supervision were graphed and then compared to the likely recidivism rates for each group (calculated as explained earlier in the report).

This analysis was conducted on a sample of 6,872 of the 13,447 adolescents in the sample with a history of placement. These were the cases with complete placement entry and exit dates for their placements. While there might be some geographic bias in the sample related to reporting artifacts, we were unable to control for this possibility. The large overall sample size and the likely limited impact of any possible sampling bias, however, makes us believe that the results below are probably stable and valid. The results of this analysis are displayed in Figure 16 below.

Figure 16: Likely and observed recidivism rates by days in placement



The relation of the observed and likely recidivism rates shifts for the groups with more than six months of institutional time. For stays below 90 and 180 days, the observed recidivism rate is below the likely rate. Above 180 days, the rates shift, with the observed rate exceeding the likely rate. This pattern of the interaction between recidivism rates and length of time in institutional care is statistically significant; this is not chance fluctuation. That is, the likely rates

and expected rates are operating significantly differently in relation to each other over these increasing time periods. It appears that institutional stays below six months have a suppressing effect on recidivism, given the characteristics of the adolescents in care, but that institutional stays beyond that time have the opposite effect. These results mirror some findings by other researchers (Lipsey, 2009; Loughran, et al., 2010; National Research Council, 2013).

The observed relations here indicate that there is no apparent gain in reducing recidivism for stays beyond six months. The general trend line of the observed recidivism exceeds the expected line after this point, indicating what could be considered a negative return on investment. While the adolescents who are in settings for extended periods appear to be at higher risk for reoffending, their level of offending is still higher than even this anticipated level. These seem to call for increased concern and possible monitoring of institutional care beyond six months, since these efforts may be having the opposite of its intended effect.

VII. PRELIMINARY ANALYSES OF YOUTH LEVEL OF SERVICE (YLS) DATA

The JCJC data sets also contained the first waves of data from counties implementing the YLS as part of their regular court operations. The available data reflected the scores given to cases at the point of intake. The results of the YLS administered at intake are presented to the court to help guide the disposition decision. This provided an opportunity to examine the distributions of these scores as well as their relation to observed recidivism.

VII.A. YLS data

Scores were available for a limited number of cases in the 2009, 2010, and 2011 cohorts of case closures. There were only 109 cases for 2009. These initial cases were eliminated from the analyses reported here. It could be argued that they cases were the first set of “test” cases done and their reliability or accuracy might be questionable. Using them could possibly introduce some variability or inaccuracy that did not reflect how the instrument might perform in the field. In addition, the sample size for 2009 was not large enough to do reliable comparisons across years. We present findings using just the initial YLS administration for cases closed in 2010 and 2011.

VII.A.1. Counties contributing YLS data. YLS scores are available for a subset cases that were closed in 2010 (n=1,326) and 2011 (n=2,688). Counties in Pennsylvania implemented the YLS at various points, so the same counties did not contribute equivalent amounts of cases in each year. Table 5 lists the 22 PA counties represented in the YLS data.

Table 5: PA Counties represented in the YLS data

County	Percent of 2010 YLS data (n=1,326)	Percent of 2011 YLS data (n=2,688)
Adams	0	1
Armstrong	0	<1
Beaver	6	4
Berks	2	11
Blair	<1	<1
Bucks	31	17
Cambria	5	4
Cumberland	2	2
Dauphin	0	1.5
Franklin	0	2
Lancaster	0	3
Lehigh	24	22
Luzerne	6	4
Lycoming	0	<1
McKean	0	<1
Montgomery	0	7
Northampton	23	13
Northumberland	0	<1
Venango	0	<1
Washington	0	2
Westmoreland	0	<1
Wyoming	0	<1

As can be seen above, most of the counties contributed a rather small proportion of cases to the overall sample. Bucks, Lehigh, and Northampton contributed the majority of cases examined (early adopting counties for the YLS). This means that the performance of the instrument in this data set may or may not reflect what will happen when the YLS is adopted more widely. It may be more or less reliable and subsequently more or less valid when implemented across the state.

VII.A.2. YLS sample compared to the rest of the JCJC sample. The fact that the YLS was only collected in select counties means that the adolescents assessed by the instrument are not representative of the adolescents in the system statewide. Importantly, the subset of cases in this dataset do not represent adolescents from the largest and most ethnically diverse counties (Philadelphia and Allegheny) in the state. The variability of the characteristics of the adolescents being assessed will have an effect on any observed relationships regarding internal consistency of the scales or the relations between YLS scores and other measures, like recidivism.

There are considerable differences between the group with a YLS score (n=4,123) and the remaining sample (n=86,735). Statistical tests of the differences indicate that, as expected, the sample of youth with a YLS score are from smaller and more rural counties. In addition, the

YLS sample has a higher proportion of white adolescents, fewer recidivists, fewer chronic and serious offenders, and fewer adolescents who had been removed from their homes.

Despite the limitations on comparability, analyses of the available cases can still provide valuable information. The existing sample sizes allow for an examination of the distributions of the scores given and a comparison of these scored cases to ones used in the standardization studies for the YLS. In addition, these scores can be compared to the likely recidivism scores derived from the existing JCJC data as a measure of the validity of the YLS scores. Finally, the relation between the YLS scores and recidivism can be examined.

VII.B. Comparison of scores to YLS standardized sample

Our first question was how the YLS scores on this sample compared to samples from other locales and times. We examined both the total risk score and risk level using gender specific normative cut-offs for US community sample reported in the YLS manual. Norms for the community sample rather than the custodial sample were used since the majority of the cases closures had a community disposition for the base case. Below are graphs illustrating the distribution of the total YLS score for each year (Figures 17 and 18). A comparison of groups showed no significant difference for the group from 2010 versus those from 2011 in this sample in the overall distributions of the total score.

Figure 17: Distribution of YLS total score for cases closed in 2010

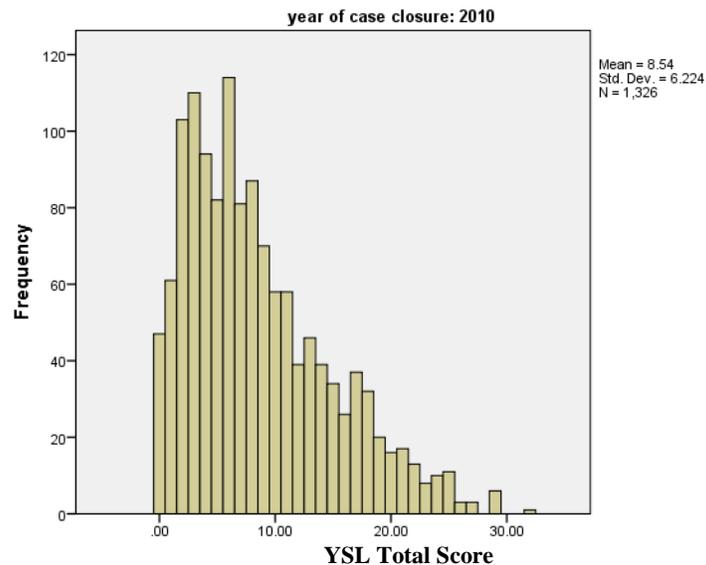
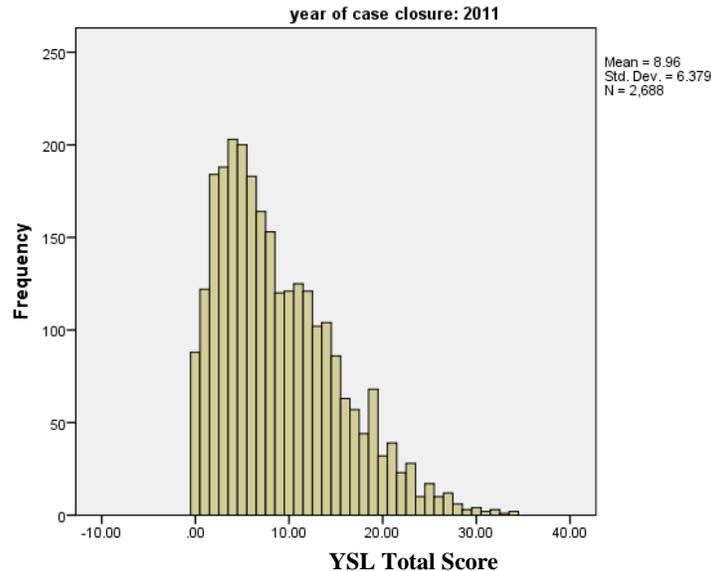


Figure 18: Distribution of YLS total score for cases closed in 2011

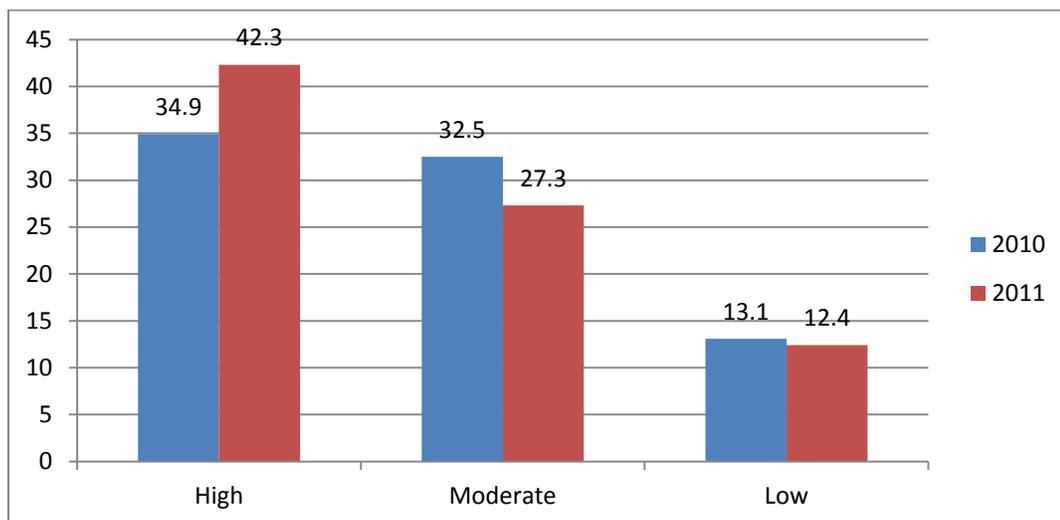


These graphs are nearly identical distributions and appear to be in line with the values that would be seen in the counties examined, i.e., overall lower levels of serious cases. In both distributions, no cases fall within the “very high risk” range (as defined in the YLS manual) in either year, and only a small percentage of cases are “high risk” in either year (3.2% in 2010 and 3.6% in 2011). Second, there is a significantly higher proportion of cases falling into the “moderate risk” category in 2011 compared to 2010 (24.6% vs 28.3%) and a significantly higher proportion of cases falling into the “low risk” category in 2010 compared to 2011 (72.2% vs 68%). This minimal shift in percentages between years could be the result of subtle shifts in the patterns of the adolescents involved in the system or a product of different counties reporting in each year.

VII.C. Recidivism among the YLS cases

Figure 19 shows the recidivism rates for each of the risk categories (from the manual cut-offs) in the YLS sample for each of the years. It is apparent that the YLS is operating as expected, differentiating groups at higher levels of risk for reoffending in each year. The percentage of cases recidivating declines as the risk level declines. The group classifications perform equivalently in the data from each year, i.e., there is no significant difference in the overall accuracy in the samples from the different years.

Figure 19: Rates of recidivism in YLS classes of risk for the YLS sample



In a final analysis of the YLS data, we explored whether the YLS was simply duplicating the prediction that had been made with the procedure used earlier using the likelihood scores derived from the case characteristics in the JCJC data. To do this, we first looked at whether the likelihood scores mapped onto the YLS categories. It was apparent that they did. The mean likelihood score for the low group (n = 2,855) was .16, for the medium group (1,107) it was .25, and for the high group (n = 142) it was .35.

We next ran a regression to see if the YLS score added anything unique and significant to the prediction that might have been obtained if we had just relied on the likelihood score alone (and recall that the likelihood score relied only on a set of 16 background characteristics available in the PaJCMS system, see Table 1). If the YLS were simply serving as a proxy for the likelihood calculation, then its inclusion into the regression equation would not increase the accuracy of the equation. In essence, it would just be bringing information that was redundant with that being used in the likelihood estimate.

The results, however, indicated that the YLS was contributing significantly to the accuracy of the prediction of recidivism in the full YLS sample. It was bringing in some predictive power over and above whatever the likelihood estimate did on its own. The YLS score picked up some unique information, and a significant amount of it, about the case characteristics that was not accounted for by the factors that went into the calculation of the likelihood estimate.

In this preliminary test, the YLS scoring was providing access to a domain of predictive factors that were not tapped by the variables included in the actuarial predictive model derived earlier. It is obviously an open question if these results can be reproduced on a broader sample. These initial results, however, indicate that the YLS may be a different, and valuable, lens for estimating risk of recidivism, even when powerful background characteristics are taken into account. This indicates that administering the YLS has value over and above the identification of particular areas of risk and need for case management purposes.

VIII. REPORT SUMMARY

The analyses reported here build upon and expand those presented in the Pennsylvania Juvenile Court Justice Commission (JCJC) report of November, 2014. That report provided a detailed picture of state trends in juvenile justice in Pennsylvania from 2007 through 2010, with an extensive overview of the characteristics of the adolescents involved in the juvenile justice system, service provision, recidivism, and county specific trends. The comprehensive analyses of the patterns of juvenile justice system operations statewide gave policy makers and juvenile justice professionals the needed empirical grounding for improvements in the statewide juvenile justice system.

The 2014 JCJC report went beyond simple description of the patterns of case processing and placement. It also provided data regarding two-year recidivism outcomes for the adolescents seen in the courts during this period. The report thus provided a salient metric for evaluating performance and assessing the types of adolescents at highest risk for reoffending as well as the likely outcomes for adolescents at different points in the juvenile justice system. This is a major step forward for the state of Pennsylvania in monitoring its systematic progress toward coordinated improvement in operations and service provision.

The next challenge taken up by JCJC was to refine its analyses of recidivism outcomes by examining and accounting for changes in the “case mix” of adolescents in the juvenile justice system from year to year. Shifts in the profiles of presenting problems of the adolescents in the system over time should be considered in order to get a more accurate assessment of overall system performance. Achieving the same level of performance in terms of recidivism even in the face of increasingly difficult and more crime-prone youths means that the system is not performing at a static level; instead, it is performing more effectively in light of more formidable challenges. If, however, the system is achieving the same result from year to year, but with less crime-prone adolescents year to year, then its performance could be thought of as becoming less effective.

This simple logic prompted the analyses presented here. In this report, we have included an additional year of data (2011) and have attempted to provide a context for assessing recidivism measures in light of the characteristics of the adolescents in the system in any given year. The approach taken is rather straightforward. It simply assigns a likely recidivism value to each case across the time period and then assesses the system performance in a given year compared to the average of those likelihood scores for the adolescents in the system that year. Fortunately, the data available in the JCJC database allowed for an adequately powerful model of likely recidivism that could produce individual likelihood estimates.

Several findings emerged during this exercise. The major observations are:

- The profile of cases seen in the time period examined did not shift dramatically. While there has been a small drop in the number of cases processed between 2007 and 2011 (about a 4% reduction), the characteristics of cases has remained rather stable. The proportion of adolescents with high, medium, and low likelihoods of

reoffending has remained relatively stable.

- The proportion of adolescents sent to out of home placements has also remained relatively stable over this period at approximately 15%.
- An acceptably valid indicator of the likelihood of recidivism can be generated for each case by combining available variables in the JCJC data base
- Comparing the estimated likelihood of recidivism and the observed recidivism across these years indicates that the overall system has performed as well as or better than might be expected since 2010. The recidivism rate for 2011 was significantly lower than might be expected, given the characteristics of the adolescents in the system that year.
- The pattern of system performance was generally the same for adolescents who were placed out of the home and those left in the community, although the performance in 2011 was significantly better than might have been expected for adolescents in the community.
- Examined across all years, the observed recidivism rates for shorter placements (six months or less) were better than might be expected, given the characteristics of the adolescents receiving these placements. Conversely, the recidivism rates for longer placements (longer than six months) were worse (higher) than what might be expected, based on the characteristics of the adolescents receiving these placements.
- Although limited to two years of select data, initial analyses on the use of the YLS are encouraging.
 - The distribution of scores across the two years shows consistent patterns and the anchoring of the scores corresponds to what might be expected from the locales providing data
 - The scores are related to observed recidivism as would be expected
 - The YLS scores add unique information to the prediction of recidivism beyond what can be captured in the available information on case characteristics

These findings extend those presented in the 2014 report in several important ways. First, they include an additional year of data and control for the characteristics of the samples of adolescents in the juvenile justice system each year. The analytic approach taken here has provided a backdrop for judging the observed recidivism figures. And the resulting picture is encouraging. The system appears to be on the right track toward improved performance, even when the characteristics of the adolescents in the system are taken into account.

These analyses also demonstrate that more sophisticated analyses of patterns statewide can be accomplished with the existing systems. It is encouraging that the JCJC data bases are detailed and consistent enough to calculate the benchmark figures used here. It is clear from this project that such comparisons and corrections could be done on an ongoing basis, and there is

even more potential for statistically controlled, comparative analyses as the statewide data collection systems improve. The JCJC system has the necessary framework in place to develop highly informative data system and is poised to do so.

Second, these findings support and expand upon one of the observations from the 2014 JCJC report regarding the effects of institutional placement. In the earlier report examining the same data bases, it is noted (on p. 106) that “Juveniles who spent longer periods of time out-of-home had higher recidivism rates than those who spent shorter periods of time out-of-home.” These results hint at a connection between recidivism and institutional length of stay; the current analyses clarify and expand the picture. Stays beyond six months not only have higher rates of recidivism, but also higher rates than might be expected, given the characteristics of the adolescents involved.

Such findings point to a potentially poor investment of limited resources. Some method for reviewing and monitoring the use of extended institutional placements (beyond six months) more closely could be a reasonable policy application of these findings. Moreover, based on the information contained in the 2014 JCJC report, this requirement may not be too burdensome, given that most of the current out of home placement stays are shorter or close to the six month mark.

Finally, the results presented here provide optimism for the continued implementation of the YLS screening system. The limited data examined here indicate that the YLS has considerable potential, not just as a tool for individual case planning, but also as a valuable component of any statewide juvenile justice data base. The scores on this instrument appear to function well and provide valuable information to expand what is already collected regarding the adolescents in the system. It does not duplicate knowledge already in the system, but instead brings unique predictive power to gauging likely recidivism. It is a new lens providing an expanded view of the adolescents in the system.

In summary, these findings provide an illustration of the type of analytic work that could improve our understanding of justice trends and operations throughout the state. It also presents good news about current practice. Pennsylvania appears to be moving in the right direction, even when subjected to the application of more probing techniques to its existing data. It can be expected to do even better with increased effort to routinize its data collection efforts and its capacities to use its established data systems to address policy and practice issues more regularly and extensively.

IX. REFERENCES

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