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DEPARTMENT OF HUMAN SERVICES

DIVISION OF YOUTH SERVICES REPORTING



JANUARY 2019

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January 15, 2019

DIANNE E. RAY, CPA
—
STATE AUDITOR

Members of the Legislative Audit Committee:

This report contains the results of a performance audit of Division of Youth Services Reporting. We conducted this performance audit pursuant to Section 2-3-124, C.R.S., which requires the State Auditor to audit the recidivism rate and education outcome reports prepared by the Division of Youth Services. This report presents our findings, conclusions, and recommendations, and the responses of the Department of Human Services.

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REPORT HIGHLIGHTS



DIVISION OF YOUTH SERVICES REPORTING
PERFORMANCE AUDIT, JANUARY 2019

DIVISION OF YOUTH SERVICES
DEPARTMENT OF HUMAN SERVICES

CONCERN

The Division of Youth Services' (Division) *Education Outcomes at the Colorado Division of Youth Services (Education Outcomes)* report does not accurately reflect the educational outcomes of the youth discharged during Fiscal Year 2017 due to incorrect calculations resulting in incorrect conclusions and incomplete and unreliable data. The Division's *Recidivism Evaluation of the Colorado Division of Youth Services (Recidivism)* report contains accurate information and generally complies with statute, but does not include all recidivist acts, identify recidivist acts covered by the Victim's Rights Act, or reflect all recidivist convictions occurring within 3 years of discharge.

KEY FINDINGS

We found problems with both reports that may limit their usefulness to policymakers and make them difficult to understand, including the following:

- The *Education Outcomes* report includes:
 - ▶ INCOMPLETE DATA—The report includes educational outcomes for only 59 percent of youth discharged from the Division's custody in Fiscal Year 2017.
 - ▶ INCORRECT CONCLUSIONS—The report overstates the academic improvement of youth in reading compared to actual results.
 - ▶ INCORRECT CALCULATIONS—The report includes miscalculations of:
 - Percentages of youth showing educational advancement at the time of discharge.
 - Percentage of youth who possessed a General Education Diploma (GED) or high school diploma at discharge, erroneously reporting that 95 percent of eligible youth had attained this achievement when the data show that only 60 percent did so.

In addition, we were unable to conclusively determine if the report accurately reports grade-level advancement due to unreliable data provided by the Division.

- The *Recidivism* report does not:
 - ▶ Include adult misdemeanor crimes adjudicated in the Denver County Court in the recidivism calculation.
 - ▶ Delineate recidivist acts that are included under the Victim's Rights Act versus other crimes, as required by statute.
 - ▶ Include information on all recidivist convictions occurring within 3 years of discharge.

BACKGROUND

- The Division supervised and treated about 5,100 youth aged 10 to 21 who were involved in the criminal justice system during Fiscal Year 2017.
- Youth are discharged from Division custody upon completion of parole.
- In Fiscal Year 2017, the Division had 13 facilities with varying security levels; 10 were operated by the Division and 3 by contractors.
- Section 19-2-402(3), C.R.S., requires the Division to provide education services to all youth within its custody, including those in facilities operated by contractors.
- The Division defines a "recidivist" as anyone convicted of a felony or misdemeanor within 3 years after discharge from Division custody.
- Beginning July 2018, statute requires the Division to report annually on education outcomes and recidivism rates for youth discharged from the Division.

KEY RECOMMENDATIONS

- Improve the accuracy and completeness of the *Education Outcomes* report by ensuring that contract facilities measure and report on educational outcomes; implementing a means to measure outcomes for youth who test at 12th grade or above at commitment; implementing uniform methods to analyze, report, and maintain documentation; and establishing a quality control process to verify data, calculations, and statements in the report.
- Improve the completeness of the *Recidivism* report by requesting Denver County Court adult misdemeanor data to include in recidivism rates, identifying recidivist acts that are classified as Victim Rights Act crimes, and reporting on all recidivist convictions occurring within 3 years of discharge.

The Department agreed with the recommendations.



CHAPTER 1

OVERVIEW OF THE DIVISION OF YOUTH SERVICES

Statute created the Division of Youth Services (Division), within the Department of Human Services (Department), to supervise and treat youth between the ages of 10 and 21 who have entered the criminal justice system and have been sentenced to detention, committed to a secure facility or a less secure community-based facility, or have been paroled [Section 19-2-203, C.R.S.].

The Division is responsible for serving three categories of youth:

- **DETAINED**—Youth in detention who are either awaiting adjudication or have completed their adjudication and are serving sentences of up to 45 days.
- **COMMITTED**—Youth in commitment who have been convicted of a crime in juvenile court and are serving longer sentences.
- **PAROLED**—Youth who have been paroled following a term of commitment. After commitment, youth typically serve parole under the supervision of one of the Division’s four regional offices located in Denver, Thornton, Colorado Springs, and Grand Junction.

The Division has physical custody of detained youth, physical and legal custody of committed youth, and supervision of paroled youth. EXHIBIT 1.1 shows the number of unique detained, committed, and paroled youth the Division served in Fiscal Year 2017.

EXHIBIT 1.1. DIVISION OF YOUTH SERVICES POPULATIONS SERVED FISCAL YEAR 2017		
	UNIQUE NUMBER OF YOUTHS SERVED	AVERAGE DAILY POPULATION
Detained Youth	3,521	257
Committed Youth	1,292	651
Paroled Youth	690	246
Total Youth ¹	5,143	1,154

SOURCE: Office of the State Auditor analysis of populations reported by the Division of Youth Services in its January 2018 *Recidivism Evaluation Report* to the Joint Budget Committee.

¹ The number of youth in the three categories do not sum to the Total Youth presented because youth can change category throughout the year (e.g., move from Detained to Committed, or Committed to Paroled), and thus some youth are included in multiple categories.

In Fiscal Year 2017, the Division had a total of 13 facilities, 10 of which were operated by Division employees and 3 that were operated by contractors. These included secure, staff-supervised, and community and other residential facilities. Once a youth is committed to the

Division, staff complete an assessment that informs the type of facility in which the youth will be housed and the services the youth will receive. The Division offers a variety of services to committed youth including educational and vocational services and training; medical, behavioral health, and offense-specific treatment; recreation; and transition services as youth are paroled and then ultimately discharged from commitment. To assist and monitor youth from initial assessment through commitment to parole, the Division assigns all youth a “client manager” who is employed by the Division and is based out of one of the Division’s regional offices. Client managers develop treatment and supervision plans for youth, monitor youth progress, communicate with families, assist with the transition to parole, and supervise youth once they are paroled.

EDUCATION

One of the services that the Division is required by statute to provide for all youth in its custody is a free and appropriate education [Section 19-2-402(3), C.R.S.]. Educational services are provided at residential facilities—which include staff-supervised and community-based contract programs—as well as at state operated secure facilities and assessment centers. These educational services include special education, General Education Diploma (GED) and high school diploma preparation, and vocational skills. Educational services may be provided by on-site Division staff, private providers, or the local school district where a facility is located. The Division does not monitor or supervise the educational services provided by the local school districts.

RECIDIVISM

Once discharged, some youth transition back into the community and do not commit any further criminal acts. However, other youth commit and are convicted of new crimes. These are considered recidivist acts. The Division defines recidivism as a new adjudication or conviction resulting from a misdemeanor or felony offense at any point within the

prescribed follow-up time periods, which are 1 to 3 years after youth are discharged from parole and Division supervision.

Since Fiscal Year 1992, the Division has reported annually on recidivism for youth discharged from commitment in response to an ongoing request for information from the Joint Budget Committee. Over the past decade, the Division has reported that 1-year recidivism rates for youth discharged from the Division have remained at around 30 percent.

FISCAL OVERVIEW

In Fiscal Year 2018, the Division was appropriated 1,140.6 full-time equivalent (FTE) staff. The Division is primarily funded with State General Funds, but it also receives some federal funds, cash funds, and reappropriated funds. For Fiscal Years 2016 through 2018, the Division has been appropriated, on average, about \$121 million each year, with almost 95 percent of that amount coming from State General Funds. Division expenditures have averaged about \$119 million each year. About 5 percent of the Division's expenditures has been spent on educational programming.

AUDIT PURPOSE, SCOPE, AND METHODOLOGY

We conducted this performance audit pursuant to Section 2-3-124, C.R.S., which requires the State Auditor to audit the recidivism rate and education outcome reports prepared by the Division of Youth Services pursuant to Section 19-2-203(6), C.R.S., for accuracy and quality. Audit work was performed from March 2018 through December 2018. We appreciate the assistance provided by Department of Human Services and Division of Youth Services management and staff during this audit.

We conducted this audit in accordance with generally accepted government auditing standards. Those standards require that we plan

and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

The objective of the audit was to evaluate whether the Division communicated accurate and quality information in the *Education Outcomes at the Colorado Division of Youth Services (Education Outcomes)* report and the *Recidivism Evaluation of the Colorado Division of Youth Services (Recidivism)* report that it issued pursuant to Section 19-2-203(6), C.R.S. The scope of the audit did not include evaluating the Division's education services or any of its programs aimed at preventing recidivist acts.

To accomplish our objective, we performed audit work that included the following:

- Reviewed relevant state and federal laws and Division contracts, rules, policies, and procedures.
- Evaluated the Division's contract requirements related to contractor facilities' provision of educational services.
- Interviewed stakeholders, including representatives from the American Civil Liberties Union and the General Assembly, as well as staff at the Division, the Judicial Branch, Legislative Council, and the Joint Budget Committee.
- Reviewed Division data on recidivism and educational outcomes and compared data over time with relevant Judicial Branch data.

We relied on sampling techniques to support our audit work. Specifically, we selected a random, non-statistical sample of 45 youth records from Fiscal Years 2014 through 2016 to compare to Judicial

Branch files to determine the accuracy of the Division's crime severity assignments and recidivist designations.

The results of our non-statistical sample cannot be projected to the population. However, the sample results are valid for evaluating the accuracy of the Division's calculations of recidivism rates and crime severity. This, along with the other audit work performed, provide sufficient, reliable evidence as the basis for our findings, conclusions, and recommendations.

GOVERNMENT AUDITING STANDARDS. Section 7.15 of the standards require that the audit report describe limitations or uncertainties with the reliability or validity of evidence if the evidence is significant to the findings and conclusions. Such disclosure is intended to avoid misleading the report users and provide a clear understanding regarding how much responsibility the auditors are taking for the information.

In accordance with standards, we are reporting that, in our judgment, the documentary evidence we received from the Division in one area was not reliable. Specifically, our analysis of data provided by the Division in support of the *Education Outcomes* report identified errors in grade level assignments, which are used to measure educational advancement. The errors indicated that the reported educational advancement of some youth was inaccurate. After receiving the results of our analysis, the Division said that (1) the query used to pull these data generated inaccurate results and (2) these were *not* the data it had used for the *Education Outcomes* report. The Division then provided a second data set that contained none of the original errors we found, but had different problems. We found problems with 62 of the 253 test records (25 percent) that were sent in the second data set. For instance, 39 of the post-test dates fell after the youth's discharge date, 24 of the pre-test dates were prior to the date the youth were committed to the Division, and one pre-test date was after the post-test date.

Due to the Division providing two data sets, neither of which had been maintained in the original form created to generate the *Education*

Outcomes report, and both of which contained errors, we could not rely on either data set. As a result, we were unable to conclusively determine if the *Education Outcomes* report accurately assigned grade-levels to youth upon entry to the Division and therefore, whether the grade level advancement reporting was accurate. We discuss the barrier to concluding in this area in greater detail in CHAPTER 2.

We planned our audit work to assess the effectiveness of those internal controls that were significant to our audit objectives. Our conclusions on the effectiveness of those controls, as well as specific details about the audit work supporting our findings, conclusions, and recommendations, are described in the remainder of this report.

The Department and Division reviewed a draft of this report. We have incorporated the Department's and Division's comments into the report where relevant. The written responses to the recommendations and the related implementation dates are the sole responsibility of the Department and Division.



CHAPTER 2

DIVISION OF YOUTH SERVICES REPORTING

In March 2018, the General Assembly passed House Bill 18-1010, which was codified in statute under Section 19-2-203(6), C.R.S, and requires the Department of Human Services (Department) to issue a report on “the recidivism rates and the educational outcomes for juveniles committed to the custody of the [D]epartment who complete their parole sentences and discharge from department supervision.” Statute required the Department to issue the first report on or before July 1, 2018, and on or before July 1 in every following year. To fulfill the statutory requirement, the Division of Youth Services (Division) produced two reports:

EDUCATION OUTCOMES AT THE COLORADO DIVISION OF YOUTH SERVICES (EDUCATION OUTCOMES)—The Division released this report in August 2018. It evaluates the Division’s educational outcomes using two measures:

- **TEST SCORES.** The Division evaluates youth by comparing changes in reading, language usage, and math test scores over time.
- **GENERAL EDUCATION DIPLOMA (GED) AND HIGH SCHOOL DIPLOMA ATTAINMENT.** The Division determines the rate at which youth who meet its eligibility criteria obtain a GED and/or high school diploma.

RECIDIVISM EVALUATION OF THE COLORADO DIVISION OF YOUTH SERVICES (RECIDIVISM)—The Division released this report in July 2018. It details 1- to 3-year recidivism rates, criminogenic risk (the risk that youth will recidivate), the severity of the offenses committed, and demographics for youth discharged during Fiscal Years 2014 through 2016. The report includes recommendations for a unified statewide data system to improve the accuracy of recidivism reporting and for using evaluations to inform program changes intended to reduce recidivism.

We reviewed the quality and accuracy of the *Education Outcomes* and *Recidivism* reports, as required by Section 2-3-124, C.R.S. With respect to quality, we observed the following issues with the reports that may limit their usefulness to policymakers and make them difficult to understand. Specifically:

- **LACK OF CONNECTION BETWEEN EDUCATION OUTCOMES AND RECIDIVISM RATES.** The Division’s two reports do not combine information on the educational outcomes of youth discharged from the Division’s supervision and recidivism rates. For example, neither report includes information on the education outcomes of those youth who commit recidivist acts versus those who do not. According to information published by the United States Departments of Justice and Education, there is a correlation between education and the ability of youth to successfully reintegrate back into society after incarceration. Although statute does not require the Division to

identify or report on such correlations, this type of information could be useful to policymakers and could serve as an additional measure of the effectiveness of the Division's educational services.

- **UNCLEAR LANGUAGE.** Both reports contain abbreviations and statistical terms that are not defined. For example:
 - ▶ Abbreviated terms, such as "ADP" and "LOS."
 - ▶ Statistical terms, such as "quasi-experimental observational cohort study design," "df," and "X²."

In addition, we found the following issues specific to the *Education Outcomes* report that may limit its usefulness to policymakers.

- **INCONSISTENT LANGUAGE.** The report used the term "assessments" to mean "pre-test" (i.e., testing youth attainment level at time of intake), "post-test" (i.e., testing youth attainment level immediately preceding discharge), and any testing conducted between those periods, without differentiating between the three. The report also used the phrases "Length of Stay" and "Length of Service" interchangeably, although they can reference a variety of different periods during a youth's commitment to the Division, including the time from commitment to the start of parole or the time from commitment to completion of parole.
- **LACK OF SUMMARIZATION OF KEY DATA.** The report does not provide a clear, concise summary of the information that readers should take away from the report. The report also does not make any statements about the educational progress of the overall population, such as whether or not youth are improving at the rate the Division expects.

These issues decrease the overall usefulness and readability of the reports and increase the risk that readers may misinterpret the information included in the reports. The Division may want to consider addressing these issues to help improve the quality of subsequent reports.

In addition, we identified issues with the accuracy of the *Education Outcomes* report and issues with the completeness of some information in the *Recidivism* report, as discussed in the following findings.

EDUCATION OUTCOMES REPORTING

The Division's 2018 *Education Outcomes* report provides information on the academic progress of committed youth in two ways.

First, upon commitment to the Division, most youth are given a Measures of Academic Progress (MAP) test that assesses the grade level the youth is performing at in reading, language usage, and math. Youth who have a GED or high school diploma at commitment are not usually tested. This initial test is called a pre-test and the Division uses it to set a baseline for where the youth is at academically when they are first committed to the Division. The MAP test was created by the Northwest Evaluation Association and is used nationally to assess the academic performance of students. The Division also estimates the grade the youth would be in based on their age and date of birth by taking the youth's age and subtracting five. For example, a 12-year-old should be assigned to the 7th grade. The Division reports that it assigns youth who have a birthday of August 15th or later to the previous grade level (meaning a 12-year old might be assigned to the 6th grade), per Department of Education guidelines. The Division then compares the youth's grade level indicated by their MAP test scores with the grade they should be in based on their age and date of birth and assigns them to one of the following four categories:

- 7 to 10 grade levels **BEHIND** the grade they should be in
- 4 to 7 grade levels **BEHIND** the grade they should be in
- 1 to 4 grade levels **BEHIND** the grade they should be in
- Less than 1 grade level **BEHIND** to one or more grade levels **AHEAD** of the grade they should be in

The Division measures the educational advancement of youth while under

the Division's supervision by administering a post-test prior to discharge.

Second, the Division tracks the number of youth who are 18 years or older upon discharge who possess a GED or high school diploma prior to their release from the Division.

WHAT AUDIT WORK WAS PERFORMED AND WHAT WAS THE PURPOSE?

We reviewed the Division's 2018 *Education Outcomes* report and compared the information included in the report to the educational data that the Division provided to us and stated were used to prepare the report. Specifically, we reviewed the Division's educational data for the 436 youth discharged from the Division's supervision during Fiscal Year 2017, which included data on the youths' GED or high school diploma attainment, MAP test performance, grade level estimate, and type of discharge. Using the educational data provided by the Division, we attempted to recalculate all of the figures in the report to verify their accuracy. Our analysis of the grade-level estimates was limited to pre- and post-tests taken in August 2015 or later, as the Northwest Evaluation Association changed the methodology for assessing grade levels at that time and the Division was unable to provide us with the previous methodology. We also interviewed Division staff to gain an understanding of how they used the educational data to create the *Education Outcomes* report. Finally, we reviewed Division policies to determine how the Division tracks and measures education outcomes at both state- and contractor-operated facilities. We provided the results of our analysis to the Division and requested its feedback on the issues we identified.

The purpose of our audit work was to determine if the Division's *Education Outcomes* report accurately reflects the educational advancement and attainment of a GED or high school diploma of the youth discharged from the Division during Fiscal Year 2017.

HOW WERE THE RESULTS OF THE AUDIT WORK MEASURED?

Statute and best practices for internal controls require that agencies communicate information that is complete, accurate, and useful. Specifically:

- The Colorado Information Coordination Act [Section 24-1-136(1)(a), C.R.S.] states that, “The operational reports of the executive agencies should provide complete...and useful information about executive operations to the governor and the [G]eneral [A]ssembly.”
- The *Standards for Internal Control in the Federal Government* (paragraph 13.05) issued by the United States Government Accountability Office and implemented for Colorado by the State Controller states that “management [should process]...data into quality information.... Quality information is...complete...[and] accurate...”

WHAT PROBLEMS DID THE AUDIT WORK IDENTIFY AND WHY DO THEY MATTER?

Overall, we found that the 2018 *Education Outcomes* report does not accurately reflect the educational outcomes of the youth discharged from the Division’s supervision during Fiscal Year 2017.

We concluded that the report is not complete or accurate based on finding that the Division reported incomplete data, incorrect calculations, and inaccurate conclusions. We could not conclusively determine whether the report contained other inaccuracies, since we could not rely on some of the data the Division provided us to assess the report. These problems are described below.

2018 *EDUCATION OUTCOMES* REPORT IS NOT COMPLETE OR ACCURATE

INCOMPLETE DATA ON EDUCATIONAL ADVANCEMENT. The Division did not report educational advancement outcomes for 178 of the 436 youth discharged during Fiscal Year 2017 (41 percent) because it did not have post-test data for these youth. None of these 178 youth had a GED or high school diploma. Because the educational advancement data included in the *Education Outcomes* report was only for 59 percent of the youth discharged from the Division during Fiscal Year 2017, the report may not accurately reflect the overall progress of youth under the Division's supervision.

INCORRECT CONCLUSIONS REGARDING EDUCATIONAL ADVANCEMENT. We found two statements the Division included in the *Education Outcomes* report that do not represent results accurately. Both overstate the academic improvement youth actually achieved. Specifically:

- The report stated that “more than three-quarters of [the youth with both a pre- and post-test] (78 percent) improved *at least one* grade level from pre- to post-test” in reading [emphasis added]. The Division based this statement on adding the 12 percent of youth who improved *up to and including one* grade level and the 66 percent of youth who improved *more than one* grade level. Since the 12 percent includes both youth who improved less than one full grade level (i.e., up to one) and those who improved exactly one full grade level, it should not have been included in the statement. The Division would need to break out the percentage of youth who improved less than one full grade level and not include them in this conclusion.
- The report stated that “*more than two-thirds* scored as four or more grade levels behind at assessment” in reading [emphasis added]. However, the actual percentage was 61 percent.

By including incorrect conclusions, some of the information in the *Education Outcomes* report is misleading to readers.

INCORRECT CALCULATIONS OF EDUCATIONAL ADVANCEMENT. The Division miscalculated the following educational advancement outcomes:

- The percentage of youth functioning in two of the four grade level categories the Division tracks to measure educational advancement, based on post-test data. As shown in EXHIBIT 2.1, the Division reported more favorable post-test results than were actually achieved for all three academic areas it measures (reading, language usage, and math). The Division could not explain why these percentages were incorrect.

EXHIBIT 2.1. INCORRECTLY CALCULATED EDUCATIONAL ADVANCEMENT OUTCOMES BASED ON POST-TESTS YOUTH DISCHARGED DURING FISCAL YEAR 2017			
	DIVISION REPORTED	AUDITOR CALCULATION	DATA AND PERCENTAGE CALCULATION ¹
PERCENTAGE OF TESTED YOUTH BELOW GRADE LEVEL (1 TO 4 GRADES BEHIND)			
Reading	24%	34%	66 of 197 youth tested were below grade level = 34%
Language Usage	18%	29%	58 of 198 youth tested were below grade level = 29%
Math	20%	26%	52 of 200 youth tested were below grade level = 26%
PERCENTAGE OF TESTED YOUTH LESS THAN ONE GRADE LEVEL BEHIND TO ABOVE GRADE LEVEL			
Reading	35%	25%	50 of 197 youth tested were less than one grade behind to above grade level = 25%
Language Usage	32%	21%	42 of 198 youth tested were less than one grade behind to above grade level = 21%
Math	22%	16%	31 of 200 youth tested were less than one grade behind to above grade level = 16%
SOURCE: Office of the State Auditor created from 2018 <i>Education Outcomes at Colorado Division of Youth Services</i> report and auditor analysis of Division data.			
¹ The number of youth tested is different in each academic area because not every youth takes a test in each of the subject areas.			

The percentage change in the number of youth in three of the four grade level categories the Division tracks to measure educational advancement from pre- to post-test. As shown in EXHIBIT 2.2, the Division reported more favorable results than youth actually achieved for all three academic areas it measures (reading, language

usage, and math). The Division could not explain why these percentages were incorrect.

EXHIBIT 2.2. INCORRECTLY CALCULATED EDUCATIONAL ADVANCEMENT OUTCOMES PERCENTAGE CHANGE YOUTH DISCHARGED DURING FISCAL YEAR 2017			
	DIVISION REPORTED	AUDITOR CALCULATION	DATA AND PERCENTAGE CALCULATION
PERCENTAGE CHANGE IN NUMBER OF TESTED YOUTH BELOW GRADE LEVEL (4 OR MORE GRADES BEHIND)			
Language Usage	-6%	-5%	103 youth at pre-test; 98 youth at post-test = -5%
Math	-11%	-6%	125 youth at pre-test; 117 youth at post-test = -6%
PERCENTAGE CHANGE IN NUMBER OF TESTED YOUTH BELOW GRADE LEVEL (1 TO 4 GRADES BEHIND)			
Reading	-8%	29%	51 youth at pre-test; 66 youth at post-test = 29%
Language Usage	-38%	0%	58 youth at pre-test; 58 youth at post-test = 0%
Math	-33%	-12%	59 youth at pre-test; 52 youth at post-test = -12%
PERCENTAGE CHANGE IN NUMBER OF TESTED YOUTH LESS THAN 1 GRADE LEVEL BEHIND TO ABOVE GRADE LEVEL			
Reading	169%	92%	26 youth at pre-test; 50 youth at post-test = 92%
Language Usage	68%	14%	37 youth at pre-test; 42 youth at post-test = 14%
Math	175%	94%	16 youth at pre-test; 31 youth at post-test = 94%
SOURCE: Office of the State Auditor created from 2018 <i>Education Outcomes at the Colorado Division of Youth Services</i> report and auditor analysis of Division data.			

Because the Division reported incorrect academic improvement information, the *Education Outcomes* report is not accurate and could be misleading to readers.

INCORRECT CALCULATIONS OF ATTAINMENT OF GED OR HIGH SCHOOL DIPLOMA. The Division miscalculated the percentage of youth who had GEDs or high school diplomas at the time of discharge, erroneously reporting that 95 percent of youth had attained this achievement when the data show that only 60 percent did so.

The Division states in the *Education Outcomes* report that its

calculation for the attainment of a GED or high school diploma was based on the following:

- Numerator—Number of eligible youth who receive a GED or high school diploma by the time they discharge.
- Denominator—Number of eligible youth discharged from the Division.

The Division also stated in the report that, for this calculation, “eligible youth” is defined as:

- Including only youth who are 18 years or older.
- Excluding any youth who are enrolled full- or part-time in school of any kind at discharge.
- Excluding any youth who are discharged directly to the Department of Corrections or are deported.
- Excluding any youth who had their sentence reconsidered, vacated, or terminated by the court.

The miscalculation occurred because the Division only applied this definition to the denominator of the formula, and not the numerator. Specifically, the Division included *all* youth who had GEDs or diplomas at discharge in the numerator, but applied its definition of “eligible youth” in the denominator. The Division’s figures and calculation are illustrated below.

ALL youth with GEDs or high school diplomas at discharge.	÷	262	÷	277	=	95%
ALL discharged youth aged 18 or above EXCEPT those enrolled in school, discharged to the Department of Corrections, deported, or with sentences that were reconsidered, vacated, or terminated.						

If the Division had applied the definition of “eligible youth” to both the numerator and denominator, the calculation would have looked as follows:

ALL discharged youth aged 18 or above with GEDs or high school diplomas EXCEPT those enrolled in school, discharged to the Department of Corrections, deported, or with sentences that were reconsidered, vacated, or terminated.	$\frac{167}{277} = 60\%$
ALL discharged youth aged 18 or above EXCEPT those enrolled in school, discharged to the Department of Corrections, deported, or with sentences that were reconsidered, vacated, or terminated.	

The numerator is smaller in the second calculation because there were 95 youth who did not meet the definition of “eligible youth,” although they did have GEDs or high school diplomas at discharge. Although the Division acknowledged in the report that it did not apply the eligibility criteria to the numerator, its calculation is incorrect and misleading to readers.

LACK OF RELIABLE DATA

Using data provided by the Division, which it told us were the data it used for the *Education Outcomes* report, we analyzed the Division’s assignment of youth to grade levels based on their age and test scores at the time of initial assessment and found inaccuracies. Specifically, the data showed that:

- The Division incorrectly assigned grade levels based on age for 126 of the 214 youth (59 percent) for whom it reported educational outcomes. The Division assigned each of these youth to a grade level one to five grades lower than the grade indicated by their age. For example, the Division assigned one youth who was 17 years old to the 8th grade, when based on their age they should have been assigned to the 12th grade.
- The Division incorrectly assigned grade levels based on test scores for:

- ▶ 187 of the 253 pre-tests (74 percent) that youth took. For example, the Division assigned one youth to the 8th grade even though their test scores in reading indicated they should have been placed at the 10th grade level.
- ▶ 141 of the 253 post-tests (56 percent) that youth took. For example, the Division assigned one youth to the 11th grade, when their post-test score indicated they should be assigned to the 5th grade level.

Assigning youth to the incorrect grade level upon entry to the Division makes the Division’s educational advancement calculations inaccurate. As shown in EXHIBIT 2.3, as a result of these inaccuracies, the Division reported more growth than youth actually achieved, resulting in the following reporting errors:

EXHIBIT 2.3. INACCURATELY CALCULATED GROWTH FROM PRE-TEST TO POST-TEST YOUTH DISCHARGED DURING FISCAL YEAR 2017				
	DIVISION REPORTED	TOTAL TESTS ¹	YOUTH IN CATEGORY	AUDITOR CALCULATION
Youth who showed negative grade level change	10%	253	49	19%
Youth who improved up to one grade level or more	86%	253	195	77%

SOURCE: Office of the State Auditor created from 2018 *Education Outcomes at the Colorado Division of Youth Services* report and auditor analysis of Division data.
¹Pre- and post-tests taken after August 2015.

After sending the results of our analysis to the Division, it informed us that the query used to pull the data that it had originally provided was not accurate and therefore, the resulting data were not what it had used for the report. According to the Division, it ran a new query and provided a second data set that it reported was correct. In this new data set, we found no incorrect grade level assignments (i.e., the problems we had originally identified had been cleared), but we did find other problems with 62 of the 253 tests (25 percent) in the data for the period we reviewed. Specifically:

- 39 of the post-tests were dated after the youths’ discharge.

- 24 of the pre-tests were dated prior to the youths' commitment.
- 15 of the post-tests were dated in Fiscal Year 2018; the *Education Outcomes* report was supposed to only include data for youth discharged in Fiscal Year 2017.
- One of the pre-tests was dated after the post-test.

Due to the Division providing two separate data sets, each of which it told us were the data used for the report, and because of the problems we found in both data sets, we could not rely on either. As a result, we were unable to conclusively determine if the *Education Outcomes* report accurately assigned grade levels to youth upon entry to the Division and therefore, whether the grade level advancement reporting was accurate.

WHY DID THESE PROBLEMS OCCUR?

THE DIVISION HAS NOT ENFORCED ITS POLICIES AND CONTRACT PROVISIONS TO OBTAIN ACADEMIC OUTCOMES DATA FROM CONTRACT FACILITIES. The Division reported that one reason it does not have post-test data for some youth is that they were placed in a less secure contract facility that does not administer post-tests. Of the 178 youth without a GED or high school diploma at discharge for whom the Division did not have post-test data, 118 (66 percent) were from these facilities. Division policies, as well as provisions in its contracts, require contract facilities to measure and report the educational advancements of the youth in their custody, but it has not enforced these policies and contract provisions. Contract facilities have not required the youth discharged from these facilities to complete standardized assessments when they are discharged.

THE DIVISION DOES NOT HAVE A MECHANISM FOR MEASURING THE EDUCATIONAL ADVANCEMENT OF YOUTH WHO SCORE AT GRADE 12 OR ABOVE IN THE PRE-TEST. The Division did not have data to report for 47 of the 178 youth (26 percent) without a GED or high school diploma at discharge because these youth scored at grade 12 or above in the pre-test. According to the Division, it did not post-test these youth because

they were already functioning at the maximum high school grade level at commitment and administering the post-test would have provided limited value. However, the Division has not implemented a different mechanism for measuring the educational advancement of these youth during the time they were under Division supervision.

THE DIVISION HAS NOT ESTABLISHED AND APPLIED A UNIFORM AND DOCUMENTED METHODOLOGY FOR DETERMINING EDUCATIONAL OUTCOMES. The 2018 *Education Outcomes* report was the first report the Division completed in response to the requirements of House Bill 18-1010. According to the Division, four staff worked on the separate sections of the report and each staff came up with their own methodology for their assigned sections. Division management did not provide guidance to staff on their methodologies, which data to use, or how to analyze the data. Further, the Division did not document the methodologies used to calculate the educational advancement data, nor did it maintain the actual data used in the report. When we notified the Division of the issues we identified in the *Education Outcomes* report, the Division stated it could not tell us if it agreed with our conclusions. This was because the Division had not retained the actual data it used or documented the methods applied to generate some of the figures in the report. Additionally, as described above, although the Division had established a methodology for calculating the percentage of youth who possessed a GED or high school diploma, the report contains conflicting methodology statements as to who was eligible for inclusion in the calculation and the methodology applied resulted in inaccurate and misleading conclusions.

THE DIVISION DOES NOT HAVE A QUALITY CONTROL PROCESS FOR THE REPORT. According to the Division, the *Education Outcomes* report did not go through a review by staff who were not involved in calculating and compiling the data to: (1) provide an independent assessment of the completeness, reliability, and accuracy of the underlying data, the calculations, and the narrative of the report; or (2) ensure that staff maintained documentation of the data and methods used in the calculations.

RECOMMENDATION 1

The Department of Human Services should improve the accuracy and completeness of its *Education Outcomes at the Colorado Division of Youth Services* report by:

- A Enforcing Division policies and contract requirements that facilities operated by contractors measure and report on the educational outcomes of youth in their custody.
- B Implementing a mechanism for measuring and reporting on the educational advancement of youth who score at grade 12 or above on the pre-test.
- C Implementing uniform, written methodologies for evaluating the educational outcomes of youth discharged from its custody and maintaining documentation of the data used for the evaluation.
- D Establishing a quality control process designed to ensure the accuracy of the report. The process should include verifying that the data used, calculations, and statements describing academic results are complete, reliable, and accurate, and that documentation of the actual data and methodology are maintained.

RESPONSE

DEPARTMENT OF HUMAN SERVICES

- A AGREE. IMPLEMENTATION DATE: JULY 2019.

The Department will enforce the Division's policy and contract requirements to measure the educational outcomes of the youth in the contractor's custody. Deadlines for contractors to report educational outcomes will be explored and the contract language will be updated to reflect any deadlines that are established when the contracts are annually renewed in July.

B AGREE. IMPLEMENTATION DATE: JULY 2019.

Prior to July 2019, the Department will explore a mechanism that will include a way to measure educational advancement. The Department will implement a mechanism to monitor educational advancement of youth who score at 12th grade or above on a pre-test.

C AGREE. IMPLEMENTATION DATE: JULY 2019.

The Department will implement uniform, written methodologies for evaluating educational outcomes of youth discharged from its custody. The Department will maintain documentation of the data used for the evaluation. For future reporting, the Division will shift the annual educational outcome report to the Data Management and Analysis unit. The Data Management and Analysis unit has the expertise in program evaluation, statistical reporting and outcome measurement.

D AGREE. IMPLEMENTATION DATE: JULY 2019.

The Department will establish a quality control process designed to ensure the accuracy of the report, to include verifying the data used, calculations, and statements describing academic results will assuring the documentation of the data and methodology are maintained. This process will be shifted to the Data Management and Analysis unit.

RECIDIVISM REPORTING

The Division’s *Recidivism* report provides information on the recidivism rates for youth who completed their parole sentences and were discharged from the Division’s supervision during Fiscal Years 2014 through 2016. In the report, the Division defines “recidivism” to mean “a new adjudication or conviction resulting from a misdemeanor or felony offense at any point within the prescribed follow-up time period(s).” The Division has defined the “prescribed follow-up time period” to include recidivist acts that have been adjudicated with a guilty verdict within 1, 2, or 3 years of discharge. EXHIBIT 2.4 shows the recidivism rates reported by the Division for youth discharged during Fiscal Years 2014 through 2016.

EXHIBIT 2.4. RECIDIVISM RATES FOR YOUTH DISCHARGED IN FISCAL YEARS 2014 THROUGH 2016				
FISCAL YEAR	NO. OF YOUTH DISCHARGED	1-YEAR RECIDIVISM RATE	2-YEAR ¹ RECIDIVISM RATE	3-YEAR ¹ RECIDIVISM RATE
2014	556	28.1%	46.2%	55.2%
2015	476	30.9%	49.2%	N/A
2016	445	31.5%	N/A	N/A

SOURCE: *Recidivism Evaluation of the Colorado Division of Youth Services* report, July 1, 2018.

¹ The 2-year and 3-year recidivism rates are cumulative. That is, the youth included in the 1-year recidivism rate are also included in the 2- and 3-year recidivism rates.

The Division also reported on the severity (i.e., felony or misdemeanor) and type (e.g., against a person, against property, traffic, drug, etc.) of offense for:

- “Commitment” offenses—the offenses that resulted in the youths’ original sentence to the Division, and
- “Recidivist” offenses—offenses committed after discharge from the Division.

According to the report, the severity of offenses were essentially the same for commitment and recidivist offenses—with 60 percent being felonies and 40 percent being misdemeanors in both cases. The report

also indicated that crimes against property and persons were the most common types for both commitment and recidivist offenses.

- Crimes against property accounted for 41 percent of commitment offenses and 32 percent of recidivist offenses.
- Crimes against persons accounted for 37 percent of commitment offenses and 29 percent of recidivist offenses.

WHAT AUDIT WORK WAS PERFORMED, WHAT WAS THE PURPOSE, AND HOW WERE THE RESULTS MEASURED?

We reviewed the Division's 2018 *Recidivism* report and compared the information included in the report to the Division and Judicial Branch data that were used to prepare it and to statutory requirements related to the report. Specifically, we selected a non-statistical sample of 45 youth who were discharged from the Division's supervision during Fiscal Years 2014 through 2016 and compared the Division's reporting about the youth (e.g., recidivist or non-recidivist and severity of offense) with Judicial Branch records from Fiscal Years 2010 through 2017. In addition, we compared the Division's delineation of type of crime to the delineations required by statute.

The purpose of our audit work was to determine if the Division's *Recidivism* report accurately reflects the recidivism rates and recidivist acts of the youth discharged from the Division's supervision during Fiscal Years 2014 through 2016, as required by the following statutory provisions.

On or before July 1, 2018, and by July 1st thereafter, statute [Section 19-2-203(6), C.R.S.] required the Department to collect, calculate, and report the following information to the General Assembly:

- Demographic characteristics of the youth included in the report.
- Recidivism rates for youth discharged from the Division's supervision.

- Any juvenile adjudications or adult convictions occurring within 3 years of discharge.
- Whether the recidivist offenses were felonies or misdemeanors.
- Whether the recidivist offenses were crimes listed in the Victim Rights Act [Section 24-4.1-302(1), C.R.S.], which includes crimes such as murder, manslaughter, assault, sexual assault, kidnapping, or child abuse.

This was the first recidivism report required of the Division under this statutory provision.

WHAT PROBLEMS DID THE AUDIT WORK IDENTIFY, WHY DID THEY OCCUR, AND WHY DO THEY MATTER?

Overall, we found that the Division's July 2018 *Recidivism* report contained accurate information and generally complied with statutory requirements. Specifically, the report included demographic characteristics and recidivism rates for youth discharged from the Division during Fiscal Years 2014 through 2016. For those youth discharged in Fiscal Year 2014, the Division was able to provide 3 years of recidivism data when calculating recidivism rates. In addition, the report included information on the severity (felony or misdemeanor) of the recidivist offenses compared to the commitment offenses.

However, we identified the following areas where the Division's *Recidivism* report did not fully comply with statutory requirements because it did not include complete information. Specifically:

RECIDIVISM RATES DID NOT INCLUDE ADULT MISDEMEANOR CONVICTIONS IN THE DENVER COUNTY COURT. The Division based its recidivism rates on data obtained from the Judicial Branch, which included juvenile felony and misdemeanor adjudications and adult

felony and misdemeanor convictions, except the data did not include any adult misdemeanor convictions in Denver County Court. That is, if a youth was discharged from the Division's supervision at the age of 18 or older and then was later convicted of a misdemeanor in the Denver County Court, that misdemeanor would not appear in the data used to calculate recidivism. This is not an issue for youth under the age of 18 who are convicted of misdemeanors in the Denver County Court because the youth is placed back under the Division's supervision and, therefore, the Division has direct data on them.

The Denver County Court is constitutionally separate from the state district courts and the Denver County Court adjudicates its own misdemeanor cases and maintains its own data on these cases. However, felony convictions are processed by the Denver District Court, which is administered by the Judicial Branch and therefore, felony convictions are included in the Judicial Branch data. According to the Division, in order to acquire the data on misdemeanors in the Denver County Court, the Court would have to agree to provide the data annually and allow the Division to use the data for the report. If the Denver County Court agreed, the Division would have to develop a data sharing agreement and memorandum of understanding with the Court. The Division reports that this process could take from 6 months to a year to complete, which means they would have received the data after the due date of the 2018 *Recidivism* report. The Division has known this to be a limitation in its previous reports to the Joint Budget Committee, and disclosed it as a limitation in this report as well.

We estimated the potential impact on recidivism rates if this data were included in the Division's calculations. Using Division and Judicial data, we determined the number of youth who resided within the jurisdiction of the Denver Judicial District, committed a misdemeanor as their original offense, were discharged from the Division at age 18 or older, and were not identified by the Division as a recidivist within 1 year of discharge. We then used the recidivism rate in each year to calculate the potential number of recidivists for that segment of the population. We used this information to estimate the additional number of possible

adult misdemeanor recidivists in Denver County Court. As shown in EXHIBIT 2.5, we estimate that including Denver County Court misdemeanor data could potentially increase the Division's reported recidivism rates about 1.03 percent per year.

EXHIBIT 2.5. ESTIMATED POTENTIAL IMPACT TO RECIDIVISM RATES IF DENVER COUNTY COURT MISDEMEANORS INCLUDED FISCAL YEARS 2014 THROUGH 2016			
	2014	2015	2016
Total Number of Youth Discharged	556	476	445
Number of Recidivists	156	147	140
1-year Recidivism Rate	28.1%	30.9%	31.5%
Additional number of possible adult misdemeanor recidivists in Denver ¹	3	4	7
New Predicted Recidivism Rate ²	28.7%	31.7%	32.9%
Potential Change to Total Recidivism Rate	+0.6%	+0.8%	+1.4%

SOURCE: Office of the State Auditor created using Division of Youth Services' recidivism reports and data for Fiscal Years 2014–2016.

¹Based on auditor analysis of Division and Judicial Branch data as described above.

²Calculated based on the Number of Possible Adult Misdemeanor Recidivists in Denver added to the actual Number of Recidivists, divided by the Total Number of Youth Discharged.

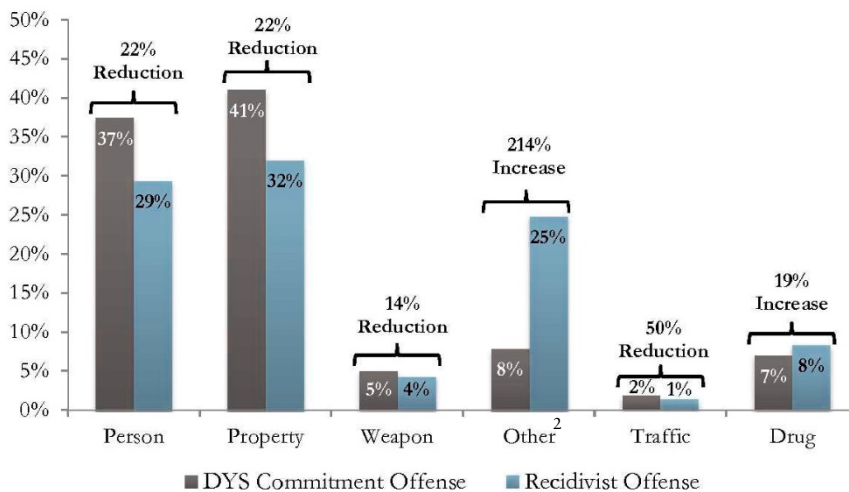
THE *RECIDIVISM* REPORT DOES NOT SPECIFY CRIMES INCLUDED IN THE VICTIM RIGHTS ACT. Instead, the report includes analysis on 1-year recidivists with the following crime type classifications:

- **PERSON**—Crimes that involve harm to another person.
- **PROPERTY**—Crimes that involve the theft or destruction of property.
- **WEAPON**—Crimes that involve a violation of statute or regulation that control deadly weapons.
- **DRUG**—Crimes that involve the manufacture, sale, or possession of illegal substances.
- **TRAFFIC**—Crimes such as driving while ability impaired or vehicular eluding (this does not include traffic violations, such as speeding or parking tickets).
- **OTHER**—Crimes such as accessory to crime, escape, impersonation, false reporting, fishing without a license, and violation of a parole order.

EXHIBIT 2.6 shows the type of commitment (i.e., the offense that resulted in the original conviction) and recidivist (i.e., the offense

committed after discharge from the Division) offenses reported by the Division in the *Recidivism* report for the youth discharged during Fiscal Years 2014 through 2016.

EXHIBIT 2.6.
TYPES OF COMMITMENT OFFENSES VS. RECIDIVIST
OFFENSES FOR YOUTH DISCHARGED
FISCAL YEARS 2014 THROUGH 2016¹



SOURCE: *Recidivism Evaluation of the Colorado Division of Youth Services*, July 2018, p.47.

¹ This analysis is based only on the recidivist acts committed within 1 year of discharge.

² “Other” offenses include forgery, obstructing a peace officer, failing to register as a sex offender, and fishing without a license.

The Division used the above classifications instead of identifying the offenses that were Victim Rights Act crimes, as required by statute. Victim Rights Act crimes generally include crimes against a person such as murder, assault, child abuse, and kidnapping, as well as crimes such as robbery, burglary, and careless driving. While there are similarities between the categories used by the Division and crimes under the Victim Rights Act, they are not exactly the same.

The Judicial Branch data the Division used for its analysis does not categorize the crimes that fall under the Victim Rights Act. According to the Division, given the date that House Bill 18-1010 was passed (March 2018) and the due date of the report (July 1, 2018), it did not have enough time go through the data to delineate crimes specified in the Victim Rights Act. Not reporting the recidivism data based on

whether the offenses were Victim Rights Act crimes may result in the General Assembly not having the information that it needs to assess the effectiveness of the Division's efforts to rehabilitate youth. The Division indicated in the *Recidivism* report that it plans to report on Victim Rights Act crimes in future reports once it has the time to perform the work to make those determinations from the available data.

SOME RECIDIVISM DATA DOES NOT REFLECT ALL RECIDIVIST CONVICTIONS OCCURRING WITHIN 3 YEARS OF DISCHARGE, AS REQUIRED BY STATUTE. As described in the *Recidivism* report, when calculating the type of recidivist offenses committed, the Division only considers misdemeanor or felony convictions occurring in the first year after youth are discharged. Specifically, according to the Division, it records recidivist acts under the following principles:

- If a youth is convicted of more than one recidivist act between discharge and the time the Division reviews recidivist records (year 1), the Division will record the most severe offense as the recidivist act.
- Once a youth is recorded as a recidivist (within year 1), the Division will not re-evaluate the youth in future review periods to account for the severity of additional recidivist acts. According to the Division, it does not look for subsequent offenses because it works under the premise that once a youth has committed a recidivist act, there is no need to go back and review for other offenses.

This approach does not account for situations where a youth commits additional, and sometimes more serious, recidivist offenses after the first year from discharge. For example, two of the 45 youth in our sample (4 percent) were convicted of a misdemeanor in the first year after discharge. However, both youth were subsequently convicted of a felony in the second or third year after discharge. The Division did not include information on these additional, more serious convictions in the report. By not including information on recidivist offenses that occur in the second or third year after discharge, the *Recidivism* report does not convey all of the information required by statute.

In addition, the Division compares the severity of the recidivist offense to the commitment offense as a way to measure the success of its rehabilitation practices. The Division considers its efforts to rehabilitate a committed youth at least somewhat successful if the youth commits a recidivist offense that is less serious than the commitment offense. In other words, if a youth's commitment offense is a felony and its recidivist offense is a misdemeanor, the Division considers this to be positive. By not including more severe recidivist offenses that occur subsequent to the first year after discharge, the *Recidivism* report may erroneously indicate that the Division's rehabilitation practices are more successful than they actually are because more serious felony convictions may not be reported. For example, one of the youth in our sample was convicted on a controlled substance possession, which is a drug misdemeanor, during the first year after they were discharged from the Division. The Division used this misdemeanor in its recidivism calculations. However, during the third year after discharge, the youth was convicted of trespassing with intent to commit a crime, which is a felony. The Division did not include this felony in its calculations. Similarly, a second youth in our sample was convicted of misdemeanor assault the first year after being discharged, then was convicted of felony menacing during the second year. The Division's recidivism calculations did not include the felony conviction.

RECOMMENDATION 2

The Department of Human Services should improve the completeness of the recidivism rates and recidivist offense information that it includes in its *Recidivism Evaluation of the Colorado Division of Youth Services* report by:

- A Requesting adult misdemeanor convictions from the Denver County Court to add to the data collected from the Judicial Branch to include in its recidivism rate calculations.
- B Implementing a written methodology for using the Judicial Branch's data to identify and report recidivist offenses that fall under the Victim Rights Act.
- C Establishing a process for reviewing data on youth identified as recidivists during the first year after discharge to determine if they have any subsequent convictions during the second and third year after discharge and including information on these additional convictions and their severity level (i.e., misdemeanor or felony) in the report.

RESPONSE

DEPARTMENT OF HUMAN SERVICES

- A AGREE. IMPLEMENTATION DATE: JANUARY 2019.

The Department will request adult misdemeanor conviction data from the Denver County Court by January 2019 and ongoing access to the data for future reporting in the recidivism report. If the Denver County Court agrees to the request, the Department will work with the Court to develop a data sharing agreement and memorandum of understanding with the Court. When the Department or the Denver County Court obtains and matches the

data, the information gathered from the data will be incorporated into future Recidivism Evaluation reports as soon as feasible.

B AGREE. IMPLEMENTATION DATE: JULY 2019.

The Department will develop a written methodology, in future Recidivism Evaluation reports, for using the Judicial Branch’s data to identify and report recidivist offenses that are included as a “crime” pursuant to Section 24-4.1-302(1), C.R.S. (i.e., “fall under the Victim Rights Act”).

C AGREE. IMPLEMENTATION DATE: JULY 2019.

The Department will meet the requirements of Section 19-2-203(6), C.R.S., by collecting recidivism data within three years after discharge. As required, the report will denote the demographic characteristics of the studied population, will include recidivism rates, and will denote the types of criminal offenses committed, delineating between felonies and misdemeanors and between crimes pursuant to Section 24-4.1-302(1), C.R.S., and other crimes.

The Department will implement a process for reporting on the types of criminal offenses committed, including the required delineations; the Department will report on all recidivist offenses occurring within the three-year follow-up time period.

APPENDIX A



Education Outcomes at the Colorado Division of Youth Services

Committed Youth

Fiscal Year 2016-2017



CO L O R A D O

**Office of Children,
Youth & Families**

Division of Youth Services

INTRODUCTION

House Bill 18-1010

The Colorado Department of Human Services (CDHS or Department), Office of Children, Youth and Families (OCYF or Office), Division of Youth Services (DYS or Division) has prepared a report on education outcomes for committed youth in partial response to the following HB 18-10101:

On or before July 1st 2018, and on or before each July 1st thereafter, the Department of Human Services shall collect the recidivism data and calculate the recidivism rate and the educational outcomes for juveniles committed to the custody of the department who complete their parole sentences and discharge from department supervision.

DEMOGRAPHICS for FISCAL YEAR 2017

The Division of Youth Services interacts with many youth as they become justice involved and follows a continuum of services to meet their needs. Within each placement, all youth receive a free and appropriate education. When a youth is detained, for example, the detention centers work with the local school district where the detention center is geographically located to provide educational services. When youth must serve a commitment sentence, educational services continue to be provided at residential facilities which include staff-supervised contract programs or community-based contract programs as well as at state-operated secure and assessment centers.

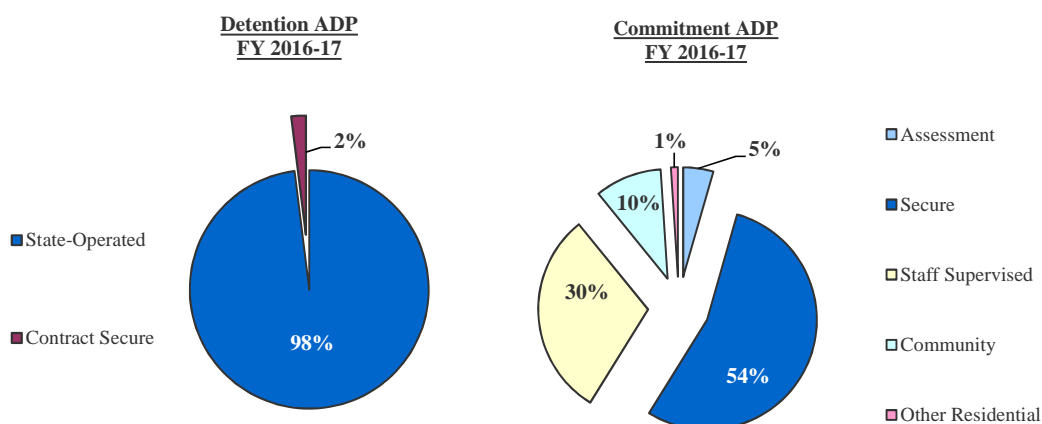
The annual data regarding average length of stay, age of youth, and placement of the youth are monitored through the Division of Youth Services Data Management and Analysis. These data are included Figure 1. for Fiscal Year 2017.

Figure 1. Population Data for Detained, Committed, and Paroled Youth Fiscal Year 2016-17.

ALL CLIENTS POPULATION DATA

Fiscal Year 2016-2017

DETAINED YOUTH	Unique Clients Served ¹	New Admissions ²	ADP	LOS
State-Operated	3,453	5,863	252.1	15.3 days
Contract Secure	94	117	5.1	14.7 days
Unique Client Count	3,521	Total 5,980	257.1	15.3 days
COMMITTED YOUTH		New Commitments ²	ADP	LOS
Assessment	419		28.9	0.9 month
Secure	922		354.2	11.0 months
Staff Supervised	493		197.3	6.8 months
Community	252		64.0	2.3 months
Other Residential ³	33		6.7	0.2 month
Unique Client Count	1,292	Total 381	651.1	20.3 months
PAROLED YOUTH		New Intakes ²	ADP	LOS
Unique Client Count	625	Total 356	220.4	7.3 months
ALL YOUTH			ADP	LOS
Unique Client Count	4,802	Total	1,128.6	27.4 months



¹Unique Clients Served is an unduplicated count of youth. These counts are not a sum of individual program areas, as youth are often served in multiple program areas (e.g., assessment and secure) throughout the fiscal year.

²Individual youth (unique clients) can have multiple detention admissions, new commitments, and new parole intakes throughout the fiscal year.

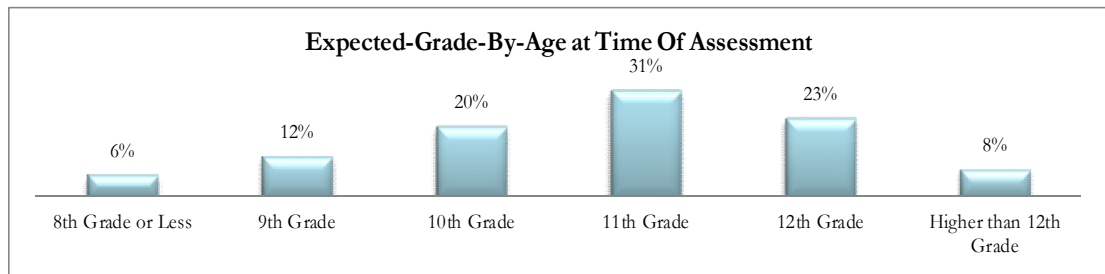
³Other Residential includes Group Homes, Job Corps, Hospitalizations, Shelter Care, etc.

During Fiscal Year 2017 (July 1, 2016 - June 30, 2017), 436 youth were discharged from the Division; in other words, 436 youth were no longer under department supervision.

Demographics: Average Age and Expected Grade-by-Age

The average age of students at time of commitment was 16.78 years old; the corresponding expected grade-by-age was 11th grade on average. Generally speaking, the expected grade-by-age can be thought of as the grade level at which a student would typically be expected to perform based solely upon age. This is illustrated in Figure 2.

Figure 2. Expected Grade-by-Age.

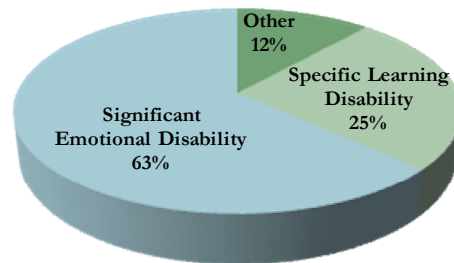


Demographics: Students with an Individualized Education Program (IEP)

Of the 436 youth evaluated in assessment, 30% were identified as having an Individualized Education Program (IEP). Each IEP indicates a primary disability that is impacting the youth’s ability to access general education and the IEP may include a secondary disability. The data show that 63% of youth with an IEP committed to DYS have a significant emotional disability (SED) as the primary disability (Figure 3).

Figure 3. Primary Disability within Student IEPs.

Primary Disability Noted in a Student IEP



EDUCATIONAL OUTCOMES

The data used to determine the educational outcomes for youth committed to the Division who complete their parole sentences and are discharged from department supervision includes two measures: standardized test scores for Measures of Academic Progress (MAP) and completion of high school requirements in the form of a high school diploma or successful completion of the suite of General Education Diploma (GED) tests.

Measures of Academic Progress (MAP)

The MAP interim assessments from Northwest Evaluation Association™ (NWEA™) “offer educators efficient and very accurate estimates of student achievement status within a subject.” The test results “compare achievement status—and changes in achievement status between test occasions—to students’ performance in the same grade at a comparable stage of the school year.” The tests are administered as a pre-test to youth at the assessment centers located at Grand Mesa Youth Services Center (GMYSC) and Mount View Youth Services Center (MVYSC). The tests given include Reading for Information, Language Usage, and Mathematics.

The initial MAP results, or pre-tests, for each student are available in the NWEA MAP database and are included with a grade equivalency in the universal education assessment report designed by and completed by Division of Youth Services education staff.

Unfortunately, some students do not complete a pre-test. The students who do not complete pre-tests include those who:

- have a verified GED or diploma;
- have scored at a 12th grade equivalency or above;
- consistently refuse testing.

MAP Pre-Test Results

Of the 436 discharged youth, 423 (97%) had a pre-test MAP score. Eleven of the thirteen who did not have a pre-test had already received their GED or Diploma.

On average, 62% of students were 4-or-more grades behind at the time of assessment, based on expected performance by age.

Specifically, 60.5% of those tested were 4-or-more grade levels behind in Language Usage (Figure 4); 66% of those tested were 4-or-more grade levels behind in Mathematics (Figure 5); and 58.5% of those tested were 4-more-grade levels behind in Reading for Information (Figure 6).

Figure 4. MAP pre-test results for Language Usage.

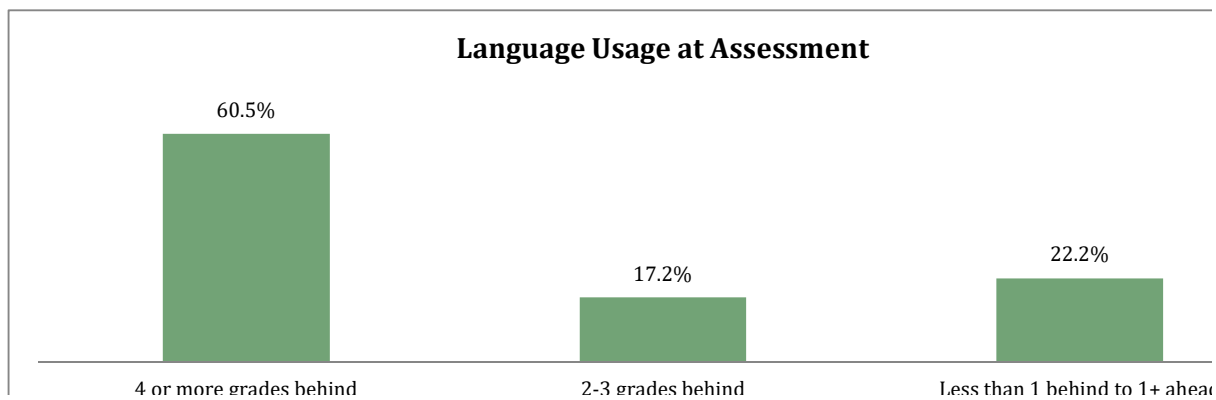


Figure 5. MAP pre-test results for Mathematics.

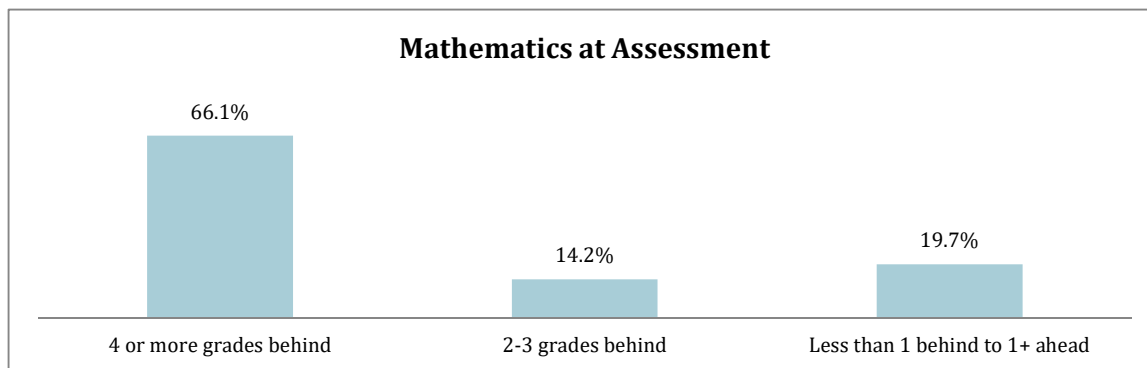
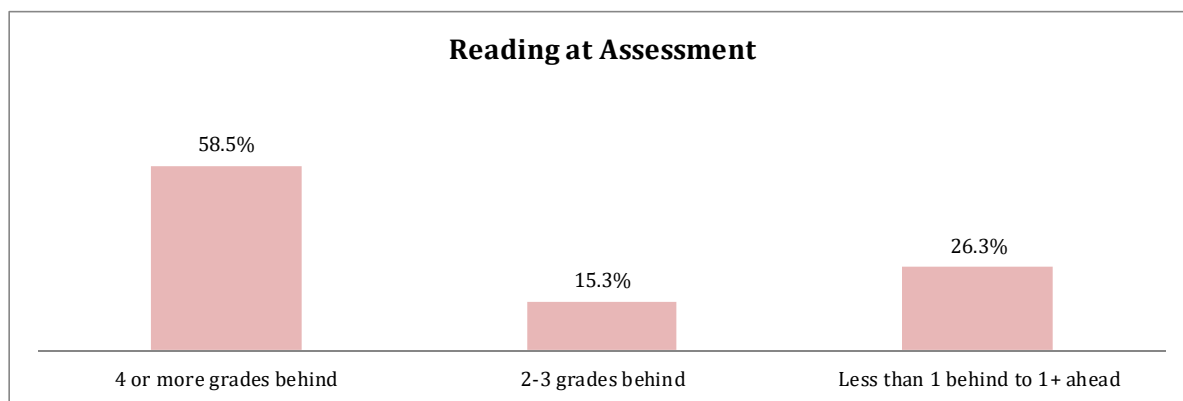


Figure 6. MAP pre-test results for Reading for Information.



MAP Post-Test Student Inclusion

During FY 17, 47% of students completed both a pre- and post-test; this represents, on average, 198 students (Figure 7).

Figure 7. FY17 discharged youth with Pre- and Post-Test MAP data.

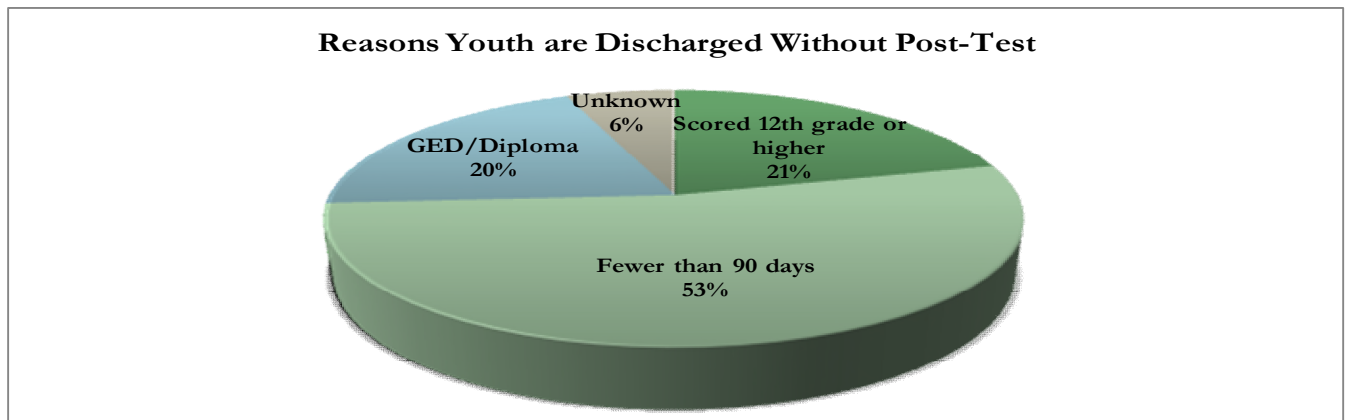
2016-17 Discharged Youth	Language	Math	Reading
Number of youth who had a pre- and post-test	198 (47.36%)	200 (47.39%)	197 (47.01%)

There are various reasons why a student might not complete a post-test. Students who are assessed at MVYSC or GMYSC but are relocated to a staff-secure residential facility or community placement do not receive interim testing, including MAP post-tests; additionally, students who are in a state commitment facility for fewer than 90 days may not be present for an additional assessment, based on the annual assessment calendar. Finally, students who score at the 12th grade level or above at the time of assessment or who have a GED or diploma are not required to take a post-test.

As illustrated in Figure 8, during FY17, of the students who did not complete a post-test:

- 53% of the students who did not complete a post-test had been placed in a less secure facility that does not administer interim testing, including MAP post-tests;
- 20% of the students who did not complete a post-test had received their diploma/GED;
- 21% of the students who did not complete a post-test had a MAP test score of 12th grade or above;
- 6% of the students who did not complete a post-test did not have data to indicate the rationale.

Figure 8. Reason discharged youth do not have a MAP post-test.



MAP Post -Test Results

The Division creates an annual calendar for on-going interim testing executed at four of the five state commitment facilities to monitor student growth.

The four commitment facilities include:

- Grand Mesa Youth Services Center (GMYSC);
- Lookout Mountain Youth Services Center (LMYSC);
- Platte Valley Youth Services Center (PVYSC);
- Zebulon Pike Youth Services Center (ZPYSC).

The Division does not provide interim testing for Mount View Youth Services Center (MVYSC) due to the itinerant nature of the students who are at MVYSC for assessment only. Typically, committed youth are placed at MVYSC for assessment purposes only prior to being placed in another facility. GMYSC assessment students do not take interim assessments; as a multipurpose facility which also has commitment services, GMYSC does test the commitment population using the annual DYS assessment calendar.

Language Usage Test Results

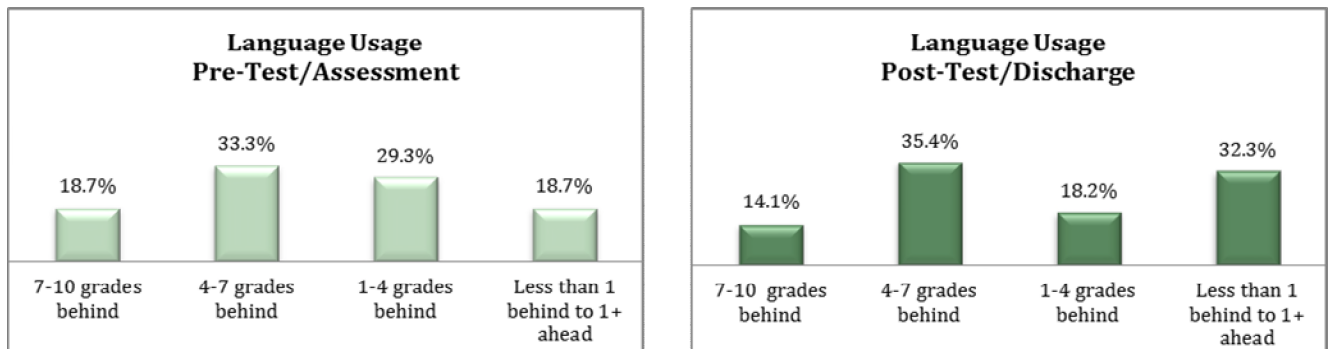
The assessment test data for the Language Usage test indicate the following:

- 52% of students were 4 or more grade levels behind their grade-by-age level expectancy.
- 29.3% of students were 1 to 4 grade levels behind their grade-by-age level expectancy.
- 18.7% of students were 1 grade level behind and up to 1 grade level above their grade-by-age level expectancy.

In comparison, the post-test data for the Language Usage test indicate the following:

- 49.5% of students were 4 or more grade levels behind their grade-by-age level expectancy, a 6% improvement from pre- to post-test.
- 18.2% of students were 1 to 4 grade levels behind their grade-by-age level expectancy, a 38% improvement from pre- to post-test.
- 32.3% of students were 1 grade level behind and up to 1 grade level above their grade-by-age level expectancy, a 68% improvement from pre- to post-test.

Figure 9. FY17: Pre and Post-Test Comparison for Language Usage.



Generally speaking, most newly committed students who completed both a pre- and post- test (52%) were four or more academic grade levels behind at the time of assessment. In contrast, at the time of discharge, 32% of students were within one grade level of what is typically expected based on a student’s age. On average, newly committed students have an average Length of Service (LOS) of 20.3 months. In other words, this means that while students arrive at an average age of 16.8, most (52%) perform at or below the 7th grade academically, and in fewer than two calendar years these students have improved by multiple grade levels.

In addition to these broad bands of results, student results were examined to determine growth in Language Usage. These data indicate:

- 4% of students showed no change in grade level.
- 15% of students improved up to one grade level.
- 67% of students improved more than one grade level.
- 14% of students demonstrated a negative grade level change.

Figure 10. FY17: Number of students demonstrating neutral, positive, or negative change.

2016-17 Discharged Students	Language Usage
N=	198
Number of students who showed no change in grade level	8 (4%)
Number of students who improved up to one grade level	29 (15%)
Number of students who improved more than one grade level	133 (67%)
Number of students who showed negative grade level change	28 (14%)

Mathematics Test Results

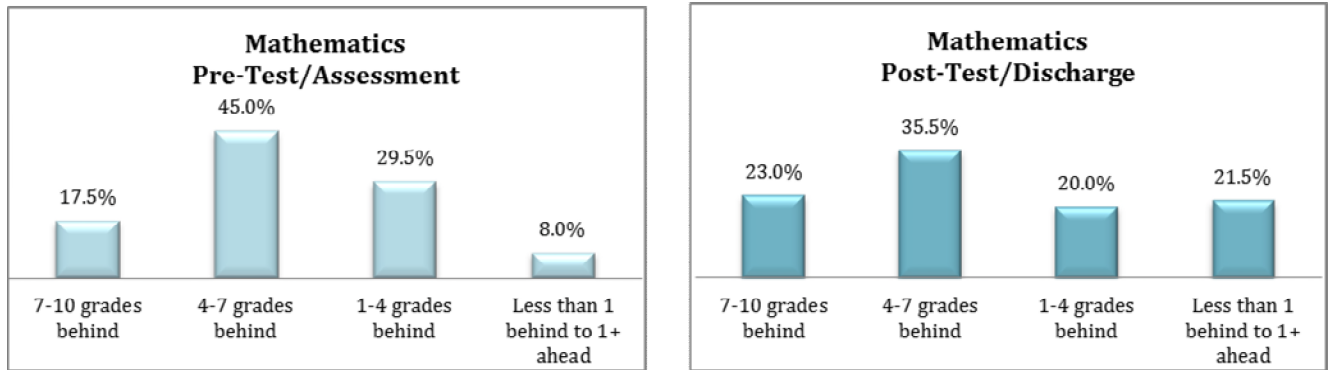
The assessment test data for Mathematics indicate the following:

- 62.5% of students were 4 or more grade levels behind their grade-by-age level expectancy.
- 29.5% of students were 1 to 4 grade levels behind their grade-by-age level expectancy.
- 8% of students were 1 grade level behind and up to 1 grade level above their grade-by-age level expectancy.

The post-test data for Mathematics indicate the following:

- 58.5% of students were 4 or more grade levels behind their grade-by-age level expectancy, an 11% decline in performance from pre- to post-test.
- 20% of students were 1 to 4 grade levels behind their grade-by-age level expectancy, a 33% improvement from pre- to post-test.
- 21.5% of students were 1 grade level behind and up to 1 grade level above their grade-by-age level expectancy, a 175% improvement from pre- to post-test.

Figure 11. FY17: Pre and Post-Test Comparison for Mathematics.



In addition to these broad bands of results, student results were examined to determine growth in Mathematics. These data indicate:

- 5.5% of students showed no change in grade level.
- 20% of students improved up to one grade level.
- 63% of students improved more than one grade level.
- 11.5% of students demonstrated a negative grade level change.

Figure 12. Number of students demonstrating neutral, positive, or negative change.

2016-17 Discharged Youth	Math
N=	200
Number of youth who showed no change in grade level	11 (5.5%)
Number of those youth who improved up to one grade level	40 (20%)
Number of youth who improved more than one grade level	126 (63%)
Number of youth who showed negative grade level change	23 (11.5%)

Reading for Information Test Results

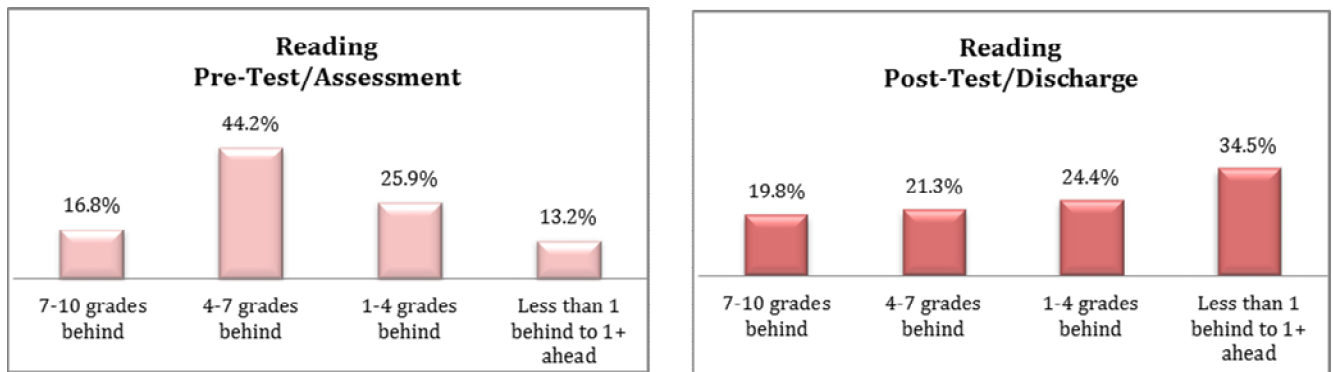
The assessment test data for the Reading for Information test indicate the following:

- 61% of students were 4 or more grade levels behind their grade-by-age level expectancy.
- 25.9% of students were 1 to 4 grade levels behind their grade-by-age level expectancy.
- 13.2% of students were 1 grade level behind and up to 1 grade level above their grade-by-age level expectancy.

The post-test data for the Reading for Information test indicate the following:

- 41.1% of students were 4 or more grade levels behind their grade-by-age level expectancy, a 33% improvement from pre- to post-test.
- 24.4% of students were 1 to 4 grade levels behind their grade-by-age level expectancy, an 8% increase from pre- to post-test.
- 34.5% of students were less than 1 grade level behind and up to 1 grade level above their grade-by-age level expectancy, a 169% increase from pre- to post-test.

Figure 13. FY17: Pre and Post-Test Comparison for Reading for Information.



In addition to these broad bands of results, student results were examined to determine growth in Reading for Information. These data indicate:

- 7% of students showed no change in grade level.
- 12% of students improved up to one grade level.
- 66% of students improved more than one grade level.
- 15% of students demonstrated a negative grade level change.

Figure 14. Number of students demonstrating neutral, positive, or negative change.

2016-17 Discharged Youth	Reading
N=	197
Number of youth who showed no change in grade level	14 (7%)
Number of those youth who improved up to one grade level	24 (12%)
Number of youth who improved more than one grade level	130 (66%)
Number of youth who showed negative grade level change	29 (15%)

In summary, newly committed students who completed both a pre- and post-test score demonstrated the greatest deficits on the Reading for Information section of the assessment, with more than two-thirds scoring as four or more grade levels behind at assessment. At post-test, however, more than a third of students tested within one grade level of what is typically expected based on a student’s age. In addition, more than three-quarters of these youth (78%) improved at

least one grade level from pre- to post test, with more than two thirds (66%) improving more than one grade level (see Figure 14). Many of these students had experienced multiple school failures in the past, making the observed increase in academic performance even more compelling.

C-STAT EDUCATION MEASURE

Eligible Youth Who Have a GED or High School Diploma by Discharge

When the Department's C-Stat initiative was adopted in mid-2012, the performance monitoring and improvement model was simultaneously rolled out across each Division. While C-Stat was once an "initiative," over the last six years it has become a well-ingrained program. Since the program's inception, it has been utilized to communicate the Division's trends, accomplishments and challenges over time.

During implementation, DYS was charged with developing and selecting a standard set of measures that would be analyzed each month, with action items assigned based upon improving or declining performance. These measures have and continue to serve as a dashboard of agency success.

The following listing and figures provide a detailed description of how this measure is reviewed each month. Eligibility criteria are explained, as well as the rationale behind each criterion utilized.

The measure is presented for review each month as a percentage. The basic percentage calculation is as follows:

- Numerator:
Number of eligible youth who receive a GED or high school diploma by the time they discharge
- Denominator:
Number of eligible DYS clients discharged in a specific month

Eligibility (or reasons for inclusion or exclusion in the measure calculation) is dependent upon the following criteria:

1) **Age Eligibility**

Criterion: Any youth who is 17.999 or younger at discharge is not eligible for inclusion in the measure. Only youth who are exactly 18 years of age or older (≥ 18.000) at discharge are eligible for inclusion.

Rationale: A youth would generally be too young to possess a GED or Diploma if younger than 18 years of age. In the U.S. public school system, the majority of students are age 18 at time of high school graduation.

2) **School or Class Enrollment Eligibility**

Criterion: Any youth who is enrolled full- or part-time in school of any kind at discharge is not eligible for inclusion.

Rationale: A youth who is actively working towards their GED or Diploma at discharge should not be considered as having met or not met the measure, but should be considered ineligible.

3) **Discharge Placement Eligibility**

Criterion: Any youth who discharged directly to the adult corrections system (Department of Corrections, or DOC) or was deported is not eligible for inclusion.

Rationale: In the days and months leading up to either an adult system transfer/discharge or deportation, youth often reside in detention or jail placements awaiting movement. In these circumstances, the Division has reduced opportunity and access to youth to provide educational services that would meaningfully impact educational attainment. Furthermore, these youth are not released back into the community, where educational attainment directly influences successful reintegration.

4) **Discharge Type Eligibility**

Criterion: Any youth who had his or her commitment sentence reconsidered, vacated, or terminated by the court are not eligible for inclusion.

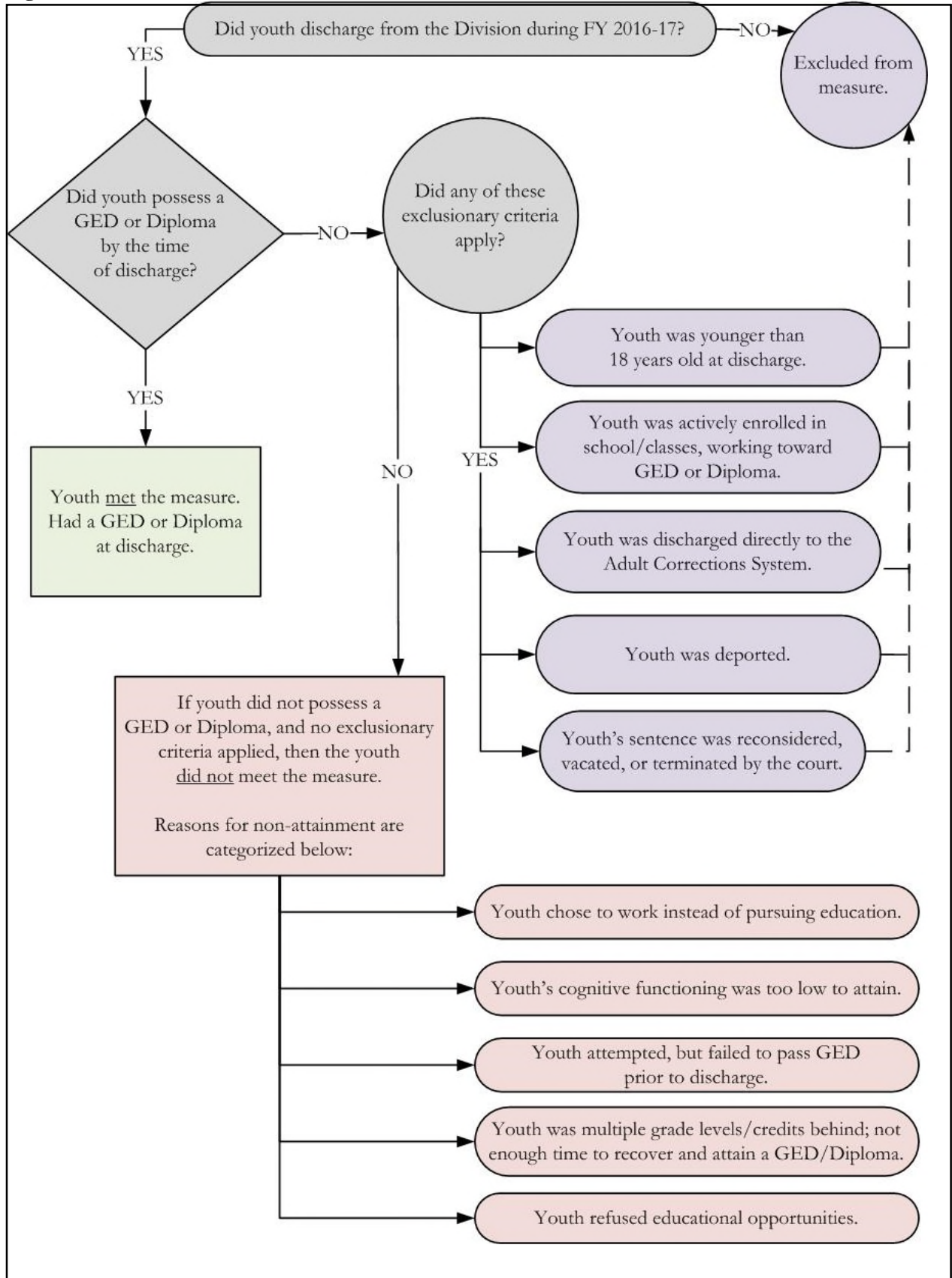
Rationale: Youth who had their sentences reconsidered, vacated, or terminated by the court are generally not under the Division's custody long enough to have attained a GED or Diploma.

An important factor to consider is youth that enter DYS commitment with a GED or Diploma. These youth are included in the measure (eligibility criteria are not applied to these youth). In fact, eligibility criteria are not applied to any youth who have attained a GED or Diploma by the time of discharge. The criteria are utilized after determining who possessed and did not possess a GED or Diploma, and only applied to those who did not possess one or the other.

An ongoing focus of success within DYS is determining how many youth "meet" each measure. Youth who do not meet the measure are flagged, and reasons are provided for those who fail to do so.

The following figures provide a visual representation of the measure, and how the data are calculated.

Figure 15. Decision Tree for DYS C-Stat Educational Attainment Measure.

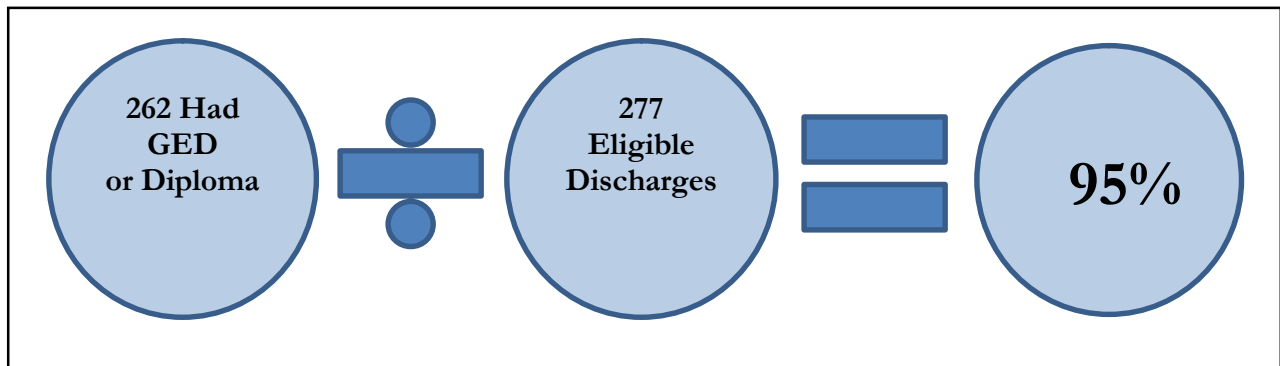


When monthly C-Stat education measure data are aggregated for the full fiscal year 2016-17 discharges ($n = 436$), the following results emerge.

Two hundred sixty two (262) youth possessed a GED ($n = 124$) or a high school Diploma ($n = 138$) at time of discharge, whereas fifteen (15) youth did not. In total, one hundred fifty-nine (159) youth were ineligible for inclusion in the measure, based upon the exclusion criteria:

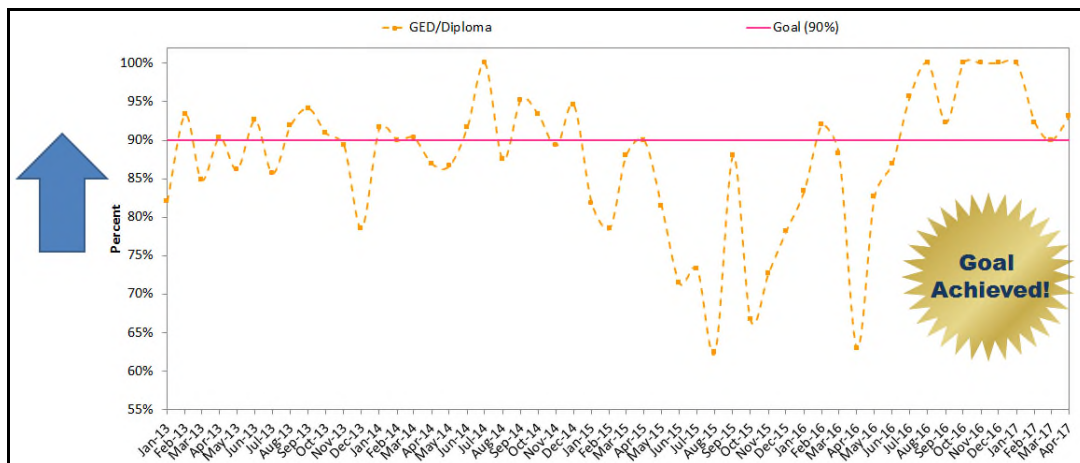
- 78 youth were under the age of 18;
- 56 youth were actively enrolled in school or classes, working towards a GED or diploma;
- 22 youth were discharged directly to adult corrections system;
- One (1) youth was deported;
- Two (2) youth had their sentences terminated by the court.

Figure 16. DYS C-Stat Educational Attainment Calculation (monthly data aggregated for FY 17)



Starting in July of 2017, this specific C-Stat measure was dash-boarded (not included in the main slide deck), after attaining the goal of 90% for ten consecutive months. Figure 17 illustrates this achievement.

Figure 17. DYS C-Stat Educational Attainment Measure



Any questions concerning this report may be directed to:

Division of Youth Services

4255 S. Knox Court

Denver, CO 80236

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Colorado Department of Human Services

Office of Children, Youth and Families

APPENDIX B



Recidivism Evaluation of the Colorado Division of Youth Services

Regarding Committed Youth

Discharged in Fiscal Years

2013-14,

2014-15,

&

2015-16

July 1, 2018



CO L O R A D O

**Office of Children,
Youth & Families**

Division of Youth Services

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EXECUTIVE SUMMARY

Annually, on July 1st, the Colorado Department of Human Services (CDHS or Department) publishes the results of a comprehensive analysis and review of juvenile recidivism for youth discharged from the Division of Youth Services (DYS or Division) in the preceding fiscal years.

YOUTH STUDIED

Recidivism rates were determined for three unique cohorts of discharged youth: one-, two-, and three-years post-discharge from DHS. The Division defines recidivism as the adjudication or conviction of a new misdemeanor or felony offense within a specified time period.

- Fiscal Year 2015-16: Four hundred forty-five (445) youth discharged from DHS. Among these discharged youth, 86% were male, and 14% were female. This cohort was used to determine a one-year recidivism rate.
- Fiscal Year 2014-15: Four hundred seventy-six (476) youth discharged from DHS. Among these discharged youth, 86% were male, and 14% were female. This cohort was used to determine a two-year recidivism rate.
- Fiscal Year 2013-14: Five hundred fifty-six (556) youth discharged from DHS. Among these discharged youth, 86% were male, and 14% were female. This cohort was used to determine a three-year recidivism rate.

ANALYSIS COHORT

As a means of combating the challenges associated with a shrinking population of youth who discharge from DHS annually, three years of data were combined to create a single, larger one-year post-discharge cohort. Specifically, each of the youth in the one-year post-discharge cohort for Fiscal Years (FY) 2013-14, 2014-15, and 2015-16 were combined to form a single analysis cohort of 1,477 youth. By combining these three cohorts into a larger cohort, some of the challenges presented by a shrinking population size were ameliorated and sufficient statistical power was generated in the analyses to detect significant between-groups differences. A total of 11 youth discharged in more than one Fiscal Year due to consecutive sentences, new commitments, or other legitimate reasons. For the purposes of the demographic analyses, these youth were only counted once to avoid "double-counting" individual characteristics of recidivists and non-recidivists. For a more detailed description of the demographic characteristics of the analysis cohort examined in the body of this report, please see Table 2 and Appendix B.

- Analysis Cohort: One thousand four hundred seventy-seven (1,477) youth discharged from DHS. Among unique discharged youth, 86% were male and 14% were female. This cohort was used for the majority of the analyses discussed throughout the report.

RECIDIVISM RATES

One-year recidivism rate

For youth who discharged in FY 2015-16, **31.5%** (140 out of 445 youth) were guilty of one or more recidivist acts within one year of discharge from DYS.

Two-year recidivism rate

For youth who discharged in FY 2014-15, **49.2%** (234 out of 476 youth) were guilty of one or more recidivist acts within two years of discharge from DYS.

Three-year recidivism rate

For youth who discharged in FY 2013-14, **55.2%** (307 out of 556 youth) were guilty of one or more recidivist acts within three years of discharge from DYS.

Analysis cohort recidivism rate

For youth in the combined one-year post-discharge analysis cohort, **30.1%** (444 out of 1,477 total youth) were guilty of one or more recidivist acts within one year of discharge from DYS.

CHANGES TO THE RESEARCH METHODS IN THE CURRENT REPORT

Colorado has experienced nine consecutive fiscal years of decline in the number of youth discharged from DYS. The decline in the number of youth discharged from the Division ($n = 445$ in FY 2016) places limitations on the type and quality of analyses that can be performed with confidence and accuracy. Specifically, the sample sizes within the one-, two-, and three-year cohorts examined annually have grown so small that they call into question whether or not sufficient statistical power can be generated to detect significant differences between groups. Given the challenges presented by the Division's shrinking population, significant changes were made to the research methods employed in the current analysis with the goal of providing a scientifically rigorous means of addressing and ameliorating these challenges. The most significant change to the methodology involved creating a larger census for analysis. In order to accomplish this, the one-year post-discharge cohorts from the past three fiscal years (FY 2013-14, FY 2014-15, and FY 2015-16) were combined into one, larger cohort of youth who were followed for one-year for the analysis. Increasing the sample size using this approach preserved the integrity of each cohort, while allowing for more meaningful comparisons both between and within groups. This larger cohort is referred to as the "Analysis cohort" throughout the report.

CRIMINOGENIC RISK REDUCTION

Criminogenic risk is defined as the statistical likelihood of future offending. The Colorado Juvenile Risk Assessment (CJRA) is a psychosocial evaluation tool used to estimate a youth's future risk of recidivism on a scale (Low, Moderate, or High risk). Youth are evaluated for risk of recidivism at several points, including but not limited to: when they are initially committed to DYS, when they transition onto parole, and upon discharge (when all DYS treatment, services, and supervision have concluded). At the time of commitment, 90% of youth in the analysis cohort with two valid CJRA scores were categorized as being at a High risk to recidivate, while at the time of discharge only 65.9% of this same cohort remained in the High risk category, a 26.8% reduction. This measured reduction in criminogenic risk indicates that services provided to youth during their time with DYS helped to reduce the likelihood of future recidivism.

NATIONAL COMPARISON

Currently, five states and the District of Columbia define, measure, and report juvenile recidivism utilizing a research methodology similar to Colorado, thus providing six data points for a between-states comparison of recidivism rates. When comparing the one-year post-discharge recidivism rates between comparable states, Colorado's rate (31.5%) is on the higher end of the performance range (16.7% - 45%). The two states with rates lower than Colorado are Maryland (16.7%) and Idaho (30%).

C.R.S., 19-2-203(6) Details

The Colorado Department of Human Services (CDHS or Department), Office of Children, Youth and Families (OCYF or Office), Division of Youth Services (DYS or Division) prepares an annual recidivism report on committed youth. The current report is submitted in response to C.R.S., 19-2-203(6) (formerly House Bill 18-1010). The educational outcomes requirement is submitted in a separate report.

On or before July 1, 2018, and on or before each July 1 thereafter, the Department of Human Services shall collect recidivism data and calculate the recidivism rates and the educational outcomes for juveniles committed to the custody of the Department who complete their parole sentences and discharge from Department supervision. In collecting the recidivism data, the Department shall include any juvenile adjudication or adult conviction of a criminal offense within three years after parole discharge.

Statute C.R.S., 19-2-203(6) specifies that:

The report must denote the demographic characteristics of the population considered in the report. In reporting on recidivism rates, the report must denote the types of criminal offenses committed, delineating between felonies and misdemeanors and between crimes that are included as a “crime” pursuant to Section 24-4.1-302(1) and other crimes.

Specific elements can be found on the following pages:

- Demographic characteristics of the population considered in the report: Table 2, pp. 19-20
- Criminal offenses committed (felonies and misdemeanors): Figures 17-20, pp. 44-47
- Crimes pursuant to Section 24-4.1-302(1), C.R.S and other crimes¹: Figures 19-20, pp. 45-46

¹ In compliance with C.R.S., 19-2-203(6), previously HB 18-1010, the Department began collecting data on those crimes included in Section 24-4.1-302(1), C.R.S. (Victim Rights Act) after the bill was signed into law on March 7, 2018. Delineations between recidivist crimes that are included in Section 24-4.1-302(1), C.R.S. and other crimes will appear in future reports, after the data has been collected for the three year post-discharge time period specified by law.

DEFINITION OF RECIDIVISM

The Division defines recidivism as a new adjudication or conviction resulting from a misdemeanor or felony offense at any point within the prescribed follow-up time period(s). In FY 2012-13 this definition was changed from measuring recidivism as a new filing (irrespective of a guilty finding) within the same time parameter(s) in order to more closely conform to the research methodologies utilized by other states who track juvenile recidivism. This more easily allows for a between states comparison of recidivism data.

POST-DISCHARGE RECIDIVISM

Post-discharge recidivism refers to new adjudications and convictions that occur within the prescribed follow-up time period(s) *after* a youth has completed all treatment and services and is fully discharged from DYS supervision. Post-discharge recidivism is the primary outcome measure utilized by juvenile justice agencies across the nation. It serves as a proxy measure for how well youth are able to re-integrate back into the community and remain crime-free upon discharge. Nationally, juvenile justice agencies are using recidivism rates to objectively determine whether treatment and services provided to youth were not only appropriate and effective, but also as a tool to inform policy and practice.

MULTI-YEAR RECIDIVISM RATES

The majority of states currently engaged in measuring and reporting juvenile recidivism typically only report a one-year post-discharge recidivism rate. In contrast, DYS tracks youth for three years post-discharge in order to determine whether they have remained crime-free. Tracking youth for three years post-discharge provides a more rigorous and comprehensive longitudinal analysis of the overall paradigm of recidivism in Colorado, as well as the trajectory of outcomes over time.

RISK REDUCTION

In addition to measuring recidivism, this report also examines risk reduction in the analysis cohort. While reducing recidivism is the primary function of corrections, reducing a youth's risk to recidivate is an equally important intermediate function of the Division. Despite the fact that recidivism is frequently viewed as the primary measure used to gauge outcome success among justice system-involved youth, other intermediate measures can also indicate whether youth are better prepared to reintegrate into the community after receiving treatment and services. These intermediate risk reduction measures examine whether the treatment services provided to a specific youth have significantly targeted those domains known to contribute to the overall actuarial risk the youth presents to public safety in terms of recidivism. When examined in tandem with primary outcome measures (recidivism rates), these intermediate measures (risk reduction) can provide a more holistic view of a juvenile justice agency's success.

RECIDIVIST ACT DEFINED

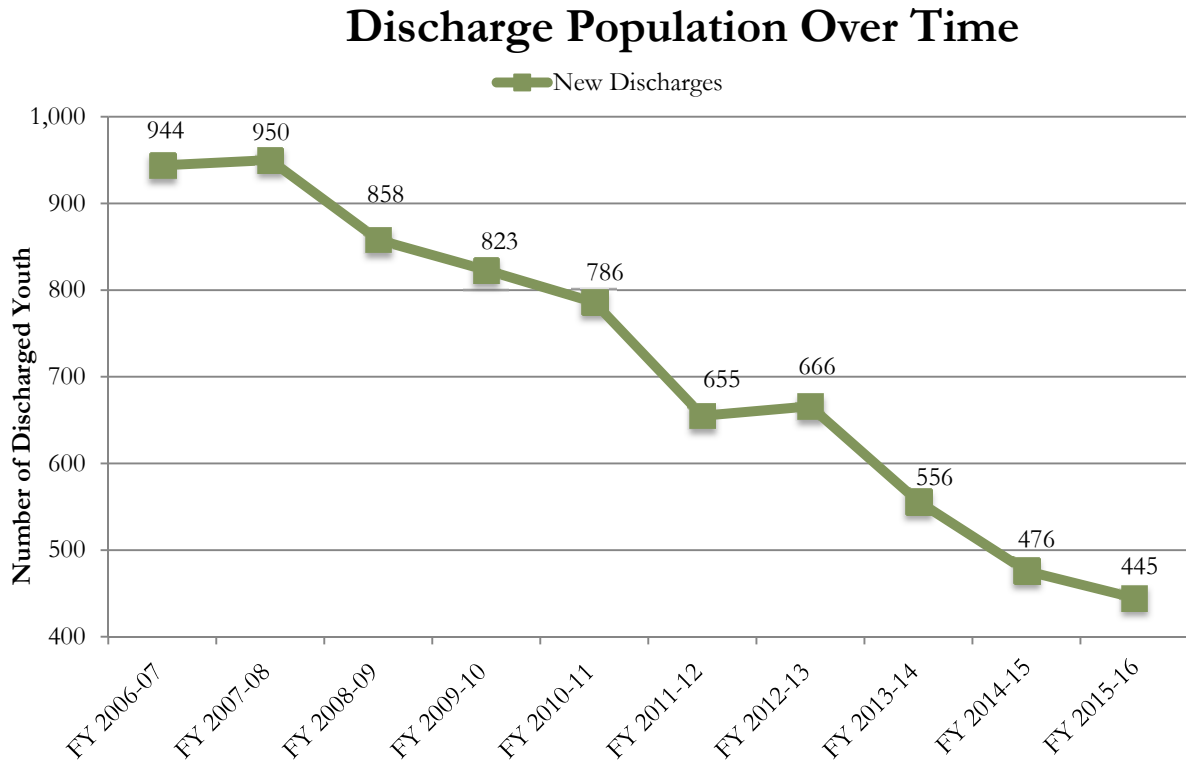
A recidivist act is defined as a new adjudication or conviction that occurs after a youth has discharged from the supervision of the Division. Within the Criminal Justice System, an *adjudication* refers to a finding of guilt for a delinquent offense involving a defendant under the age of 18, and is analogous to a *conviction* of an adult defendant found guilty of a criminal offense. A youth is deemed to be a recidivist if he or she commits a new offense that results in a guilty finding for a misdemeanor or felony class charge (adjudication/conviction). Traffic violations (not to be confused with traffic infractions), and petty offenses are not counted as recidivist acts. The unit of analysis for this study is youth discharged from the Division (rather than the number of recidivist acts), and all information is reported in the aggregate.

STUDY POPULATION

In FY 2015-16, four hundred forty-five (445) youth discharged from DYS. These youth were observed for one year after discharge, and official adjudication/conviction Judicial records were used to calculate a one-year post-discharge recidivism rate. In FY 2014-15, four hundred seventy-six (476) youth discharged from DYS. These youth were observed for two years after their discharge, and official adjudication/conviction Judicial records were used to calculate a two-year post-discharge recidivism rate. In FY 2013-14, five hundred fifty-five (556) youth discharged from DYS. These youth were observed for three years following their discharge, and official adjudication/conviction Judicial records obtained from the Judicial Branch were used to calculate a three-year post-discharge recidivism rate.

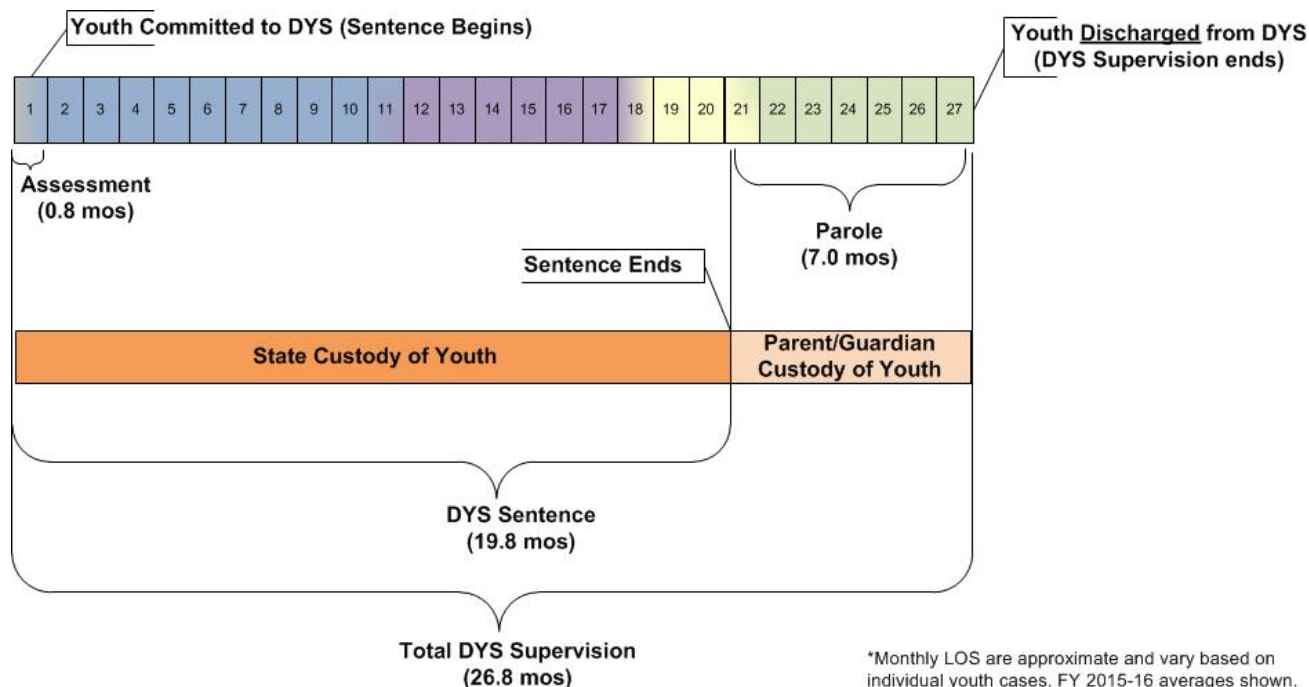
An analysis cohort of 1,477 youth was created by combining each of the one-year post-discharge cohorts from three Fiscal Years (FYs 2013-14, 2014-15, and 2015-16) into a single, larger cohort. All of the analyses that follow were conducted on this analysis cohort as a means of minimizing the trend of a substantially shrinking population size. Over the past ten years, the population of youth discharged from DYS has declined from a high of 950 in FY 2007-08 to a low of 445 in FY 2015-16, a 53.2% reduction (see Figure 1 for details). This decrease in population size directly impacts the Division's ability to detect significant differences between groups, particularly when examined in smaller sub-populations (e.g.: males vs. females, by ethnicity, or among our special populations). Increasing the sample size is one accepted means of minimizing these challenges.

Figure 1: Ten-Year Discharge Population Trends



As Figure 2 illustrates, the average total length of DYS supervision for committed youth was 26.8 months in FY 2015-16. This total commitment Length of Service (LOS) begins at the time of commitment to DYS and continues through the parole period until a youth is officially discharged and DYS supervision ends.

Figure 2: DYS Timeline of Care



STUDY DESIGN

A prospective quasi-experimental observational cohort study design with a longitudinal follow-up period measured at three distinct intervals was used in the current analysis. This approach allowed for non-intrusive observation of the natural progression of three cohorts of previously delinquent youth in the community after they were discharged from DYS. The Division utilized Judicial court data from the Colorado State Judicial Department (Judicial) to determine whether or not a youth had committed a recidivist act during the follow-up period for each cohort.

Due to several safeguards related to confidentiality and data-sharing, the Division and the Office of the State Court Administrator developed a Memorandum of Understanding (MOU) specifically related to this annual study. This MOU serves as a data-sharing agreement that grants DYS permission to utilize the adjudication/conviction information for purposes of identifying youth who recidivate.

RECORD MATCHING BETWEEN DYS AND JUDICIAL

Matching records from Judicial to youth discharged from DYS is a difficult and labor-intensive process that is challenged by an inability of data systems across State agencies to “talk” to one another. In addition, typical matching techniques used in identifying adult offenders simply aren’t applicable to a juvenile population. Specifically, the typical forms of identification commonly present in the adult population (e.g.: driver’s license, social security number, etc.), are often rare or nonexistent for system-involved juveniles. Thus, youth discharged from DYS must be matched to a multitude of Judicial filings

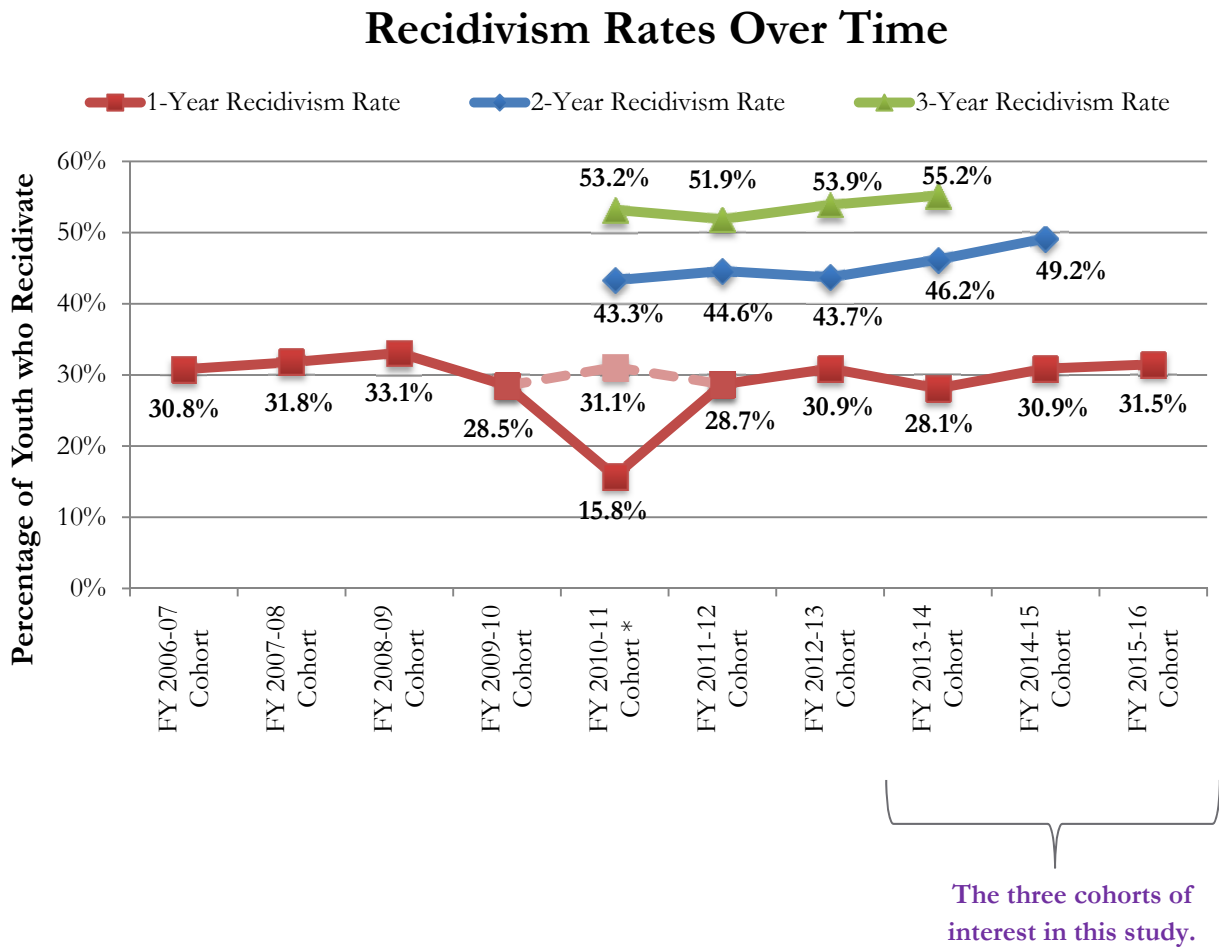
using less straightforward means. For this study, youth were matched between the two data systems through a two-step process which is both automated and manual. Initially, youth are matched through an algorithm that compares elements of a youth's name, and date of birth. Next, the remaining youth who do not match are identified by hand until all discharged DYS youth are accounted for in the Judicial system database. This hand-matching process is hindered by the vast number of aliases, misspellings, hyphenated names, attempts at intentional misrepresentation of identity, and data entry errors for dates of birth, social security numbers, etc. present in both data sets. Finally, all cases in the analysis data are reviewed to ensure the automated portion of the match did not result in any "false matches" in which two separate youth with similar names and identical dates of birth are incorrectly matched together. As a fidelity measure, each youth's commitment case is found in Judicial's data, thus providing great confidence that all youth are being appropriately matched across systems.

RECIDIVISM RATES

A decade (10 years) of DYS recidivism rates are displayed in Figure 3. The one-year post-discharge recidivism rate has consistently averaged around 31%, with the exception of the data reported in FY 2010-11. The recidivism rate of 15.8% originally reported in FY 2010-11 was investigated and found to be a result of a data coding error that failed to identify certain filings. The data were subsequently re-pulled from the system, and the actual one-year post discharge recidivism rate of 31.1% was revealed. In the spirit of transparency, the original rate is preserved in Figure 3. Given this generally consistent historical trend, it is anticipated that recidivism rates will continue to hover around one-third of the total discharge population, barring significant systemic changes (e.g.: the use of front-end discretion in sentencing among adjudicated youth, the increased use of alternatives to incarceration, the quality and efficacy of treatment services delivered, resources available to both clinicians and youth, etc.).

Two- and three-year post-discharge recidivism rates are a relatively new addition to the study methodology. The two-year post-discharge recidivism rate has averaged around 45% over five years of measurement, with a range of 43% to 49%. The three-year post-discharge recidivism rate has remained slightly over 50% over four years of measurement. As a relatively new outcome measure with only four data points currently available, analysis is limited; however, over half of youth were consistently found to recidivate within three years of their discharge from the Division.

Figure 3: Recidivism Trends (One-, Two-, and Three-Years Post-Discharge)



MULTI-YEAR RECIDIVISM RESULTS

The table that follows (Table 1) reports the recidivism rates across all three cohorts of interest in this study. The three unique cohorts of discharged youth were examined by follow-up period to see how many youth recidivated after one, two, and three years post-discharge. See Table 1 for details on multi-year recidivism rates.

Table 1: Recidivism Rates by Discharge Cohort

Youth Discharge Cohort	One-Year Recidivism Rate	Two-Year Recidivism Rate	Three-Year Recidivism Rate
FY 2015-16 cohort (N = 445)	31.5%	TBD*	TBD*
FY 2014-15 cohort (N = 476)	30.9%	49.2%	TBD*
FY 2013-14 cohort (N = 556)	28.1%	46.2%	55.2%

*Rates TBD; available in forthcoming reports

FY 2015-16 Cohort

The FY 2015-16 discharge cohort (N = 445) has currently been tracked for one year following discharge from DYS. The one-year recidivism rate for this cohort was 31.5%. The two- and three-year rates will be reported once the allotted two- and three-year time periods have concluded.

FY 2014-15 Cohort

The FY 2014-15 discharge cohort (N = 476) has been tracked for two years following discharge from DYS. The one- and two-year recidivism rates for this cohort were 30.9% and 49.2%, respectively. The three-year recidivism rate will be reported once the allotted three-year time period has concluded.

FY 2013-14 Cohort

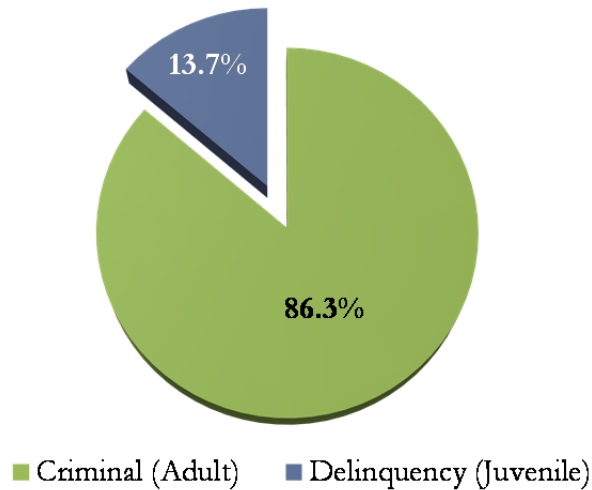
The FY 2013-14 discharge cohort (N = 556) has been tracked for three years following discharge from DYS. The one-, two-, and three-year recidivism rates for this cohort were 28.1%, 46.2%, and 55.2%, respectively.

Adjudications vs. Convictions

As previously mentioned, when juveniles are found guilty of a criminal offense they are adjudicated, while adults who are found guilty of a criminal act are convicted. As discharged youth age over the course of the follow-up period, some recidivists are charged as adults. In the analysis cohort (N = 1,477), just over 86% of youth who committed a recidivist act received adult criminal charges, while nearly 14% were adjudicated as juveniles (see Figure 4 for details). It should be noted that the majority of youth who discharged from DYS during Fiscal Year 2015-16 turned 18 prior to discharge, thus making them eligible to receive adult probation or Department of Services sentences if found guilty.

Figure 4: Criminal Convictions vs. Delinquency Adjudicationsⁱⁱ

Percent of Guilty Filings by Type



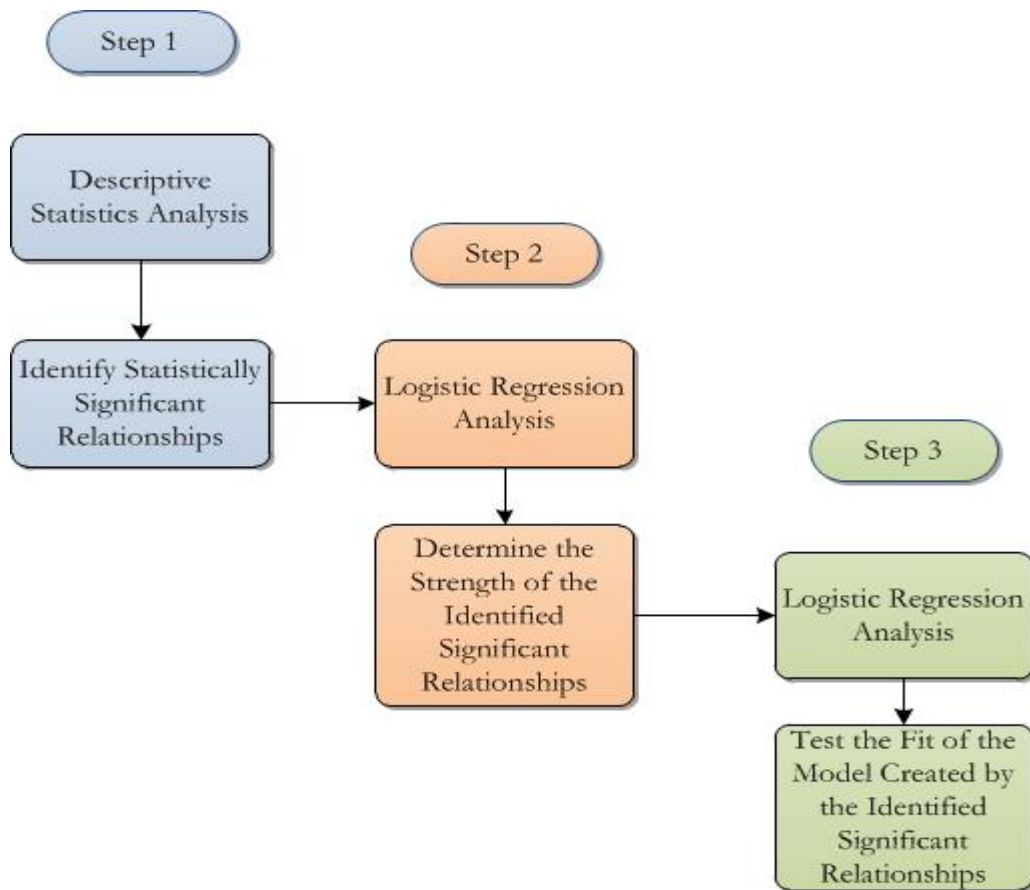
RECIDIVISM ANALYSIS COHORT

Statistical Analysis Steps

Conducting statistical analysis is a scientific process that must, like all science, adhere to a series of procedures or steps. Each of these steps is guided by the data, and the results of the analyses conducted within each step dictate what additional analyses can be conducted. Simply put, the analysis begins with basic tests of the relationships between a number of independent variables identified by the literature and larger body of juvenile justice research as contributing to recidivism (the dependent variable in this case: being a recidivist). Any variables found to have a significant relationship are thought to create a “model” for accurately predicting an outcome (being a recidivist) based on the data. Next, this model is subjected to more sophisticated analyses in order to test the *strength* of any relationships previously identified as being statistically significant. Finally, additional tests are then performed in order to determine *how well* the model created by these significant variables “fits,” or is capable of accurately predicting an outcome based on the data. Thus, the data identified in step 1 as being statistically significant will be included in each of the following steps (See Figure 5).

ⁱⁱ Due to rounding throughout the report, figures may not total to 100% in all figures or tables.
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Figure 5: Statistical Analyses Steps



Step 1: Descriptive Statistics

The table that follows (Table 2) details some basic descriptive differences between youth who recidivated and youth who did not recidivate within one year of discharge (FYs 2013-14, 2014-15, and 2015-16 discharge cohorts combined into one large analysis cohort). Only those youth demographics which demonstrated differences that were statistically significant are displayed in Table 2. For a list of the non-significant demographics examined, please refer to Appendix B.

Table 2: Demographic Differences between Non-Recidivists and Recidivists (Analysis Cohort)

	Non recidivists		Recidivists		<i>p</i> -value	Effect Size ¹	% of Total
	<i>n</i>	%	<i>n</i>	%			
Total (<i>N</i> = 1,466)²	1,027	100%	439	100%			100%
	<i>n</i>	%	<i>n</i>	%			
1. Gender							
Male	857	83.4%	404	92.0%	0.00*	0.11 (small)	86%
Female	170	16.6%	35	8.0%			14%
2. Mean Age at Discharge							
	18.7 years		18.4 years		0.00*		18.6 yrs
3. Mean Length of Prior Detentions							
	19.3 days		25.9 days		0.02*		21.2 days
4. DYS Region							
Central	427	41.6%	155	35.3%	0.05*	0.07 (weak)	39.7%
Northeast	303	29.5%	141	32.1%			30.3%
Southern	184	17.9%	100	22.8%			19.4%
Western	113	11.0%	43	9.8%			10.6%
5. Number of Escapes³							
None	487	47.4%	154	35.1%	0.00*	0.11 (small)	43.7%
One or more	540	52.6%	285	64.9%			56.3%
6. Mean Age at First Adjudication							
	14.8		14.5 yrs		0.00*		14.7 yrs
7. Mean Age at Commitment							
	16.4 years		16.2 years		0.01*		16.3 yrs
8. Prior Number of Adjudications							
None	297	28.9%	84	19.1%	0.00*	0.1 (small)	26.0%
One	272	26.5%	127	28.9%			27.2%
More than Two	458	44.6%	228	51.9%			46.8%
9. Ethnic Minority							
Non-Minority	456	44.4%	170	38.7%	0.04*	0.05 (weak)	42.7%
Minority	571	55.6%	269	61.3%			57.3%
10. Parole Discharge Rating⁴							
Unsatisfactory	355	34.6%	241	54.9%	0.00*	0.2 (small)	40.7%
Satisfactory	182	17.7%	74	16.9%			17.5%
Excellent	429	41.8%	108	24.6%			36.6%
Not on Parole at Time of Discharge	61	5.9%	16	3.6%			5.3%

(Table continued on following page)

Table 2 (continued): Demographic Differences between Non-Recidivists and Recidivists (Analysis Cohort)

	Non recidivists		Recidivists		<i>p</i> -value	Effect Size ¹	% of Total
	<i>n</i>	%	<i>n</i>	%			
11. Program at Discharge							
Full-time Program	665	64.8%	247	56.3%	0.01*	0.1 (small)	62.2%
Part-time Program	115	11.2%	46	10.5%			11.0%
No Program	247	24.1%	146	33.3%			26.8%
12. CJRA Overall Risk Level at Discharge							
Low	73	7.2%	16	3.7%	0.00*	0.12 (small)	6.2%
Moderate	302	29.9%	86	19.7%			26.8%
High	634	62.8%	335	76.7%			67.0%
13. Secure Need Factors							
Zero	212	20.6%	58	13.2%	0.01*	0.09 (weak)	18.4%
One	383	37.3%	168	38.3%			37.6%
Two	299	29.1%	150	34.2%			30.6%
More than Two	133	13.0%	63	14.4%			13.4%

**p* < 0.05 (indicates a statistically significant difference between recidivists and non-recidivists)

¹An effect size is considered large at 0.5, medium at 0.3, small at 0.1, and weak when below 0.1.

²There were a total of 11 youth who discharged in more than one Fiscal Year due to consecutive sentences, new commitments, etc. For the purposes of the demographic analyses, these youth were only counted once to avoid "double-counting" individual characteristics of recidivists and non-recidivists.

³An escape, for the purposes of this study, is defined as a period of time when a youth absconds from a commitment facility, a community placement, or from parole for four hours or longer without permission.

⁴The Parole Discharge Rating is the level at which the client manager determines the youth to be at discharge in regard to parole compliance, which is based on pre-determined criteria.

Summary of Descriptive Analyses

Demographic Differences Found between Recidivists & Non-Recidivists

An extensive analysis of potentially differential demographic characteristics (variables) was conducted in order to determine which traits best characterized youth who recidivated. In other words, the analysis that follows attempts to define, in very general terms, significant differences in characteristics between youth who recidivate when compared to youth who did not recidivate. As was anticipated, increasing the analysis sample size did, in fact, generate sufficient statistical power to detect significant between-groups differences for variables identified by the literature to be linked to juvenile recidivism. The 13 characteristics that generated significant findings are shown in Table 2 and are summarized below.

1. Gender

Although 86% of the total number of youth in analysis cohort were male, 92% of recidivists were male, which indicates that a significantly larger percentage of recidivists were male than female, with a small effect size (Phi) (92% male vs. 8% female, *p* < 0.001; Phi = 0.11). Generally speaking, an effect size is a statistical tool used with certain tests to illustrate practical or meaningful differences observed, and can

be thought of as a measurement of the *amount of impact* an independent variable (gender, in this case) has on a dependent variable (being a recidivist). It should be noted, however, that the number of female recidivists in the analysis sample remained very small, despite aggregating three years of one-year cohort data ($n = 35$). This very small sample size excluded the possibility of performing additional analyses comparing female recidivists to their male counterparts.

2. Average Age at Discharge

The average age at which youth in the analysis cohort discharged from DYS supervision was 18.6 years. Recidivists were significantly younger at discharge (18.4 years) compared to non-recidivists (18.7 years) ($p < 0.001$). As recidivists were also significantly younger at the time of their commitment and there was no significant difference in the length of service between groups, it is not surprising that recidivists would thus be younger at discharge than non-recidivists.

3. Average Length of Prior Detentions

The average length of stay in detention for all youth in the analysis cohort was 21.2 days. On average, recidivists had a length of stay in detention that was 4.7 days longer compared to non-recidivists, a significant difference ($p = 0.02$). Non-recidivists had an average detention LOS of 19.3 days, compared to 25.9 days among recidivists.

4. DYS Region

For the purposes of this analysis, “Region” refers to the specific Region of the state where a committed youth’s case is managed, and frequently reflects either the Region to which a youth will discharge, or where immediate family members reside. Most of the youth in the analysis cohort (39.7%) had their cases managed out of the Central Region, followed by the Northeast Region (30.3%), the Southern Region (19.4%), and the Western Region (10.6%). Regional differences when comparing recidivists to non-recidivists were statistically significant, but had a weak effect size ($p < 0.05$, $\Phi = 0.07$), indicating that while the observed differences are significant, the strength of the relationship between Region and being a recidivist is weak. If a stronger relationship was identified, it might be possible to examine differing regional practices that impact recidivism, such as service provision, judicial practices, etc. Unfortunately, the observed weak effect size most likely points to the unequal distribution of youth across the four Regions rather than true Regional differences in recidivism. Given the unequal distribution of the sample sizes across Regions, caution should be used when interpreting these data.

5. Number of Escapes

An escape, for the purposes of this study, is defined as a period of time when a youth absconds from a commitment facility, a community placement, or from parole for four hours or longer without permission. Although more than half (56.3%) of all youth in the analysis cohort had an escape at some point during their commitment to DYS, recidivists comprised a significantly larger percent of those with one or more escapes compared to non-recidivists. Nearly 65% of recidivists had an escape sometime

during their commitment, while roughly 53% of non-recidivists had an escape sometime during their commitment to DYS, though the effect size was small ($p < 0.001$, $\Phi = 0.11$).

6. Average Age at First Adjudication

The average age at which youth in the analysis cohort were first adjudicated for a delinquent offense was 14.7 years. Recidivists were significantly younger (14.5 years) than their non-recidivist counterparts (14.8 years) ($p < 0.001$) at the time of their first adjudication. This finding is consistent with the literature on juvenile delinquency, which finds that the likelihood of becoming an adult offender is greater among youth who demonstrate an early onset of criminality, are chronic delinquents, and commit violent offenses [1] [2].

7. Average Age at Commitment

The average (mean) age at commitment for youth in the analysis cohort was 16.3 years. Recidivists were significantly younger (16.2 years) compared to non-recidivists (16.4 years) at the time of commitment ($p = 0.01$). Again, this is consistent with the finding that recidivists begin offending at an earlier age, and thus experience their first commitment at a significantly younger age compared to non-recidivists.

8. Prior Number of Adjudications

Roughly 47% of youth in the analysis cohort had more than two prior adjudications. There was a significantly larger percentage of recidivists with both one (28.9%) and two or more (51.9%) escapes compared to non-recidivists (26.5% and 44.6%, respectively), although the effect size was small ($p < 0.001$, $\Phi = 0.1$). Generally speaking, youth with multiple prior adjudications may possess a tolerance or acceptance for a deviant life course or trajectory, which would be consistent with behaviors associated with recidivism [1].

9. Ethnic Minority

When ethnicity was examined in terms of four categories (Caucasian, Black/African-American, Hispanic, and Other), no significant differences were observed between recidivists and non-recidivists. Significant differences were observed, however, when ethnicity was examined as a dichotomous variable and the above four categories were collapsed into either “minority” or “non-minority” ethnicity. There were more minority youth (57.3%) in the analysis sample than non-minority youth (42.7%), which is consistent with the changing demographics of the Division over the past several years, as well as the over-representation of minorities among incarcerated populations observed on a national level. Among recidivists, there was a larger percentage of minority youth (61.3%) compared to non-recidivist youth (55.6%), a significant difference with a weak effect size ($p = 0.04$, $\Phi = 0.05$).

10. Parole Rating at Discharge

The Parole rating at discharge is the level at which the client manager determines the youth to be in regard to parole compliance (based on pre-determined criteria) at discharge. The goal of the Division is that each youth earns either a Satisfactory or Excellent parole rating at discharge. Unfortunately, some youth ultimately discharge from parole with an Unsatisfactory rating (40.7% in the analysis cohort). An Unsatisfactory parole rating at discharge indicates a high level of non-compliance; however, the Division relinquishes all supervision and authority over youth once the parole sentence has been served and youth are discharged from the Division.

A closer look at the 40.7% revealed that recidivists comprised a larger percentage of youth with an Unsatisfactory rating (54.9%) compared to non-recidivists (34.6%), a significant difference with a small effect size ($p < 0.001$; $\Phi = 0.2$). Similarly, recidivists had a significantly smaller percentage of youth receiving either a Satisfactory or Excellent rating compared to non-recidivists. While 17.7% of non-recidivists received a Satisfactory parole rating, only 16.9% of recidivists received this rating. In addition, 41.8% of non-recidivists received an Excellent parole rating compared to only 24.6% of recidivists.

11. Program at Discharge

It is the Division's goal to have every youth engaged in either a full- or part-time program at discharge. A youth is considered to have a program in place at discharge if they are either employed, enrolled in school or vocational training, performing community service, parenting, or have other consistent responsibilities in place. Almost three-quarters of the youth in the analysis cohort had either a full- or part-time program in place at discharge (73.2%). A smaller percentage of recidivists had either a full-time (56.3%) or part-time (10.5%) compared to non-recidivists (64.8% and 11.2%, respectively), a significant difference with a small effect size ($p = 0.01$, $\Phi = 0.1$). Similarly, a larger percentage of recidivists had no program in place (33.3%) compared to non-recidivists (24.1%).

12. CJRA Overall Risk Level at Discharge

Slightly more than two thirds (67%) of all youth in the analysis cohort scored as High risk to recidivate on the Colorado Juvenile Risk Assessment (CJRA) administered at discharge. Recidivists represented a larger percent of youth scoring High risk compared to non-recidivists. More than three quarters (76.7%) of recidivists scored as High risk on the discharge CJRA compared to 62.8% of non-recidivists, and represented a smaller percentage of youth scoring as either Moderate or Low risk to recidivate compared to non-recidivists, a significant difference with a small effect size ($p < 0.001$; $\Phi = 0.14$).

13. Secure Need Factors

Most youth in the analysis cohort had at least one secure need factor (81.6%). Secure need factors refer to certain youth characteristics identified during assessment that indicate a need for placement in a secure facility. Specifically, these secure need factors include scoring in the secure need range on the

Commitment Classification Instrument administered during assessment, having a special sentence, having more than one recommitment, having a history of more than two out-of-home placements, and having a history of one or more escapes. There were a larger percentage of recidivists with one (38.3%), two (34.2%), and more than two (14.4%) secure need factors compared to their non-recidivist counterparts (37.3%, 29.1%, and 13%, respectively), and a smaller percentage of recidivists with zero (13.2%) secure need factors compared to non-recidivists (20.6%). These differences were statistically significant, but had a weak effect size ($p = 0.01$; $\Phi = 0.09$).

Step 2: Logistic Regression Analysis

Which Characteristics were MOST predictive of Recidivism?

Logistic regression analysis is a statistical modeling technique that seeks to quantify the degree to which two groups are different based on the characteristics identified during the initial descriptive analysis (step 1). While the initial analysis examined whether or not a significant difference exists between those characteristics of youth who recidivate and youth who do not recidivate, the analysis that follows attempts to demonstrate the strength of the observed differences. The results of the logistic regression estimate the probability of an event (being a recidivist) occurring, and can be interpreted as the odds of a youth in the population being a recidivist based on the variables present in the model. In addition, logistic regression allows for a test of the overall fit of the model. In other words, logistic regression can also provide a description of how well the variables included in the model predict whether individuals are recidivists or not.

A binomial logistic regression model was fit for the variables found to be predictive of recidivism in the descriptive analysis (step 1) in an effort to determine which youth characteristics had the most influence on recidivism when all other differential variables were considered. The results of this type of analysis are interpreted in terms of probability using an odds ratio. The greater the odds ratio, the more likely an individual with a particular characteristic is to be a recidivist when taking into account other possible factors. Conversely, the smaller the odds ratio, the less likely an individual with a particular characteristic is to be a recidivist.

Summary of the Logistic Regression

Which Characteristics Were MOST Predictive of Recidivism (Presented as Odds Ratios)?

There were 1,477 youth in the analysis cohort, with 444 re-offending within the one-year follow-up period (30.1%). A binomial logistic regression model was created that included each of the 13 individual-level characteristics found to be significant among recidivists described in the previous

section: gender, age at discharge, length of prior detentions, region, number of escapes during commitment, age at first adjudication, age at first commitment, number of prior adjudications, ethnic minority status, parole rating at discharge, program at discharge, CJRA overall risk level at discharge, and number of secure needs factors^{iii,iv}. The model sought to further examine the relationship between these variables and being a recidivist, with the goal of developing a formula for making predictions about recidivism based on the observed values of the independent variables. In this model, 7 of the 13 variables (gender, age at discharge, length of prior detentions, region, number of prior adjudications, parole rating at discharge, and CJRA overall risk level) were found to be predictive of recidivism (see Table 3). The significant findings are reported in the pages that follow.

Table 3: Characteristics Predictive of Recidivism (Presented as Odds Ratios)

Characteristics Predictive of Recidivism		
	Recidivists	Odds Ratio*
Gender	Male	2.14
Age at Discharge	Younger at Discharge	1.26
Length of Prior Detentions	Longer Length of Stays	1.01
Region	Southern Region	1.42
Number of Prior Adjudications	More Prior Adjudications	1.10
Parole Rating at Discharge	Unsatisfactory	2.30
CJRA Overall Risk Level at Discharge	High Risk	1.50

*The odds ratio represents the odds that an outcome (being a recidivist) will occur given the presence of certain characteristics.

GENDER

In the analysis cohort, the odds of being a recidivist were 2.14 times greater for males compared to females. This finding is consistent with national studies which have repeatedly indicated that males are more at risk for delinquency and criminality than are females, controlling for all other variables [3] [4].^v

ⁱⁱⁱ There were a total of 13 studentized residuals with values greater than 2 standard deviations kept in the analysis.

^{iv} Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell procedure. A Bonferroni correction was applied using all 19 terms in the model resulting in statistical significance being accepted when $p < .00263$. Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable.

^v Males: OR = 2.14, 95% Confidence Interval (CI): 1.4-3.2, $p < 0.001$

AGE AT DISCHARGE

Youth who were younger at discharge had greater odds of being a recidivist compared to youth who were older at discharge, controlling for all other variables. For every one year reduction in age at discharge, the odds of being a recidivist were 1.26 times greater for youth in the analysis cohort^{vi}.

LENGTH OF PRIOR DETENTIONS

In general, youth with longer detention length of stays (LOS) had greater odds of being a recidivist compared to youth with shorter detention LOS^{vii}. For every one day increase in detention LOS, the odds of being a recidivist were 1.01 times greater for youth in the analysis cohort^{vii}, holding all other variables constant. The length of detention may be an indicator of a more serious offense or of youth with multiple detention stays within the time period of interest.

REGION

In order to evaluate how region affected the probability of being a recidivist, the data were re-coded with the most populous region, the Central Region in this case, as a reference category. Thus, each additional region was compared to the Central Region in the analyses. For youth from the Southern Region, the odds of being a recidivist were 1.42 times those of youth in the Central Region when controlling for all other variables. Although there were observed differences in the number and percent of recidivists in the remaining regions, the odds of being a recidivist were not statistically significant compared to the Central Region^{viii}.

NUMBER OF PRIOR ADJUDICATIONS

Youth with a larger number of prior adjudications had increased odds of being a recidivist compared to youth with a smaller number of prior adjudications. For every additional prior adjudication, the odds of being a recidivist is increased by a factor of 1.1 holding all other variables constant^{ix}

PAROLE RATING AT DISCHARGE

As is consistent with the results of prior analyses, youth who discharged with either an Unsatisfactory or Satisfactory parole rating at discharge had greater odds of being a recidivist compared to youth with an Excellent parole rating at discharge. For youth who discharged with an Unsatisfactory rating, the odds of being a recidivist were 2.3 times greater compared to youth who discharged with an Excellent parole rating at discharge, when controlling for all other variables. The odds of being a recidivist for youth

^{vi} Age at discharge: OR = 1.26, 95% CI: 1.1-1.46, $p = 0.002$

^{vii} Detention LOS: OR = 1.01, 95% CI: 1.0-1.1, $p = 0.03$

^{viii} Southern region: OR = 1.42, 95% CI: 1.0-2.0, $p = 0.04$

^{ix} Number of prior adjudications: OR = 1.1, 95% CI: 1.0-1.2, $p = 0.04$

who discharged with a Satisfactory parole rating were not significantly different compared to youth with an Excellent parole rating, although this is likely due to the small number of youth with a Satisfactory parole rating ($n = 253$) compared to either Excellent ($n = 531$) or Unsatisfactory ratings ($n = 597$).^x

CJRA OVERALL RISK (FOR RECIDIVISM) LEVEL AT DISCHARGE

Very few youth scored as Low risk to recidivate on the discharge CJRA ($n = 87$) compared to youth who scored as High ($n = 921$) or Moderate ($n = 373$). These differences make it difficult to capture an accurate picture of how CJRA risk levels affect the odds of being a recidivist. Youth who scored as High risk for recidivism had 1.5 times the odds of being a recidivist compared to youth who scored as Moderate risk, when controlling for all other variables.^{xi} The number of youth who scored as Low risk to recidivate was too small to generate enough statistical power when compared to the large number of youth who scored as High risk to recidivate.

Which Characteristics Were Non-Predictive?

When controlling for all other variables:

- The number of prior **escapes** was not found to be predictive of recidivism.
- The **age at first adjudication** was not found to be predictive of recidivism.
- The **age at first commitment** was not found to be predictive of recidivism.
- Identifying as an **ethnic minority** was not found to be predictive of recidivism.
- Having a **program in place at discharge** was not found to be predictive of recidivism.
- The **number of secure need factors** was not found to be predictive of recidivism.

A Note on Males vs. Females

Given the number of females ($n = 205$ total, $n = 35$ recidivists) in the analysis cohort, it was not possible to draw meaningful predictive comparisons between male and female recidivists, even after aggregating three years of the one-year post-discharge cohorts into one, larger cohort. In general, descriptive terms, females comprised 14% of the total one-year post-discharge population (males = 86%), and had a recidivism rate of 17% compared to males who had a recidivism rate of 32%.

^x Unsatisfactory parole rating at discharge: OR = 2.3, 95% CI: 1.6-3.3, $p < 0.001$

^{xi} High overall risk to recidivate score on discharge CJRA: OR = 1.5, 95% CI: 1.1-2.0, $p = 0.02$

Step 3: Test of Model Fit

Outcomes of the Test of Model Fit

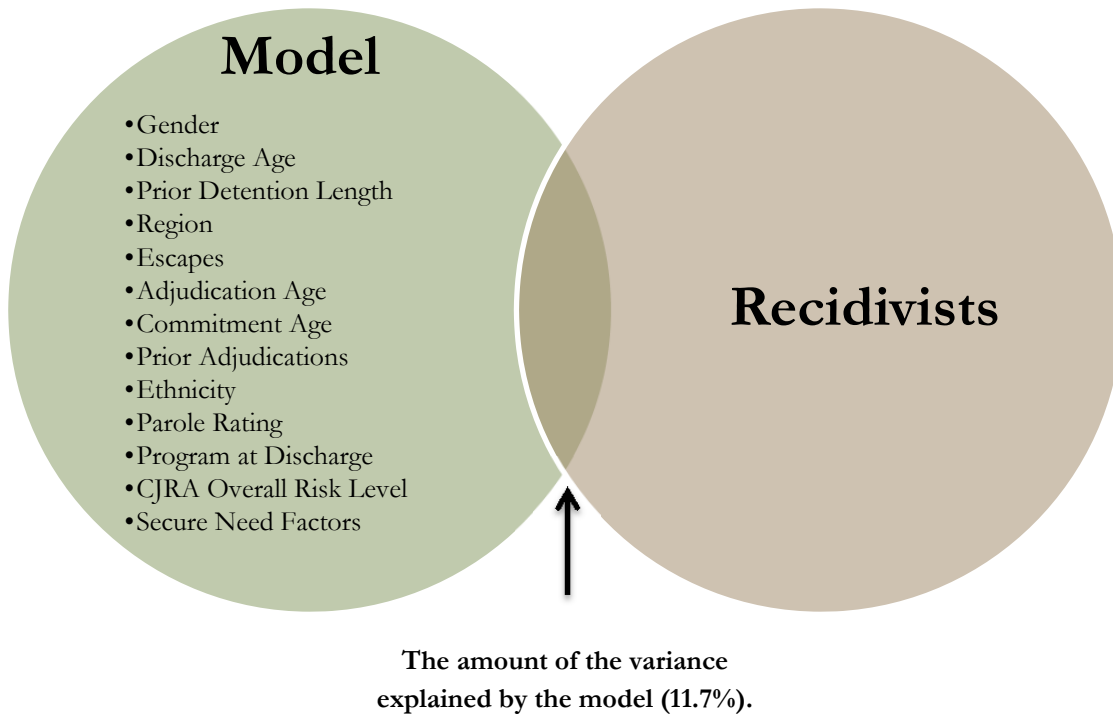
When conducting analyses that investigate the significance of certain characteristics of recidivists, it's equally important to understand how well the model fits, or how well it can predict the dependent variable knowing only the independent variables. In the following analysis, the dependent variable was recidivist status (a dichotomous yes/no), and the independent variables were those identified as having a statistically significant relationship to youth who recidivate. In order to determine how well the model is able to predict recidivism, a binomial linear regression was performed and included all 13 of the variables identified as significant in the original analysis: Gender, Age at Discharge, Length of Prior Detentions, Region, Number of Escapes (Escapes), Age at First Adjudication (Adjudication Age), Age at First Commitment (Commitment Age), Number of Prior Adjudications (Adjudications), Ethnic Minority, Parole Rating at Discharge (Parole Rating), Program at Discharge, CJRA Overall Risk Level at Discharge (Risk), and Number of Secure Need Factors.

The model indicated^{xiii} that the 13 variables found to be significantly associated with greater odds of being a recidivist in the original analysis explain roughly 12% of the variation in the model. Generally speaking, given the small percentage of the variance that is explained by the model, it is clear that there are additional, yet unknown factors that are predictive of recidivism than were included in the model (see Figure 6). In social science research, explaining a relatively small percentage of the variance in a model involving human behavior is both common and not necessarily an indicator of poor model fit [5]. Understanding how well a model explains the variance or “fits” a research question is at the heart of all social science research. Additional research is required in order to better understand and predict recidivism among this population.

For a detailed description of the specific tests of statistical significance and model fit, please see Appendix C.

^{xiii} The pseudo R² for the model (0.117) should be interpreted with caution and only in tandem with the additional tests of overall model fitness with a binomial logistic regression.

Figure 6: Venn Diagram of the Variance Explained by the Model



COLORADO JUVENILE RISK ASSESSMENT (CJRA)

CJRA RESULTS

The Colorado Juvenile Risk Assessment is an actuarial instrument that is utilized by DYS to assist in predicting a youth's risk of recidivism. The CJRA is based on the Washington State Juvenile Court Assessment, which has been shown to be predictive of recidivism in several validation studies, with juvenile probation populations. The CJRA was developed using 12 domains of risk and protective factors and has been shown to be a useful tool to identify psychosocial criminogenic domains susceptible to recidivist tendencies in individual youth [6].

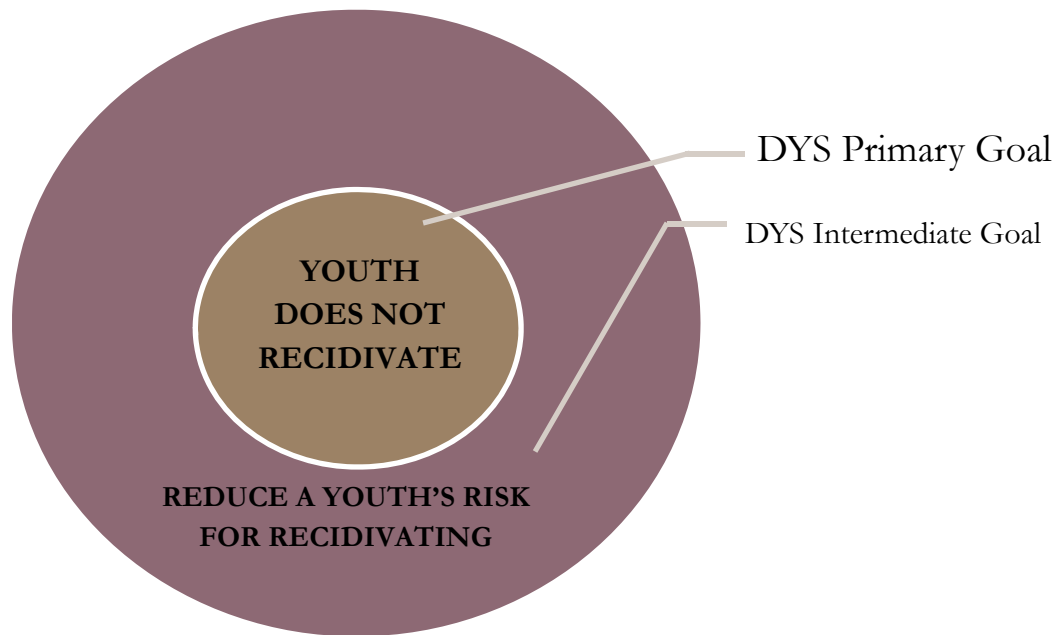
Every youth committed to DYS is assessed for criminogenic risk and protective factors, both from a static and dynamic perspective. Static domains are based on historical data which cannot be improved with treatment (such as gender, criminal history or history of substance abuse). In contrast, dynamic domains are based on a youth's current living and social factors, which can be targeted during commitment with appropriate treatment and services in order to reduce risk (such as attitudes and behaviors).

The CJRA is utilized by DYS to initially assess and periodically re-assess the risk of recidivism for individual youth at specified points in time. For this analysis, the focus has been narrowed to CJRAs administered during assessment and at the time of discharge from DYS. Re-assessment of risk and protective factors at critical junctures during a youth's commitment and parole sentence allows assessment staff, client managers, and Multi-Disciplinary Teams (MDTs) to accurately gauge a youth's current risk of recidivism, and informs treatment decisions based upon a youth's most current needs. The primary goal of DYS is to decrease recidivism among its youth population by targeting criminogenic risk while increasing protective factors before a youth is discharged from the Division.

For most youth, a final CJRA re-assessment is completed upon discharge. This final risk assessment is called a youth's discharge CJRA. Of the 1,477 youth in the analysis cohort, nearly eighty-eight percent (87.5%; $n = 1,292$) had a valid discharge CJRA. Valid, in this instance, is defined as an assessment that was completed within 90 days of a youth's discharge date.

While each youth is assessed several times throughout his/her commitment to DYS, the last CJRA administered is given the most weight in regard to predicting future recidivism. As the instrument measures a youth's risk for recidivism at a specific point in time, the CJRA completed *closest to discharge* best describes a youth's risk trajectory when s/he is preparing to fully integrate back into the community after completing DYS supervision. Furthermore, research indicates that a youth's most recent risk assessment is the most predictive of future re-offending behavior [7].

Figure 7: DYS Goals for Committed Youth



Risk Reduction from Commitment to Discharge

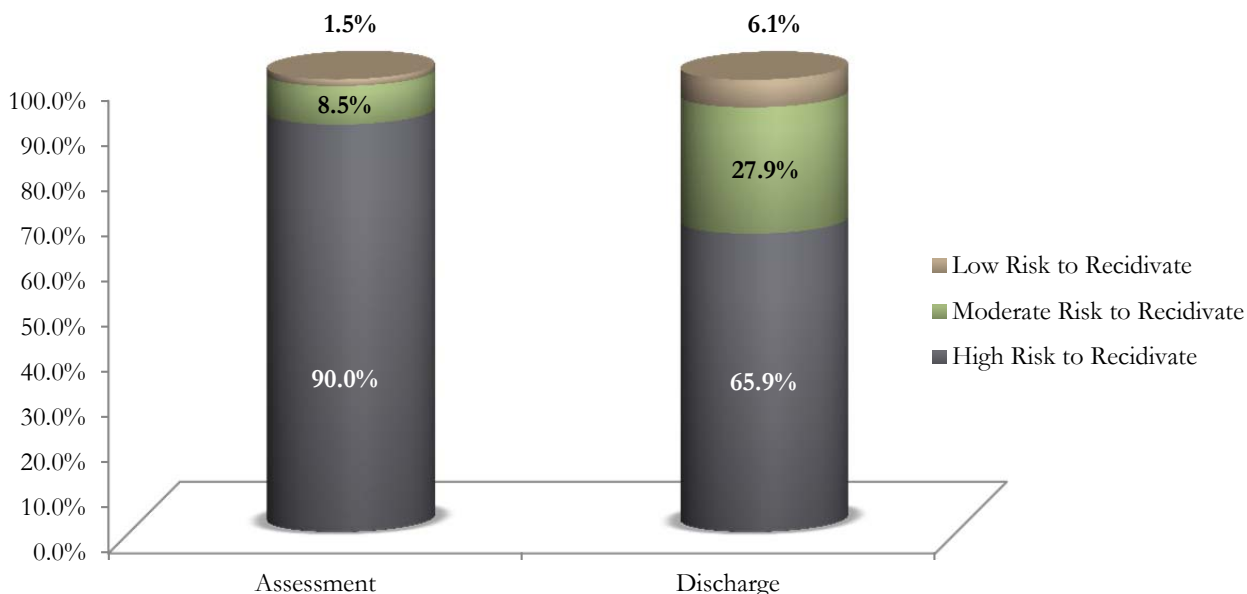
The Division's primary goal is that youth discharged from DYS do not recidivate (see Figure 7). In other words, the Division's primary goal is a lag measure, meaning the outcome is unknown until the one-, two-, and three-year post-discharge follow-up periods have passed for each discharged youth. Although actual recidivism cannot be determined sooner, there is another measure (an intermediate goal) that *can* be measured while a youth is still serving his or her commitment sentence—the youth's *risk* of recidivism. Recidivism risk assessments, like the CJRA, can determine whether a youth's risk of recidivating has been reduced over the course of treatment and services provided during commitment. As adjudicated youth are at increased risk of committing a new offense in the future due to their criminal history, criminogenic risk reduction is critical to overall reductions in recidivism, as criminogenic risk reduction results in a reduction in risk to re-offend [8] [9] [10]. Thus, one of DYS' key intermediate goals is reducing criminogenic risk.

CJRA OVERALL RISK LEVEL

When youth are committed to DYS, the vast majority score as High risk to re-offend in the future. Among the analysis cohort, 90% scored as High risk to recidivate at assessment ($n = 1,163$), and only 10% scored as Low or Moderate risk ($n = 129$) (See Figure 8). When examined at discharge, however, 65.9% of the analysis cohort scored as High risk ($n = 852$), and 34% scored as Low or Moderate risk

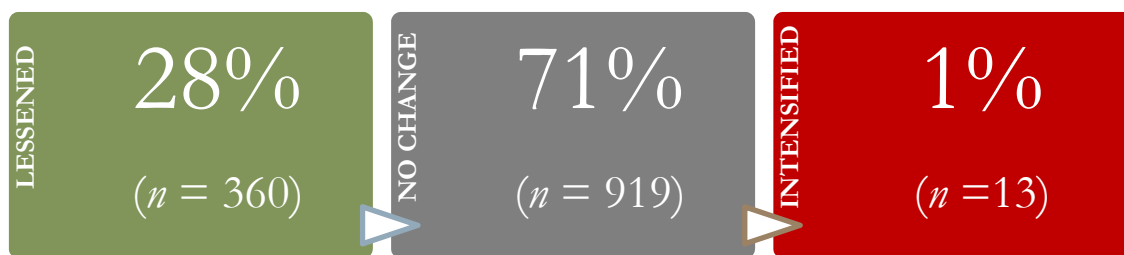
($n = 440$). Only youth with both a valid assessment and discharge CJRA were included in the analysis ($N = 1,292$). The results of the analysis revealed that the analysis cohort demonstrated a statistically significant reduction in recidivism risk (re: CJRA levels) from assessment to discharge after receiving treatment and services from DYS ($\chi^2 = 498.538$, $df = 4$, $p < 0.001$).

Figure 8: CJRA Overall Risk Level Changes from Assessment to Discharge (Analysis Cohort)



The analysis cohort experienced a 26.7% ($n = 311$) reduction in High risk to recidivate scores, and even more dramatic gains in the Moderate (228.2%; $n = 251$) and Low risk (315.8%; $n = 60$) scores. Unfortunately, while the percentage of High risk youth was significantly reduced from commitment to discharge, the majority of youth maintained a High risk score at discharge.

Figure 9: CJRA Overall Risk Level Changes (Lessened, No Change, Intensified) (Analysis Cohort)



For many of these youth who did not have a change in their risk level, their individual score may actually have decreased, but the change was not sufficient to move them to a lower risk level category. When examined further (see Figure 9), a proportion of youth (28%) lessened their risk level from DYS assessment to discharge. This reduction includes those who initially scored as High risk at assessment and then scored as Moderate risk at discharge, those who moved from Moderate to Low risk scores, or even those who moved from High to Low risk scores. The largest percent of youth scored as the same

risk for recidivism at assessment and discharge (71%). In other words, these youth were committed to DYS with a High risk for recidivism, and discharged with the same High risk. Finally, one percent (1%, $n = 13$) of youth in the analysis cohort experienced an intensified risk level of any kind.

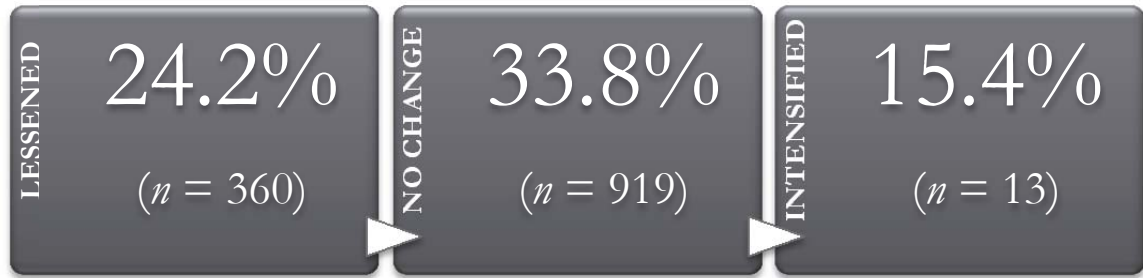
This last finding is significant as it relates to the *Do No Harm* philosophy in corrections. The Division strives to reduce risk among its juvenile population, but is also dedicated to ensuring that lower level offenders are not at an increased risk for recidivism at discharge. As the third box of Figure 9 illustrates, roughly 1% of youth in the one-year cohort ($n = 13$ youth) increased their risk to recidivate between assessment and discharge. Eleven of these youth were assessed as Moderate risk upon commitment to DYS and scored as High risk to recidivate at discharge, while the remaining two youth were assessed as Low risk at assessment and then scored as Moderate risk at discharge. A substantial body of literature points to the iatrogenic effects of incarcerating lower risk youth as well as treating Low risk youth with intensive services [11]. As Social Learning Theory suggests, these lower risk youth may learn anti-social skills from High risk youth that they may not have otherwise been exposed to if not incarcerated [12] [13].

Recidivism Rates by CJRA Overall Risk Level Changes

In general, for those youth with observed decreases in risk level from assessment to discharge, it can be posited that DYS treatment was effective in terms of targeting the risk factors associated with recidivism. In contrast, those youth who did not have a change in risk level may not have responded as positively to treatment. Finally, treatment was perhaps deleterious to those youth who experienced an intensified (or increased) risk level.

The recidivism rate for youth with a lessened risk level confirms that the change in risk level itself can have an effect on recidivism. As shown in Figure 10, youth whose risk score was lessened after DYS treatment and services had a recidivism rate of 24.2% one year after discharge (19.6% lower than the than the average rate of 30.1% for the analysis cohort). Youth with no change in risk score had a slightly higher recidivism rate of 33.8% one year after discharge (higher than the average rate). The 13 youth in the analysis cohort who had an aggravated risk score after being committed to DYS had a recidivism rate of 15.4% one year after discharge, although caution should be used when interpreting outcomes with such a small group. These differences in recidivism rates compared by risk level changes from assessment to discharge were statistically significant ($\chi^2 = 12.817$, $df = 2$, $p = 0.02$). An investigation into the eleven youth with aggravated CJRA risk levels who had not recidivated revealed that four had committed a recidivist act after the one-year post-discharge follow-up period and will be captured in the two-year post-discharge cohort next year, and an additional two had open warrants or cases with pending charges. This is consistent with the Time to Recidivist Offense data presented in Figure 22, where 94% of youth who recidivate do so within 24 months of discharge.

Figure 10: Recidivism Rates by CJRA Overall Risk Level Changes (Analysis Cohort)



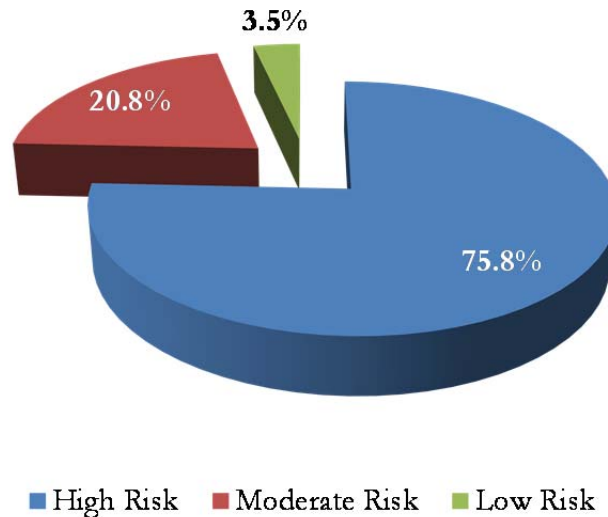
Sensitivity of the CJRA

Human behavior is unpredictable by nature, and thus incredibly difficult to predict with accuracy [14]. The use of actuarial risk assessments provides some insight into the probability that those who possess certain characteristics might re-offend in the future [15]. From a research perspective, the “sensitivity” of an assessment tool is a term used to describe the number of cases that are correctly identified by the tool. In this assessment, the term sensitivity is used to describe the proportion of youth in each cohort who recidivated and also scored High risk to recidivate on the CJRA. If the CJRA is sufficiently sensitive, it should correctly identify a large percentage of youth who eventually recidivate as High risk to recidivate.

As shown in Figure 11, 75.8% of recidivists in the analysis cohort scored as High risk to recidivate on their discharge CJRA. Comparatively, fewer than 4% of youth who scored as Low risk on the discharge CJRA committed a recidivist act. These findings indicate that the CJRA is sensitive enough to correctly identify nearly eighty percent of youth who recidivate.

Figure 11: CJRA Discharge Overall Risk Levels for Recidivists (Analysis Cohort)

Recidivist Discharge CJRA Risk Scores



Positive Predictive Value of the CJRA

Within the context of this study, the positive predictive value of the CJRA is defined as the proportion of youth who score as High risk who actually go on to recidivate. If the CJRA is accurately assessing youth who are at the highest risk of recidivating, one would expect to see a large proportion of youth with High risk scores eventually recidivate. As shown in Table 4, among the population of youth who scored as High risk to recidivate, 35.6% ($n = 303$) had recidivated within one year (18.3% higher than the analysis cohort recidivism rate). Among those youth who scored as Moderate risk to recidivate, 23% ($n = 83$) had recidivated within one year (23.6% lower than the analysis cohort recidivism rate), and 17.7% of youth who scored as Low risk to recidivate ($n = 14$) had recidivated within one year (41.2% lower than the analysis cohort recidivism rate). In short, we are seeing a higher rate of recidivism among youth who scored High risk to recidivate compared to youth with Moderate or Low risk scores in each cohort, and the differences are statistically significant ($\chi^2 = 25.648$; $p < 0.001$; Phi = .14). Generally speaking, the observed higher rate of recidivism among High risk youth indicates that the CJRA is internally valid and is measuring what it is intended to measure: youth who are at greater risk to recidivate in the future. In addition, the CJRA also appears to be externally valid in that it is possible to use the risk scores generated to assist in predicting future recidivism among the Division's youth population (i.e., predictive validity)

Table 4: Recidivism Rates by Discharge CJRA Risk Level (Analysis Cohort)

Recidivism Rate		
	Analysis Cohort*	
	Recidivists	
Discharge CJRA Risk Level [†]	%	<i>n</i>
High (risk to recidivate)	35.6%	303
Moderate (risk to recidivate)	23.0%	83
Low (risk to recidivate)	17.7%	14
Total recidivism rate for youth with valid CJRAs	32.4%	400

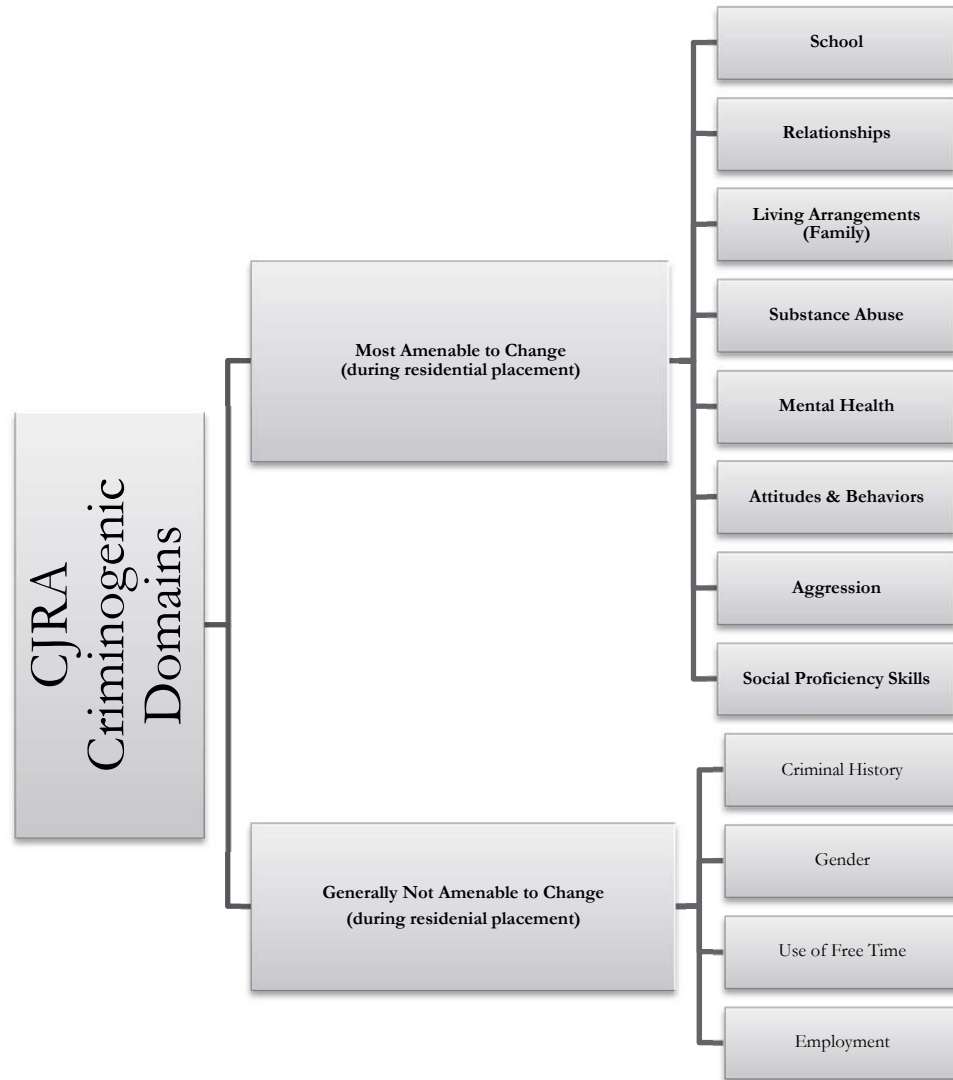
* $p < .001$ (indicates a statistically significant difference).

[†]Only youth with a valid discharge CJRA are included in this analysis (valid = within 90 days of discharge and a completed assessment).

DOMAIN RISK LEVEL

The prior section focused on the CJRA overall risk level (i.e.: Low, Moderate, High), while the current section will focus on those criminogenic domains within the CJRA on which the most youth frequently score as being High risk. In an effort to reduce the overall likelihood of re-offending, youth committed to DYS have treatment plans developed to specifically address their individual criminogenic needs. The CJRA is rooted in the following 12 criminogenic domains presented in Figure 12:

Figure 12: Colorado Juvenile Risk Assessment Domains



Of the twelve CJRA domains, DYS focuses treatment plans on the eight domains that are most amenable to change during a youth’s commitment sentence (School, Relationships, Living Arrangements (Family), Substance Abuse, Mental Health, Attitudes & Behaviors, Aggression, and Social Proficiency Skills). These eight dynamic domains are pertinent to this analysis as they are the only domains where change can be influenced and measured with consistency through treatment and services. The remaining four domains are generally not amenable to change. Criminal History and Gender are static and cannot be changed. Use of Free Time and Employment are generally not amenable to change while youth are in secure residential placement, but may become so during parole or post-discharge.

REDUCTIONS IN RISK FACTORS OVER TIME

The analysis in this section focuses on calculated CJRA risk scores at the time of discharge. On average, more than three quarters of the youth in the analysis cohort were committed to DYS and assessed as being High risk on four of the eight domains. At time of discharge, this average decreases to fewer than half scoring High risk on these same four domains (see Figure 13).

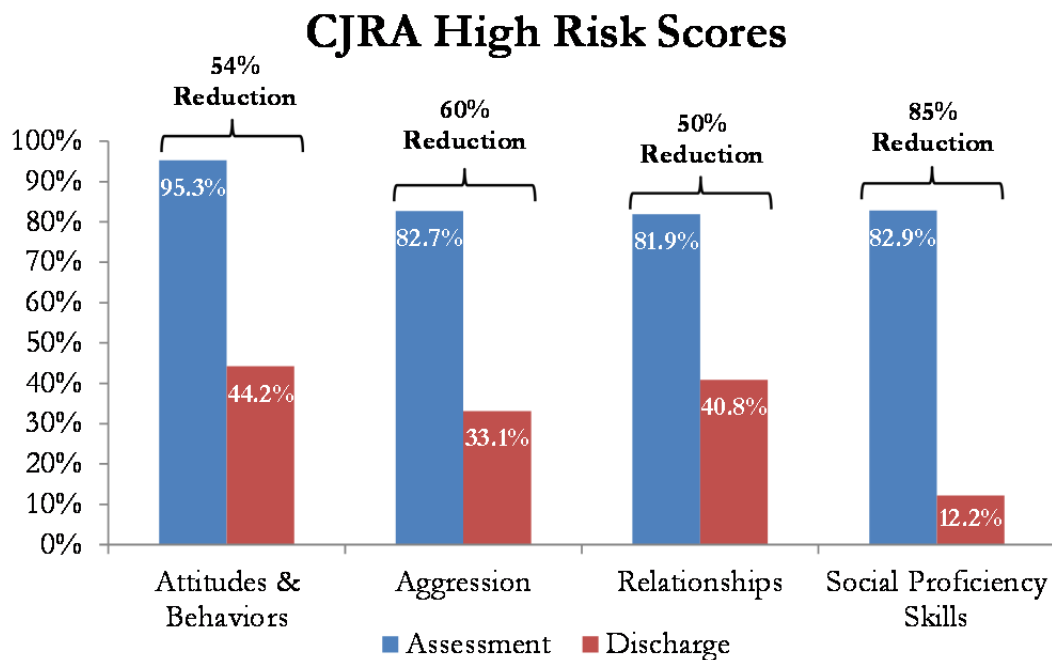
Assessment CJRA

On the assessment CJRA, the most frequent High risk domains included Attitudes & Behaviors (95.3% scored as High risk), Aggression (82.7% scored as High risk), Relationships (81.9%) and Social Proficiency Skills (82.9% scored as High risk).

Discharge CJRA

On the discharge CJRA assessment, the most frequent High risk domains were Attitudes & Behaviors (44.2% scored as High risk); Relationships (40.8% scored as High risk); and Aggression (33.1% scored as High risk). See Figure 13 for details.

Figure 13: Percentage of Youth Who Scored High Risk on Both Assessment & Discharge CJRAs, by Most Frequent High Risk Domain

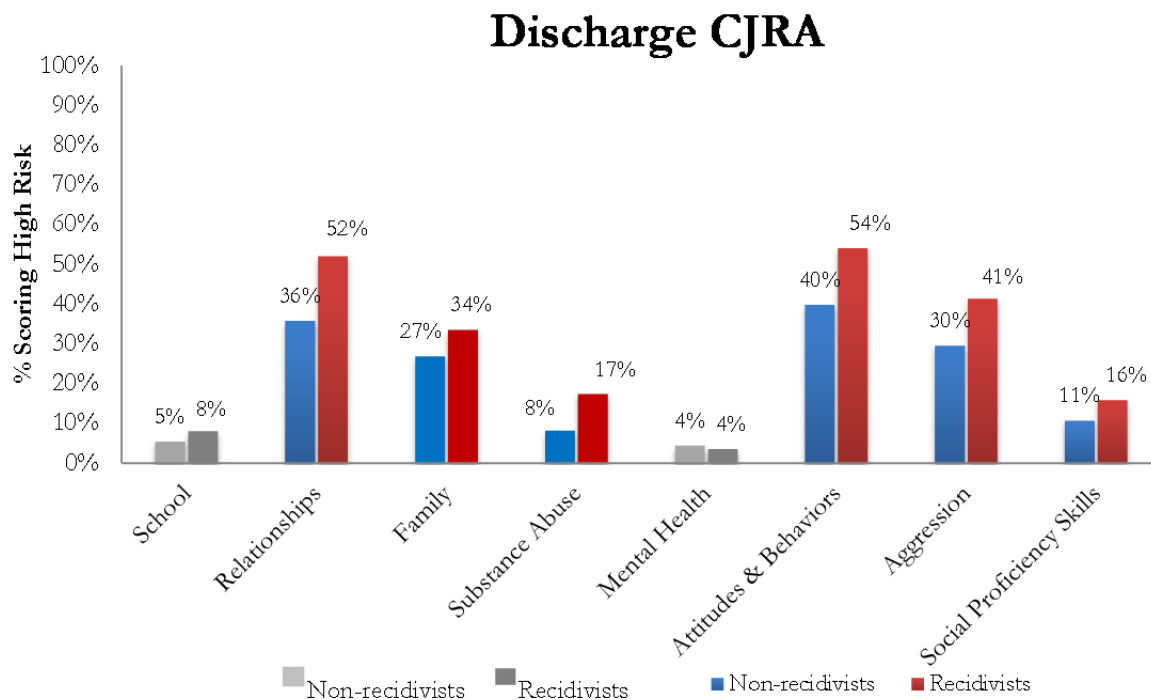


CJRA DOMAIN RISK FOR NON-RECIDIVISTS VS RECIDIVISTS

This section of the analysis will focus on the relationship between individual criminogenic risk factors (i.e. CJRA domains) and rates of recidivism for youth who scored High vs. Not High risk (Low or Moderate risk) on each domain. For each domain, the percentage of recidivists who scored High risk was compared to the percentage of non-recidivists who were High risk, with the goal of determining if certain domains were more characteristic of future recidivism over the course of commitment. The shading in Figure 14 is intended to help demonstrate which domains were statistically significant. Only the domains that demonstrated a statistically significant difference between the percentage of non-recidivists and recidivists who scored High risk in that domain appear in color.^{xiii}

Discharge CJRA

Figure 14: Percentage of Non-Recidivists vs. Recidivists Who Scored High Risk on the Discharge CJRA, by Domain



^{xiii} As the CJRA administered closest to discharge (e.g.: the discharge CJRA) is considered to be the most valid for predicting who is at the greatest risk for recidivating, the analysis was limited to between groups differences in the risk scores on this discharge CJRA.

On the discharge CJRA, Figure 14 shows the percentage of non-recidivists who scored High risk in each CJRA domain versus the percentage of recidivists who scored High risk in each CJRA domain. It is informative to identify those domains on which youth scored High risk at discharge as well as the demographics of those who ultimately went on to recidivate. These differences help to decode some of the reasons for subsequent criminogenic behavior within the population. A larger percentage of recidivists scored as High risk for recidivism on seven of the eight CJRA domains, with Mental Health being the only domain in which a larger percentage of non-recidivists (4.4%) scored as High risk compared to recidivists (3.5%).

Relationships

It is important to remember that the discharge CJRA happens after a youth has been on parole in the community for at least six months. This allows time for youth to regress to associating with anti-social peers and social networks, which can influence the percentage of youth who score High risk on this domain at discharge. Peer group influence is perhaps at its strongest during the teenage years when adolescents are seeking to define themselves, and the Relationships domain is an indicator of the degree to which a youth's relationships place him/her at risk for recidivism. On the discharge CJRA, 52% of youth who ultimately went on to recidivate scored High risk on the Relationships domain compared to 36% of those who did not recidivate ($\chi^2 = 30.148$, $df = 1$, $p < 0.001$) [16].

Family

Having prosocial family members who are both present and engaged in a youth's transition back to the community and beyond is critical to a youth's future success. Conversely, family disorganization, family members who have attitudes that are tolerant toward crime and delinquency, who use illicit substances or abuse legal substances, are abusive, or who are otherwise inconsistently or negatively involved in a youth's life are real risk factors for future criminality. On the discharge CJRA, 33.5% of youth who eventually went on to recidivate scored High risk on the Family domain compared to 26.8% of youth who did not recidivate ($\chi^2 = 6.048$, $df = 1$, $p = 0.01$) [16] [17].

Substance Abuse

Substance abuse is a pervasive problem, particularly among juvenile populations, and among those with an early onset of alcohol, tobacco, or other drug use. The Alcohol and Drugs domain of the discharge CJRA measures current substance use as a risk factor for recidivism. When youth are committed to DYS, it is expected that youth do not have access to illicit substances or to substance using peers. Thus, given the threat of being caught violating this expectation and receiving a sanctions and/or modified treatment plans, one would expect the current Alcohol and Drug use reported on the discharge CJRA to be quite low while youth remain under DYS supervision. Conversely, once a youth has discharged and no longer faces the same consequences for substance use, it would not be surprising for youth with a history of substance abuse to re-engage in substance use behavior with peers. On the discharge CJRA, 17.3% of youth who ultimately went on to recidivate scored as High risk on the Alcohol and Drugs

domain, compared to 8.2% of those who did not recidivate ($x^2 = 23.203$, $df = 1$, $p < 0.001$) [18] [19] [20].

Attitudes and Behaviors

The same concepts described for the Relationships and Family domains are true for the Attitudes and Behaviors domain. Many youth relapse back into formerly established behaviors when they re-enter their homes, neighborhoods, and are surrounded by members of their community. Often times a youth returning home will be confronted with the same anti-social behaviors or attitudes that are tolerant of crime or delinquency that they espoused prior to commitment. Unfortunately, at this stage in the youth's commitment many of the therapeutic advances made while in residential placement are in jeopardy of being reduced. On the discharge CJRA, 54% of youth who ultimately went on to recidivate scored High risk on the Attitudes and Behaviors domain compared to 39.8% of those who did not recidivate ($x^2 = 22.584$, $df = 1$, $p < 0.001$).

Aggression

On the discharge CJRA, 41.3% of youth who ultimately went on to recidivate scored High risk on the Aggression domain compared to 29.5% of those who did not ultimately recidivate ($x^2 = 17.257$, $df = 1$, $p < 0.001$). It has long been established that incarcerated offenders tend score higher on assessments of aggression than the general population. Youth who are committed to DYS have typically experienced an array of aggression and complex trauma in their lives, whether it was perpetrated or witnessed in their neighborhoods, schools, or even at home. Past experiences with violence and complex trauma can lead to aggressive reactions to stress or other confrontations [19].

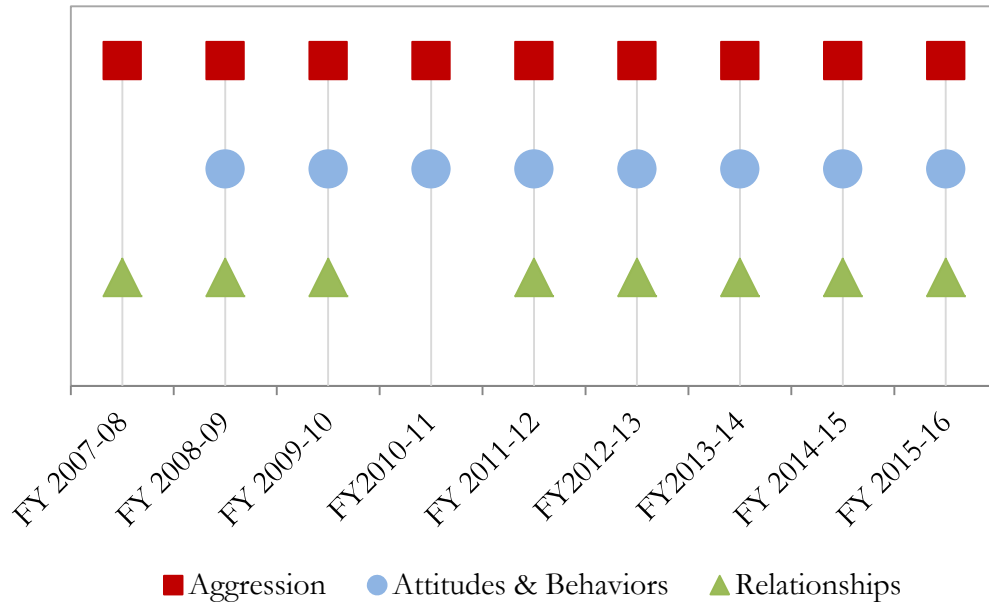
Social Proficiency Skills

The possession of certain social proficiency or "life skills" can have a significant protective effect on juveniles, while a deficit in this area can place a juvenile at greater risk for violence, delinquency, and substance abuse. Youth without a depth of social proficiency skills may be more prone to being isolated by their peers, lack self-esteem derived from social competency, and may be prone to lashing out in anti-social ways, including violence. On the discharge CJRA, 15.8% of youth who ultimately went on to recidivate scored High risk on the Social Proficiency Skills domain compared to 10.7% of youth who did not ultimately recidivate ($x^2 = 6.691$, $df = 1$, $p = 0.01$).

Consistently Predictive CJRA Domains: Aggression, Attitudes & Behavior, and Relationships

Discharged youth scoring High risk on the CJRA Aggression domain have proven **for nine consecutive years** to be at statistically higher risk of recidivating, while discharged youth scoring High risk on the Attitudes & Behavior and the Relationships domains have proven for eight of nine consecutive years to be at statistically higher risk of recidivating (see Figure 15).

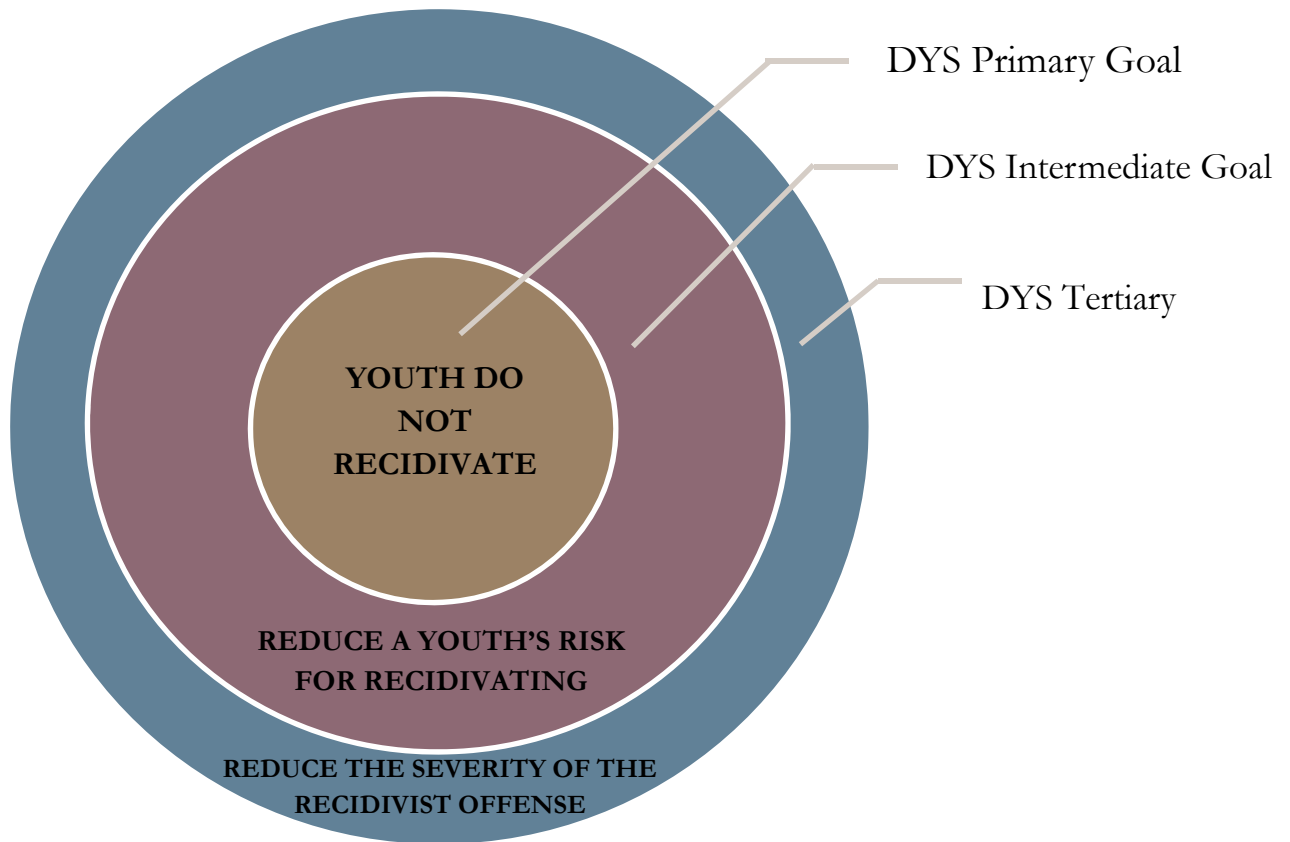
Figure 15: Consistently Predictive CJRA Domains



RISK REDUCTION - OFFENSES

As stated previously, DYS's primary goal is that youth do not go on to recidivate after treatment, while the Division's intermediate goal is to reduce our youth's *risk* of recidivating. Given that a large portion of DYS youth do, in fact, recidivate within three years of discharging, an additional means by which to measure youth progress made while in treatment with DYS was developed. One way to evaluate youth progress is to examine the individual recidivist offense severity in comparison to the DYS committing offense (see Figure 16). Reducing the severity of a recidivist act can be thought of as the Division's tertiary goal. Although it is not ideal, the reality is that for many youth treated at DYS, committing a less severe offense can be considered an achievement.

Figure 16: DYS Goals



OFFENSE SEVERITY

This section of the analysis examines a youth's commitment offense (the offense that resulted in his or her DYS sentence) compared to his/her most serious recidivist offense (the offense after discharge from DYS). Although youth who re-offend still present a threat to the community, this threat can be considered mitigated if their recidivist offense is less severe than their commitment offense.

Severity of Commitment Offenses vs. Recidivist Offenses

The following analysis examined the severity of the offense type for which a youth was committed to DYS (commitment offense) and compares it to the most serious recidivist offense that occurred during the one-year follow-up period (recidivist offense).

Figure 17: Commitment Offense Severity of Recidivists (Analysis Cohort, $N = 444$)

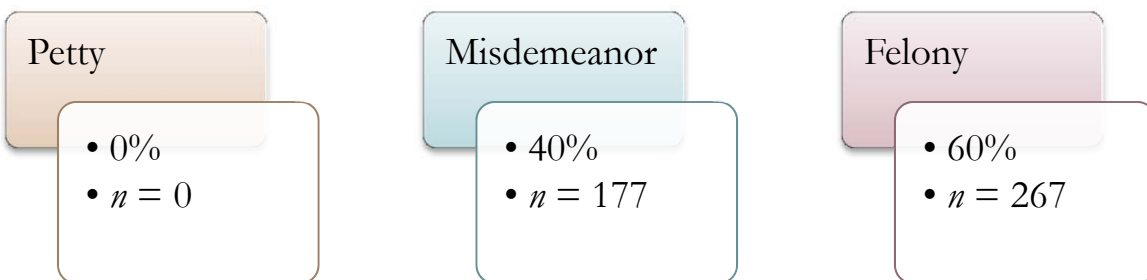
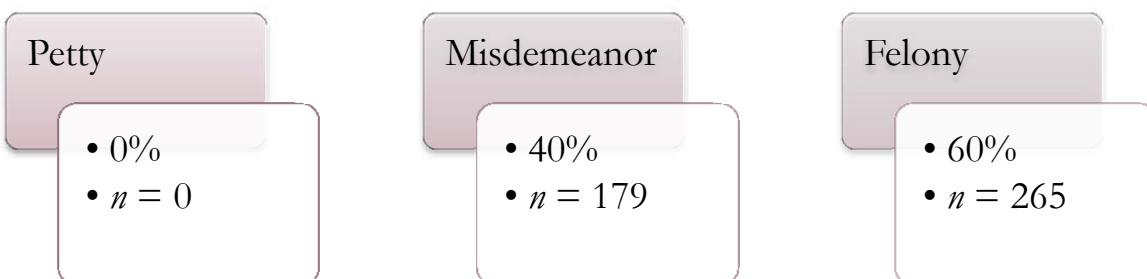


Figure 18: Recidivist Offense Severity (Analysis Cohort, $N = 444$)



Of the 444 clients in the analysis cohort who recidivated during the one-year follow-up time period, the majority were originally sentenced to DYS on felony adjudications (60.1% felony vs. 39.9% misdemeanor) (see Figure 17). The same is true for recidivist offenses; the most common recidivist offense was also a felony (59.7% felony vs. 40.3% misdemeanor) (see Figure 18). In order to truly examine offense severity, however, one also needs to consider the class of felony and misdemeanor for which an individual was adjudicated or convicted. Unfortunately, the available data regarding offense class is not robust enough to examine more closely.

Recidivist Offenses^{xiv}

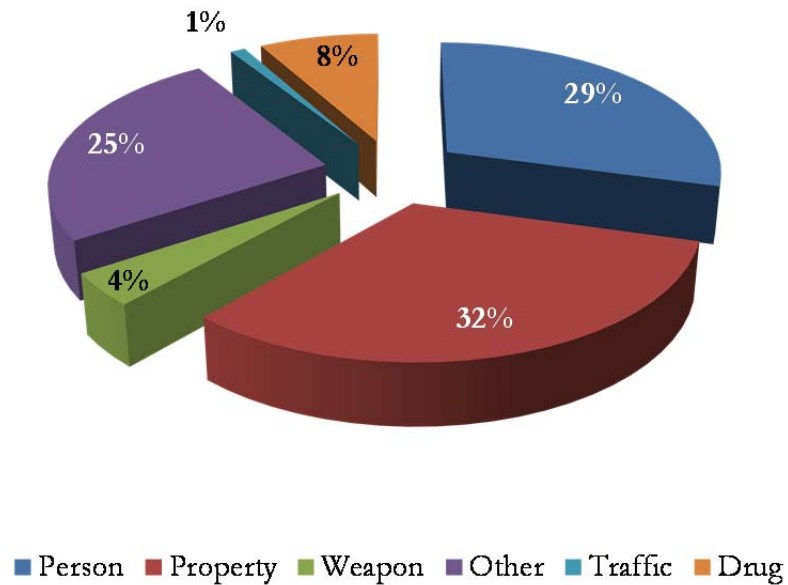
While the previous section delineated between felonies and misdemeanors, the section that follows will provide an analysis of the types of recidivist acts. An analysis was conducted regarding the different types of recidivist offenses perpetrated among the analysis cohort. Specifically, every recidivist offense committed by each of the 444 recidivists in the analysis cohort was examined for type and severity (based on offense class), with only the most serious recidivist act included in the analysis.

There are several different categories into which offenses are classified: person, property, weapon, traffic, drug, and other. Person offenses involve harm to another person and are considered the most severe type of offense. Property offenses involve the theft or destruction of property, while weapon offenses are violations of statutes or regulations that control deadly weapons. Drug offenses can include the manufacture, sale, or possession of specific quantities of illicit substances or prescription medications without a valid prescription. Traffic offenses, not to be confused with traffic violations (e.g.: parking tickets), include things like driving under restraint, driving while ability impaired, and vehicular eluding. Other offenses among the analysis cohort included: accessory to crime, escape, contributing to the delinquency of a minor, impersonation/false reporting, forgery, obstructing a peace officer, obstructing government operations, resisting arrest, failure to register as a sex offender, violating a protection order, identity theft for financial gain, fishing without a license, and violation of a parole order.

Of the 444 recidivists in the analysis cohort, 130 (29%) committed a crime against a person as their most serious recidivist act (see Figure 19). In contrast, the remaining 314 recidivists (70%) did not commit a crime against a person as their most serious recidivist act.

^{xiv} In compliance with C.R.S., 19-2-203(6), previously HB 18-1010, the Department began collecting data on those crimes included in Section 24-4.1-302(1), C.R.S. (Victim Rights Act) after the bill was signed into law on March 7, 2018. Delineations between recidivist crimes that are included in Section 24-4.1-302(1), C.R.S. and other crimes will appear in future reports, after the data has been collected for the three year post-discharge time period specified by law.

Figure 19: Types of Recidivist Offenses



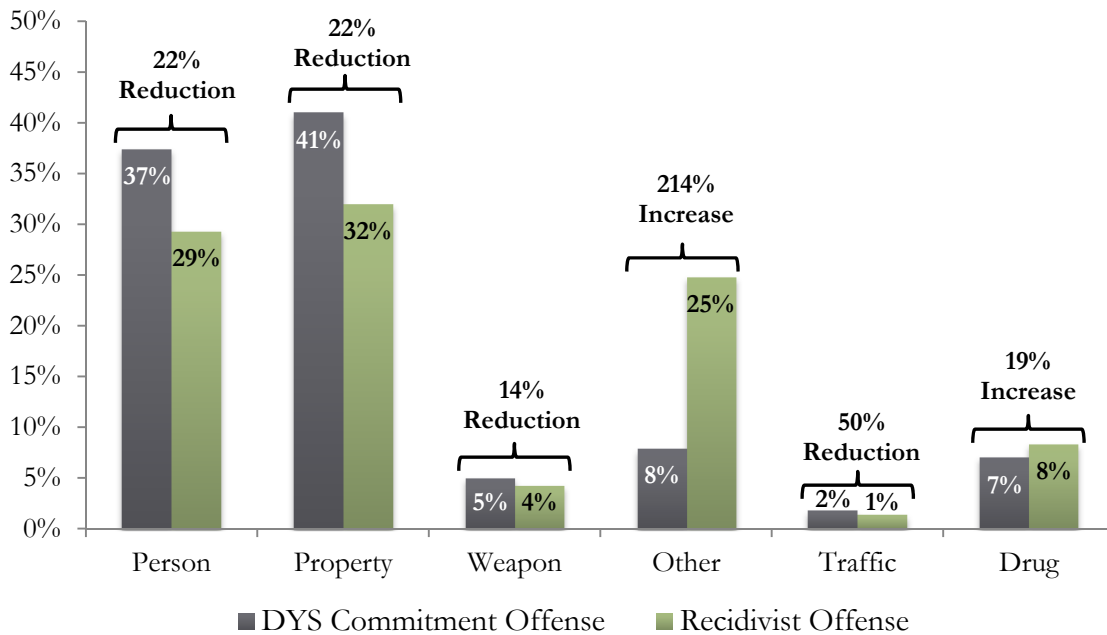
Types of Commitment Offenses vs. Recidivist Offenses

Among recidivists in the analysis cohort, as shown in Figure 20, the most common types of commitment offense were person offenses (37%) and property offenses (41%). Property offenses were the most common DYS commitment offense type.

The most common types of recidivist offenses were also property (32%) and person (29%) offenses. It should be noted that the proportion of recidivist offenses that were of person offenses (29%) was 22% lower than the proportion of DYS commitment offenses that were person offenses (37%). A similar reduction was noted between commitment and recidivist property offenses: 41% of commitment offenses were property offenses, but only 32% of recidivist offenses were property offenses, a 22% reduction. Recidivist offenses classified as other demonstrated a 214% increase from commitment offense to the most serious recidivist act ($n = 35$ and $n = 110$, respectively). Drug offenses experienced a 19% increase from commitment ($n = 31$) to recidivist offense ($n = 37$), but remained a relatively small number of the total recidivist acts (see Figure 20).

For youth who had more than one recidivist offense, the most severe offense was selected for this analysis (as defined by the severity class). In the event a youth had more than one recidivist offense with the same severity class, the first those offenses to occur was selected.

Figure 20: Types of Commitment Offenses vs. Recidivist Offenses

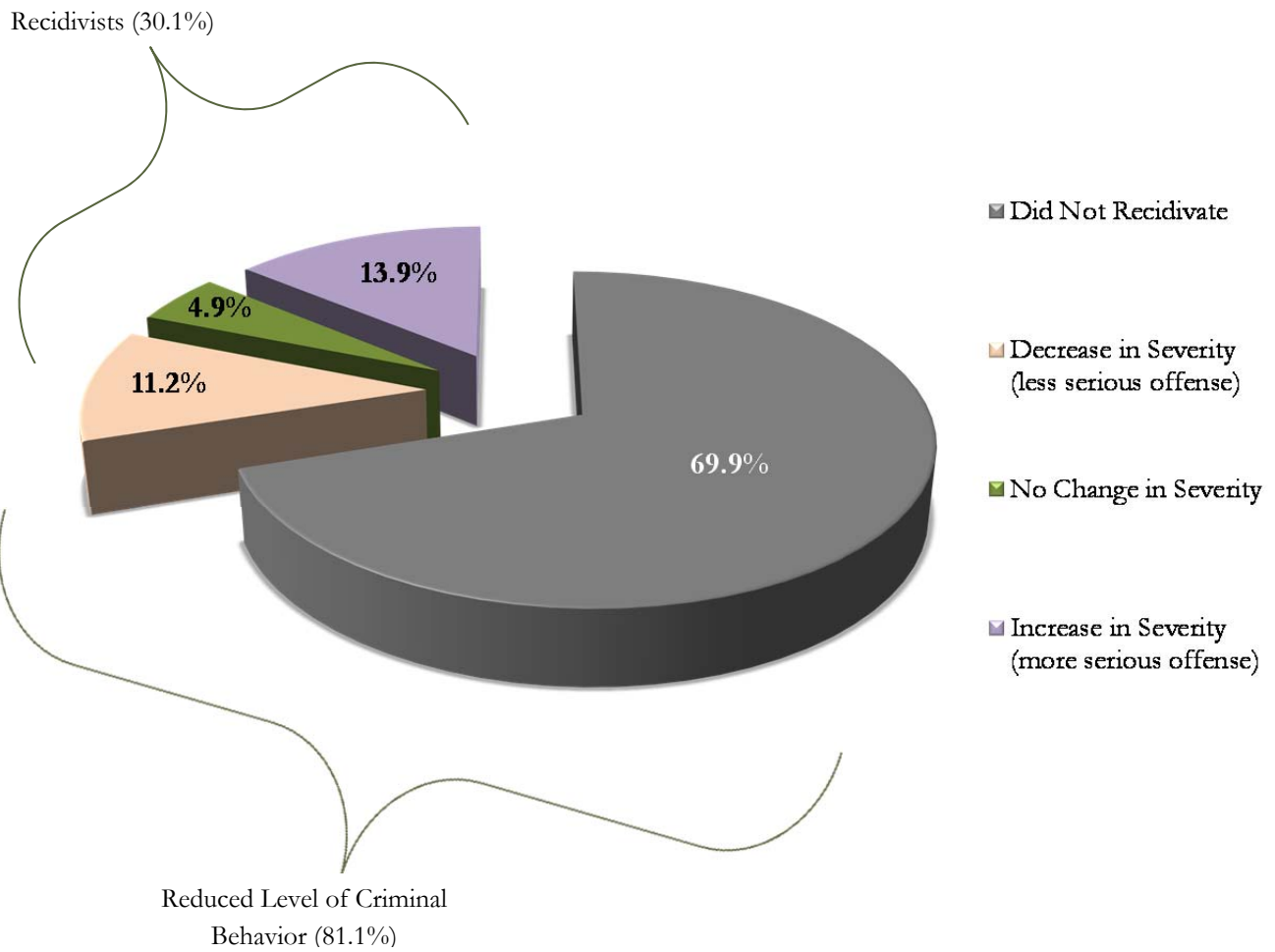


Offense Severity Reduction

As shown in Figure 21, of the 1,477 total discharges, nearly seventy percent (69.9%; $n = 1,033$) did not recidivate in the twelve months following discharge, while the remaining 30.1% ($n = 444$) did recidivate. Five percent (4.9%; $n = 73$) of the analysis cohort re-offended with the same level as the original committing offense. Eleven percent (11.2%; $n = 165$) of youth re-offended with a less serious offense. The remaining fourteen percent exhibited more serious criminal behaviors following discharge (13.9%; $n = 206$).

Viewed from this perspective, the Division was successful in reducing the level of criminal behavior for 81.1% of youth discharged in FYs 2013-14, 2014-15, and 2015-16 (those who did not recidivate or had a decrease in offense severity: 69.9% + 11.2%).

Figure 21: Offense Severity Risk Reduction



NATIONAL COMPARISON

The following section provides a comparison of Colorado’s one-, two-, and three-year post-discharge juvenile recidivism rates to other states with the goal of gaining a better understanding of how the State compares nationally. A 2013 study of how juvenile recidivism is measured and reported in the United States conducted by the Pew Charitable Trusts surveyed executive branch agencies responsible for juvenile state commitment facilities in each of the 50 states and the District of Columbia. This extensive study examined current practices in the data collection, measurement, performance, and reporting of juvenile recidivism data. The results found that individual states utilize very different definitions and methods to study juvenile recidivism, and revealed a need for more policy-relevant data collection and reporting practices [21]. Specifically, approximately one in four states does not regularly collect and report juvenile recidivism data, and fewer than half use measures that provide a comprehensive picture of youth reoffending. In this context, a comprehensive measure of youth reoffending refers to comparing youth to previous cohorts, following youth through adult corrections and probation, and tracking youth beyond the juvenile parole period (e.g.: utilizing a longitudinal research design). Using these terms as defined by the Pew study, Colorado is one of the few states conducting regular research with rigorous data collection, measurement, performance evaluation, and reporting of juvenile recidivism information.

Currently, individual states differ in a number of key factors in terms of defining, measuring, and reporting juvenile recidivism [21]. These differences can complicate between-states comparisons, as outlined in Table 5.

Table 5: Data Collection and Reporting Practices in Juvenile Corrections

Defining Recidivism	
Measures of Reoffending	Number of Agencies¹
Arrest	16
Adjudication or Conviction	28 ²
Commitment (juvenile or adult)	25
Length of Follow-Up	
12 months	21 ²
24 months	15 ²
36 months	19 ²
Follow Offenders into the Adult System	
	30 ²
Measuring Performance	
Compare to the Previous Year Release Cohorts	32 ²
Compare Rates by Offender Risk	21 ²
Reporting	
At Least Annually	33 ²
Results Released to All Three Branches of Government	21 ²

¹Sub-categories are not mutually exclusive

²Indicates methods currently used in Colorado

Methods of National Comparison

This process involved an extensive review of available juvenile recidivism reports which conveyed each state’s juvenile recidivism rates and research methodology. A state was considered ideal for comparison if it met the following conditions: 1) utilized a similar methodology to that of Colorado, 2) had a similar definition of a recidivist act, 3) reported on multiple years of recidivism, and 4) maintained consistency in how recidivism measures were reported in the most recent years. Data from the most recent one-year post-discharge cohort ($n = 445$, discharged in FY 2015-16) were used in the national comparison.

Results of National Comparison

Each state identified as a possibility for comparison varied in its definition of recidivism, the time period used to capture recidivism, and in the overall availability of data on recidivism rates. It is important to acknowledge that for the purposes of this analysis, definitions of recidivism were matched as closely as possible. Each juvenile correctional system, however, may be structured differently or have population-specific considerations which make it unique.

Table 6 represents the six states that were identified as methodologically comparable to Colorado in terms of defining juvenile recidivism. Respective recidivism rates are reported by state in ascending order.

Table 6: National Comparison

States with Comparable Juvenile Recidivism Measures			
State	One-Year Recidivism Rate	Two-Year Recidivism Rate	Three-Year Recidivism Rate
Maryland	16.7%	29.7%	39.0%
Idaho ^{1,2}	30.0%	N/A	N/A
Colorado	31.5%	49.2%	55.2%
District of Columbia ¹	36.0%	N/A	N/A
Maine ³	36.8%	53.8%	N/A
Virginia	41.6%	65.0%	74.2%
Florida ¹	45.0%	N/A	N/A

¹State only tracks youth for a one-year follow-up time period.

²State defines "discharge" as the start of parole; the recidivism measurement period includes parole.

³State analyzes data on youth who were released from a facility *for the first time* during the time period of interest.

When comparing the one-year post-discharge recidivism rates between comparable states, Colorado’s rate (31.5%) appears to reside toward the top of the performance range (16.7% - 45%). The two states with rates lower than Colorado are Maryland (16.7%) and Idaho (30%).

Last year, Colorado had the fourth lowest one-year juvenile recidivism rate (30.9%) after Maryland (19.1%), Idaho (23%) and Maine (26.7%). It is important to note that Idaho currently defines “discharge” as the start of parole, as their juvenile parole services are handled at the county level rather than the Idaho Department of Juvenile Corrections. Thus, youth on parole are considered “discharged” from their agency and currently included in their recidivism data collection process. While this difference in when the one-year post-discharge recidivism follow-up period begins clearly differs from Colorado’s, it was determined that there were sufficient similarities and adequate rigorous design elements to warrant keeping Idaho among the pool of states with similar research methodologies.

Maine had the greatest change in recidivism rates, from reporting a 26.7% rate in FY 2014-15 to reporting a rate of 36.8% in FY 2015-16. Other states reporting recidivism data were mostly consistent in their comparability and had similar ranking order and recidivism rates reported for this year. Data from all other states (not shown in Table 7) were sought out and examined when available, but were ultimately excluded because they either could not be found, did not report a recidivism rate, or due to differences in their definition or measurement of recidivism. For instance, Ohio defines a recidivist

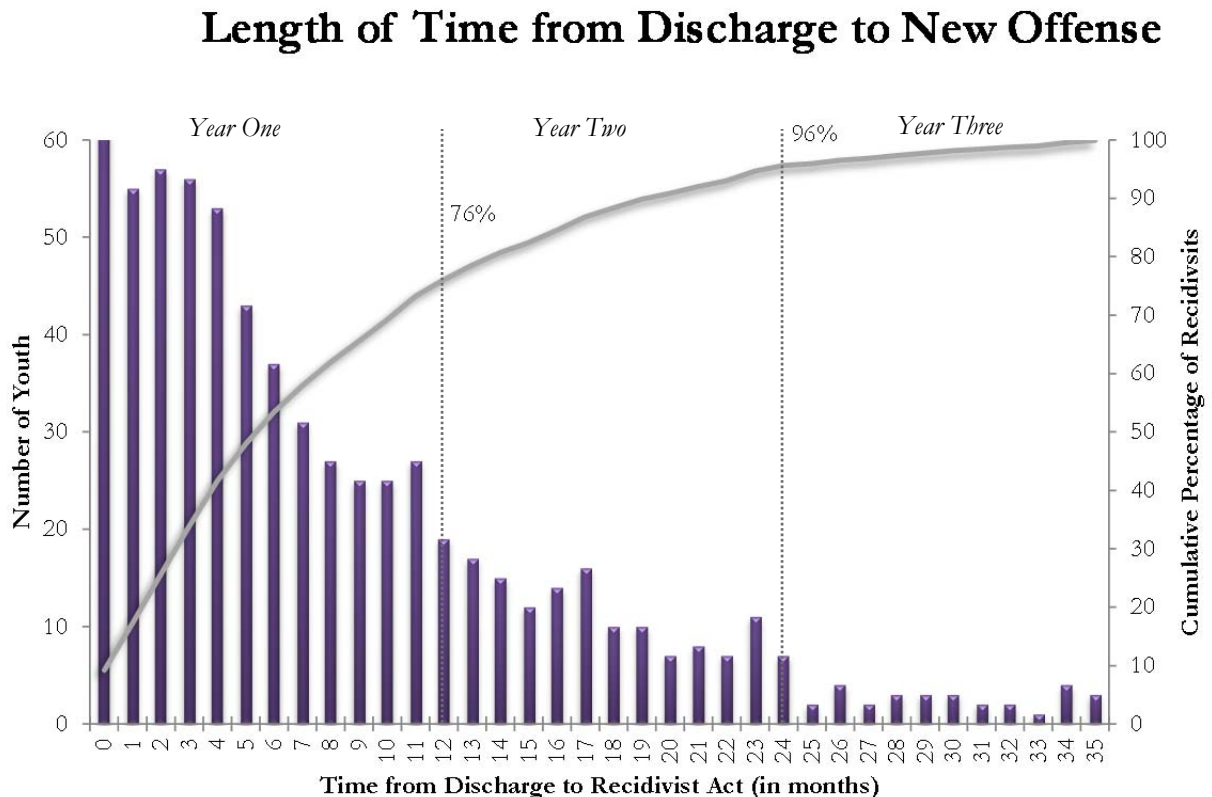
act as “a return to the Department of Youth Services (DYS)” or any juvenile “incarcerated in the adult correctional system.” Using this definition might result in a misinterpretation of the true comparability of this state’s recidivism rate and Colorado’s.

TIME TO RECIDIVIST OFFENSE

TIME TO NEW OFFENSE

Youth from all three discharge cohorts (FY 2013-14, FY 2014-15, and FY 2015-16) were included in the time to new offense analysis ($N = 1,477$). For youth who committed a recidivist act within the prescribed time period ($n = 681$), Figure 22 depicts the points in time when the new offenses occurred. As shown in the histogram, more than three quarters of youth who recidivated did so within the first year after discharge (76%). At two years post-discharge almost all youth who did recidivate had done so (96%). Finally, at three years post-discharge, 100% of youth who recidivated during the follow-up time period had done so. The graph illustrates that as time progresses, fewer and fewer youth commit new offenses. The literature is robust with findings supporting the desistance from criminal activity, or “aging out” of crime and delinquency. Similarly, the age at which a youth discharged from DYS was found to be statistically significant in terms of recidivism, with recidivists being significantly younger than non-recidivists ($p < 0.001$). In the current analysis, only the first recidivist offense was reported among those youth with multiple recidivist offenses.

Figure 22: Time to Recidivist Act



The True Recidivism Rate is Unknown

Recidivism is defined by Colorado's youth services system as a new felony/misdemeanor conviction/adjudication for an offense committed within a specified follow-up time period. Given this definition, recidivism rates are, at best, merely an estimate. The rates reported are as close to the true rate as is currently possible; however, they are still an underestimate. Several challenges exist that reduce the accuracy of these estimates.

1) Denver County Cases Not Included

The Denver County Court System is the only county court system in the State whose data is not captured by the Judicial Department's data system. Thus, adult misdemeanor convictions processed by Denver County Court are not included in this study. Many former DYS youth included in the multi-year follow-up periods were at or over 18 years of age, and thus fall under this "gap" in reported cases. Denver County adult felony convictions are captured in the data collection process because they are processed by the Denver District Court, which is a part of the Judicial Department's data system. Denver Juvenile Court processes juvenile misdemeanor and felony adjudications, therefore all juvenile adjudications from Denver are included in this study.

2) Youth Discharged to the Department of Corrections/Adult Corrections Not Included as Recidivists

For all intents and purposes, youth who are discharged from DYS directly to the adult correctional system would be considered recidivists by most people's standards. Most of these youth are transferred to the Department of Corrections (DOC) because they commit offenses while at DYS (which is captured as pre-discharge recidivism not post-discharge recidivism); however, due to the restrictions of the methodology in the current analysis that defines a recidivist act as occurring within a defined time period post-discharge, the youth who are discharged directly to DOC do not have the same opportunities to commit recidivist acts as do youth who are discharged to the community. The only way a youth who is discharged to DOC can be considered a recidivist, using the current definition, is if he/she is charged with an offense while at an adult correctional facility. This study does capture those offenses as described. This limitation will be experienced by any state defining juvenile recidivism using the same methodology as Colorado.

3) Offenses Committed in Other States Not Captured

This study only uses data from the Colorado Judicial System; therefore, if a youth commits an offense in another state, it remains undetected and is not included in the analysis. While it would be more accurate to include offenses committed in other states, the reality of obtaining highly confidential data from 49 states is simply not feasible.

4) Offenses While on Parole Status are Not Considered Recidivist Offenses

Offenses committed while a youth is on parole status are not considered to be recidivist acts because they did not occur *after the youth fully discharged from the Division*. While a youth is on parole status, he/she remains under the supervision of the Division, and the recidivism clock does not start until all DYS supervision has ended. Offenses committed on parole are considered to be pre-discharge recidivism. Pre-discharge recidivism rates are calculated internally, but are not reported in the current analysis.

5) Time-at-Risk (actual increases)

Time-at-risk increases when follow-up periods are extended (such as the two- and three-year follow-up periods). Increased time-at-risk results in “net widening,” during which more re-offending behavior is detected, and results in increased recidivism rates. For example, in a one-year follow-up period, a youth has 365 days at-risk, or one year’s opportunity to re-offend. Similarly, in a two-year follow-up period, that same youth has twice as much time-at-risk, thus doubling the opportunity to re-offend (730 days). It has been demonstrated that with increased time-at-risk, an increased number of youth recidivate.

6) Judicial Process Delays Erroneously Decrease Recidivism Rates

A recidivist act, as described in the methodology section of this analysis, is determined by a guilty finding leading to a new adjudication or conviction. The Judicial process involved in obtaining a guilty finding includes committing an offense, being arrested, having the offense filed in court, various court proceedings (hearings, trials, etc.) and then being found guilty by the court. This process can take a substantial amount of time, and due to several possible Judicial delays, many filings remain open when the data used to create this report is extracted from the Judicial database. This means that a youth may ultimately be guilty of a new offense but the verdict has not been determined at the time when the data is extracted for analysis. Filing charge findings (i.e., guilty, not guilty) can come days, months, or even years following a filing, particularly among more serious offenses. Youth who had open cases with missing findings during the one-year follow-up period are not considered to be recidivists---as the definition of recidivism is a new adjudication or conviction, and a finding is necessary to determine whether or not a youth recidivated. Although these youth are not captured as recidivists in year one, they will most likely be captured with extended two- and three-year follow-up periods. When data is more complete, more adjudications and convictions are captured, and this in turn increases recidivism rates.

7) Misclassification Bias

Many of the analyses in this report are based on the analysis cohort, or three years of the most recent DYS discharge cohorts combined into one, larger cohort. Naturally, the Division wants to know information on the most recently discharged youth; however, many of the youth who are identified as non-recidivists after one year ultimately do recidivate in the subsequent two or three years. This means that for many of the analyses they are labeled as “non-recidivists” when in fact they will be “recidivists.”

RECOMMENDATIONS

Discharge Assessments

When youth are committed to DYS, they undergo a battery of assessments. These assessments help to formulate the youth's treatment plan while they are committed and serve their parole sentences. It is recommended that the Division also re-assess youth on more of these evaluations so that treatment progress can be measured. Currently, the CJRA is the only re-assessment given at discharge.

Unified Statewide Data Systems

The single largest barrier to in-depth, criminological research surrounding juvenile recidivism in Colorado is the lack of data systems that can “talk” to one another. The current process has been as streamlined and automated as the data allow, but still relies on months of “hand matching” Judicial records to youth in the discharge cohort. Infrastructure that allows for unique identifiers or links between DYS, Judicial, DOC, etc. would greatly assist in the process, allowing for the bulk of time spent producing the report to be focused on the actual analysis rather than on the exhaustive data cleaning and matching process.

Parole Rating at Discharge

The results of many years of analyses, including the current analysis, have pointed to the importance of this rating in predicting future recidivism. While currently the Division's client managers assign this rating to youth upon discharge, if a similar rating system could be implemented earlier in the parole process (perhaps mid-way through parole, or even 60-90 days into parole), youth flagged as “adjusting” unsatisfactorily to the parole period could potentially have certain services bolstered or new services put in place. These additional services or interventions may impact future discharge ratings and ultimately, the likelihood of future offending. In addition, developing a more nuanced measure that delineates the specific areas on which a youth receives an “Unsatisfactory” rating and which resources, programs, treatments, etc. were made available would create insight into potential areas of continued concern for youth discharging from parole (substance abuse, associating with criminally involved peers, etc.).

High Risk on the Aggression, Attitudes & Behavior, and Relationships Domains (CJRA)

Discharged youth scoring High risk on the CJRA Aggression domain have proven **for nine consecutive years** to be at statistically higher risk of recidivating, while discharged youth scoring High risk on the Attitudes & Behavior and the Relationships domains have proven for eight of nine

consecutive years to be at statistically higher risk of recidivating. The Division should strive to provide increased treatment services to those deemed High risk on these domains at Assessment and at time of Parole. While DYS already strives to match aggression-reduction therapy to youth, and work with youth to identify triggers and build appropriate coping skills, this domain (Aggression) has proven to be a consistent red flag for future offending. Similarly, the Division currently works with youth to augment prosocial attitudes, behaviors, and relationships while striving to bolster skills and competencies to mitigate the effects of negative influences and thought processes, given their consistent association with future offending. It is recommended that the Division focus on these treatment need areas and ensure that those youth exhibiting a High risk domain levels are receiving the appropriate treatment, modality, dosage, and frequency of services for these concerns.

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APPENDIX B – Non-Significant Findings

FACTORS TESTED BUT FOUND NOT TO DIFFER STATISTICALLY BETWEEN
 RECIDIVISTS AND NON-RECIDIVISTS (ANALYSIS COHORT)

	Non recidivists		Recidivists		P- value	Total	
	n	%	n	%			
Mean Length of Residential Commitment	19.5 months		19.1 months		0.55		
Mean Length of Parole	6.6 months		6.8 months		0.26		
Mean Number of Prior Out-of-Home Placements	2.06		2.1		0.81		
Primary Race/Ethnicity							
	White	456	44.4%	170	38.7%	0.07	42.7%
	Black/African American	177	17.2%	82	18.7%		17.7%
	Hispanic	359	35.0%	178	40.5%		36.6%
	Other	35	3.4%	9	2.1%		3.0%
DYC Committing Offense Charge							
	Felony	595	57.9%	265	60.4%	0.57	58.7%
	Misdemeanor	431	24.0%	174	39.6%		41.3%
	Petty	1	0.1%	0	0.0%		0.1%
DYC Committing Offense Type							
	Person	448	43.6%	164	37.4%	0.32	41.7%
	Property	386	37.6%	180	41.0%		38.6%
	Drug	55	5.4%	30	6.8%		5.8%
	Weapon	51	5.0%	22	5.0%		5.0%
	Other	77	7.5%	35	8.0%		7.6%
	Status	1	0.1%	0	0.0%		0.1%
	Traffic	9	0.9%	8	1.8%		1.2%
Mental Health							
	No formal mental health intervention required at commitment	466	45.6%	209	47.9%	0.41	46.3%
	Formal mental health intervention required at commitment	556	54.4%	227	52.1%		53.7%
Original Security Level							
	Secure	277	27.0%	109	24.8%	0.21	26.3%
	Staff-Supervised	382	37.2%	185	42.1%		38.7%
	Community	368	35.8%	145	33.0%		35.0%
Sex Offender							
	Not Sex Offender	896	87.2%	398	90.7%	0.63	88.3%
	Sex Offender	131	12.8%	41	9.3%		11.7%

	Non recidivists		Recidivists		<i>P</i> - value	Total
	<i>n</i>	%	<i>n</i>	%		
Discharge Placement						
Home	786	80.5%	316	79.6%	0.55	80.2%
Adult Jail/Adult Corrections	130	13.3%	61	15.4%		13.9%
Group Living	10	1.0%	2	0.5%		0.9%
Escape	5	0.5%	0	0.0%		0.4%
Other	42	4.3%	17	4.3%		4.3%
Data not available	4	0.4%	1	0.3%		0.4%
Prior Number of New Commitments						
None	977	95.1%	416	94.8%	0.34	95.0%
1	48	4.7%	20	4.6%		4.6%
2	2	0.2%	3	0.7%		0.3%

A test of the model without any independent variables included indicated that the model correctly classified 69.2% of youth as recidivists. Generally speaking, this indicates the model’s ability to predict whether or not youth in the population are recidivists using only the most common value in the dependent variable (non-recidivist status, in this case). By first excluding all independent variables in the model, it is then possible to compare a model based on the most common, or average, value of the dependent variable to one that includes those independent variables found to have a significantly relationship with the dependent variable. In this case, after including each of the 13 independent variables in the equation, the model improved slightly and was able to correctly classify 70.8% of youth as recidivists. Although the observed increase in the ability to correctly classify recidivists appears to be small (1.6%), an analysis sample of this size is capable of producing a high level of statistical significance for a relatively small effect size.

An omnibus test of the model coefficients indicated the model was statistically significant, meaning it is significantly better at predicting which youth are recidivists compared to a model without any independent variables and based on chance ($p < 0.001$; see Table 7). In addition, the Hosmer and Lemeshow goodness of fit test was non-significant, indicating that the model was a good fit to the data ($p = .687$). Unlike most statistical tests, a non-significant finding is the desired outcome for the Hosmer and Lemeshow goodness of fit test.

Table 7: Overall Statistical Significance of the Model

Omnibus Tests of Model Coefficients				
		Chi-square	Degrees of Freedom	<i>p</i>
Step 1	Step	119.648	20	0.000
	Block	119.648	20	0.000
	Model	119.648	20	0.000

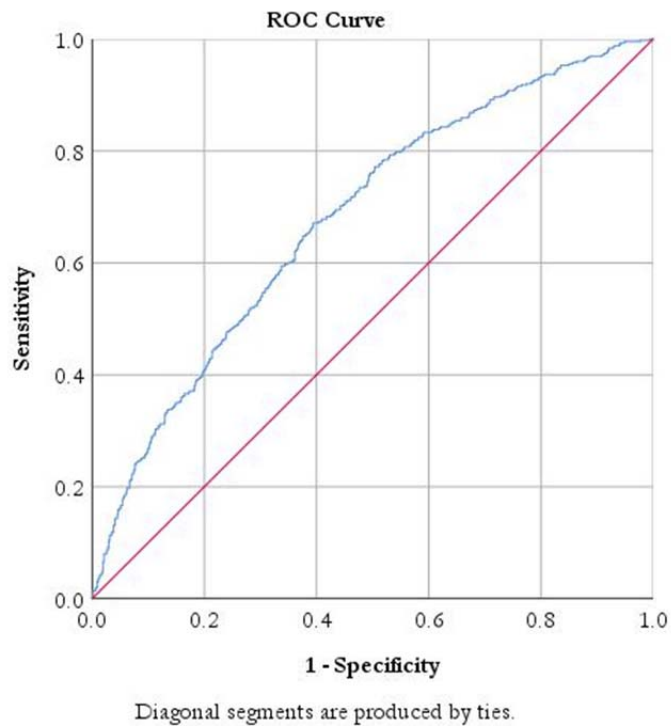
As a test of the overall fit of the model, a Receiver Operating Characteristic (ROC) curve was generated (see Figure 25). The ROC curve is a plot of sensitivity versus one minus specificity and can be used to calculate an overall measure of discrimination. In terms of the analysis, discrimination is thought of as the ability of a binomial logistic regression model to accurately discriminate or recognize those participants with and without the characteristic of interest; in this case: being a recidivist or not. When interpreting the results of the ROC curve, the further the curved blue line extends above the straight red line, the better the model is able to discriminate those with the characteristic of interest. Thus, the area under the curve (AUC) is a visual representation of how well the model is able to discriminate. The AUC can range from 0.5 to 1.0 with higher values representing better discrimination (see Table 8). The

area under the ROC curve was .679 (95% CI, .649 to .709), which is a poor level of discrimination approaching acceptable discrimination according to Hosmer et al. (2013)[22].

Table 8: Area under Curve (AUC) Interpretation

AUC	Classification	Results
0.5	Suggests no discrimination.	
$0.5 < \text{AUC} < 0.7$	Suggests poor discrimination.	AUC = 0.68
$0.7 \leq \text{AUC} < 0.8$	Suggests acceptable discrimination.	
$0.8 \leq \text{AUC} < 0.9$	Suggests excellent discrimination.	
$\text{AUC} \geq 0.9$	Suggests outstanding discrimination.	

Figure 23: ROC Curve



Any questions concerning the data presented in this report may be directed to:

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