JUVENILE PROBATION RECIDIVISM ANALAYSIS

JANUARY 2023

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INTRODUCTION

This report presents findings from a recidivism analysis of youth under supervision of the Sonoma County Probation Department. The report answers three primary analysis questions, via two different methodologies. The respective methodologies and results from these two analyses are shared in this report.

Analysis Questions

1. What is the rate of recidivism for youth on supervision, per the Chief Probation Officers of California (CPOC) Unified Recidivism measure?
2. How do recidivism outcomes vary across different groups (race/ethnicity, gender, supervision type, etc.)?
3. What is the rate of recidivism for youth after supervision ends, what is the amount of time between the end of supervision and the recidivating event, and how does that vary across different groups?

PART I: RECIDIVISM RATES DURING SUPERVISION - CPOC DEFINITION

Methodology

The first analysis leverages the Chief Probation Officers of California (CPOC) Unified Recidivism measure for juvenile adopted by the 58 counties in California: *Of those terminated or closed from a juvenile grant of probation in a given time period, provide a count of how many had new true findings / law convictions during their time under supervision.* Recidivism rates are calculated as follows:

$$\frac{\text{Youth terminated or closed from a juvenile grant of probation}}{\text{Youth with new true findings / law convictions during their time under supervision}}$$

While new cases/referrals are not part of the official CPOC definition for recidivism, we additionally include a separate recidivism rate for new cases/referrals while on supervision in order to consider additional cases, such as those diverted.

This analysis includes youth on **Wardship, DEOJ, Formal Probation or 654.2(A)** informal supervision who **ended supervision between July 1, 2014 and June 30, 2022**. Observation periods are made up of uninterrupted periods of supervision on one of these supervision types. Each uninterrupted period of supervision may be made up of different supervision types on multiple cases. Recidivism events are defined as follows:

- **New cases** are defined as: (1) any new juvenile referral for a new misdemeanor or felony offense, excluding violations of probation, electronic monitoring violations or escapes from an institution, that occurred while on supervision, or (2) any new arrests and booking into the Main Adult Detention Facility (MADF) for a new misdemeanor or felony charge that occurred while the

youth was on supervision. New cases for events occurring while a youth is in custody at Juvenile Hall or MADF are included in the analysis, though these events are rare. New cases originating outside Sonoma County are only included in this analysis if they are transferred to Sonoma County.

- **New adjudications** are defined as any new adult or juvenile cases that occurred during the youth's time on supervision and led to a misdemeanor or felony conviction in the adult system or an adjudication in Juvenile Court, during the supervision period. Note that if an adult conviction on a charge was later expunged, the original conviction will not be captured in the analysis. As above, cases originating outside Sonoma County are only included in this analysis if they are transferred to Sonoma County. Analysis to include recidivism events originating outside Sonoma County is planned for the future.

Descriptive statistics

1,977 distinct periods of supervision among 1,713 unique youth were included in the analysis. A youth is included more than once if they completed more than one period of supervision during the analysis between July 1, 2014 and June 30, 2022. Table 1 below presents the demographics and characteristics of the population included.

Over three-quarters (78%) of youth observations were for males, and the most commonly represented race or ethnicity was Hispanic, representing nearly half (48%), followed by white youth (37%). While there was a broad range of ages at which youth completed supervision, 17 and 18 years were the most common, accounting for 57%. Among supervision endings during the time period, roughly half (49%) ended supervision between FY 14-15 and FY 16-17; FY 20-21 and FY 21-22 had for the fewest number of youth, with just 5% completing supervision in FY 21-22 and 9% in FY 20-21. The most common assessed risk level among youth observed was low risk (40%), followed by high (32%) and moderate (27%).

With respect to supervision type, a large majority of youth observations in the population included wardship supervision (71% when including DJJ parole wardship), followed by 654.2(A) informal supervision (16%). Note that the supervision type reflects the highest, or most restrictive, type of supervision that a youth was on during a continuous period of supervision.[1]

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[1] Note that in this report, recidivism analyses will not be stratified by supervision type. This is a goal but requires further development, and will be forthcoming in a future report.

Table 1. Characteristics of youth observations

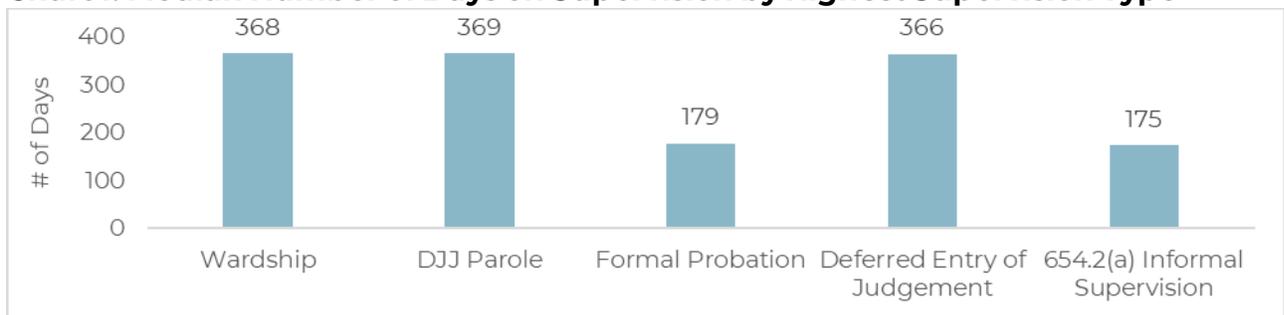| Gender	#	%
Male	1533	78%
Female	444	22%
Race/Ethnicity	**#**	**%**
Hispanic	946	48%
White	743	37%
Black	116	6%
Asian	34	2%
American Indian	30	2%
Native Hawaiian or Other Pacific Islander	24	1%
Multi-Racial	3	<1%
Other/Unknown	81	4%
Age **(at end of supervision)**	**#**	**%**
<14 years old	35	2%
14 years old	110	6%
15 years old	204	10%
16 years old	339	17%
17 years old	535	27%
18 years old	585	29%
≥19 years old	169	9%
Fiscal Year **(at end of supervision)**	**#**	**%**
FY14-15	300	15%
FY15-16	335	17%
FY16-17	332	17%
FY17-18	256	13%
FY18-19	204	10%
FY19-20	265	13%
FY20-21	180	9%
FY21-22	105	5%
Risk Level **(at start of supervision)**	**#**	**%**
Low	788	40%
Moderate	533	27%
High	642	32%
No Assessed Risk Level	14	1%
Supervision Type	**#**	**%**
Wardship	1370	69%
DJJ Parole	44	2%
Formal Probation	155	8%
Deferred Entry of Judgement	99	5%
654.2(A) Informal Supervision	309	16%
TOTAL	**1,977**	**100%**

Limitations exist in the collection and reporting of demographic data, particularly with respect to race/ethnicity and gender. With respect to gender, only binary male and female options exist in the data system. This limits our ability to account for a range of other gender identities, including transgender and gender nonconforming youth who according to national and statewide data are overrepresented in the juvenile justice system.[2] In terms of race/ethnicity, these data are typically not self-report, and may not reflect how a youth self-identifies. Additionally, our data system collapses race and ethnicity into a single field, masking multiple identities. Conflating race and ethnicity has been shown to inflate the counts of white youth, and undercount Latinx youth and other youth of color.[3]

Length of the Time on Supervision

Overall, the median length of time of a continuous period of supervision for youth observed in this analysis was 281 days. The four charts below show how the median length of time on supervision varied by supervision type, gender, race/ethnicity, and risk level.

Note that the supervision type reflects the highest, or most restrictive, type of supervision that a youth was on during a continuous period of supervision. As shown below in Chart 1, the median number of days spent on supervision for youth on DJJ parole was 369 days, 368 days for wardship (non-DJJ parole), and 366 days for DEOJ youth. Youth whose highest supervision types were Formal Probation and 654.2(A) had considerably shorter median durations, at 179 days for formal probation and 175 days for 654.2(A) informal supervision.

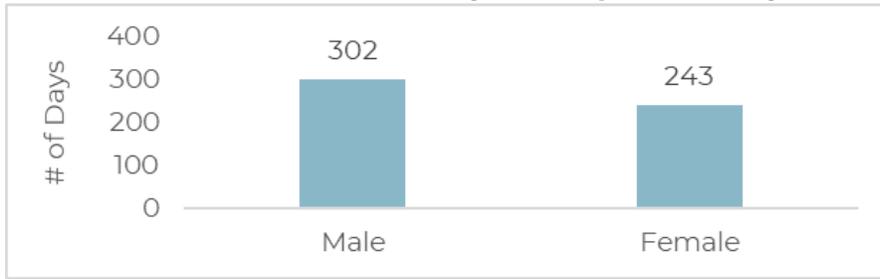**Chart 1. Median Number of Days on Supervision by Highest Supervision Type**

Overall, the median length of time spent on supervision was greater for males at 302 days, compared to 243 days for females, as depicted below in Chart 2.

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[2] Irvine, Angela et al. 2017. Lesbian, Gay, Bisexual, Questioning and/or Transgender Girls and Boys in the California Juvenile Justice System: A Practice Guide.
[3] Alianza for Youth Justice and UCLA's Latino Policy and Politics Initiative. 2020. The Latinx Data Gap in the Youth Justice System.
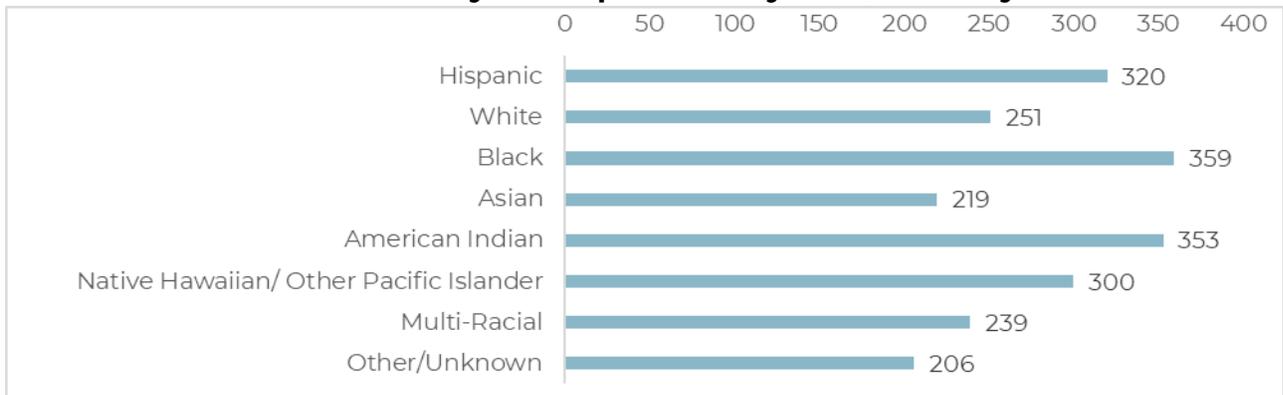
## Chart 2. Median Number of Days on Supervision by Gender

As shown in Chart 3 below, Black youth had the highest median number of days on supervision at 359 days, followed by American Indian youth (353 days), Hispanic youth (320 days), and Native Hawaiian or Other Pacific Islander youth (300 days). The median duration for a period of supervision for white youth was 251 days. Asian youth, multi-racial youth, and youth with an unknown or other racial/ethnic identify had the lowest median number of days on supervision.

Chart 3. Median Number of Days on Supervision by Race/Ethnicity

As shown in Chart 4 below, high risk youth had the highest median number of days spend on supervision at 462 days, followed by moderate risk youth (296 days), and low risk youth (183 days).

Chart 4. Median Number of Days on Supervision by Risk Level
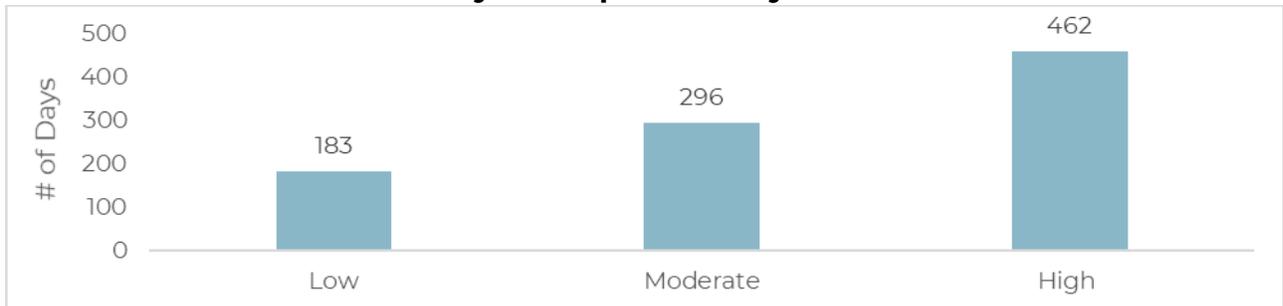
Overall Recidivism Rates

The table below presents the overall recidivism rates for youth who ended supervision between July 1, 2014 and June 30, 2022 using the CPOC definition of recidivism. To help interpret the recidivism rates, estimated low-to-high ranges using the 95% confidence intervals[4] are also presented, showing the range of rates that can be expected 95 times out of 100 based on the group size and recidivism rate. The ranges do not account for community or policy factors that may influence future changes in the rates, and are based solely on the observed numbers. This analysis does not examine causes, but instead points to areas for further inquiry. It cannot be assumed that higher recidivism is a feature of any racial/ethnic or other group. Critical examination of policies, practices and community conditions must be explored to understand root causes of the differences.

Table 2. Overall Recidivism Rates For All Youth During Supervision with 95% Confidence Intervals

CPOC Definition	#	The recidivism rate was...	Next time we check it might be as low as...	or as high as...
New Case/Referral During Supervision	356	18.0%	16.3%	19.8%
New Adjudication During Supervision	200	10.1%	8.8%	11.5%

Stratified Recidivism Rates

Table 3 below presents recidivism rates stratified by gender, risk level, race/ethnicity, age at end of supervision, and fiscal year. New case/referral rates are shown for all, followed by adjudication rates for all. Because some of the rates are based on small counts and therefore subject to wide fluctuation with small changes in the counts, estimates of confidence are shown along with the rates. Where confidence intervals do not overlap across groups, there can be strong confidence that the groups truly have a different recidivism experience. Where the confidence intervals do overlap, and the more they overlap, the difference may more likely be the result of chance as opposed to a real difference in recidivism between the groups. Even where there is overlap between groups, the low-high range for each group provides useful information about that group's experience with recidivism.

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[4] A one-sample binomial success rate (Klopper-Pearson) confidence interval method is used.

Table 3. Recidivism During Supervision: Risk Level, Gender, Race/Ethnicity, Age at End of Supervision and Fiscal Year

New case/referral	The recidivism rate was...	Next time we check it might be as low as...	or as high as...
Risk Level			
Low Risk	6.2%	4.6%	8.1%
Moderate Risk	18.4%	15.2%	21.9%
High Risk	32.6%	28.9%	36.3%
Gender			
Female	10.4%	7.7%	13.6%
Male	20.2%	18.2%	22.3%
Race/Ethnicity			
White	13.7%	11.3%	16.4%
Black	25.9%	18.2%	34.8%
Hispanic	20.9%	18.4%	23.7%
American Indian	33.3%	17.3%	52.8%
Native Hawaiian or Other Pacific Islander	16.7%	12.0%	20.7%
Asian	14.7%	5.0%	31.1%
Multi-racial	0.0%	0.0%	70.8%
Other/Unknown	8.6%	3.5%	17.0%
Age at End of Supervision			
<14 years	11.4%	3.2%	26.7%
14 years	8.2%	3.8%	15.0%
15 years	11.8%	7.7%	17.0%
16 years	13.9%	10.4%	18.0%
17 years	15.0%	12.0%	18.3%
18 years	19.5%	16.4%	22.9%
19+ years	46.2%	38.5%	54.0%
Fiscal Year			
FY 14-15	16.7%	12.6%	21.4%
FY 15-16	17.9%	14.0%	22.4%
FY 16-17	15.7%	11.9%	20.0%
FY 17-18	18.8%	14.2%	24.1%
FY 18-19	14.2%	9.7%	19.8%
FY 19-20	23.4%	18.4%	29.0%
FY 20-21	18.9%	13.5%	25.4%
FY 21-22	20.0%	12.8%	28.9%

New adjudication	The recidivism rate was...	Next time we check it might be as low as...	or as high as...
Risk Level			
Low Risk	2.4%	1.5%	3.7%
Moderate Risk	9.0%	6.7%	11.8%
High Risk	20.7%	17.6%	24.1%
Gender			
Female	5.4%	3.5%	7.9%
Male	11.5%	9.9%	13.2%
Race/Ethnicity			
White	8.1%	6.2%	10.3%
Black	14.7%	8.8%	22.4%
Hispanic	11.2%	9.3%	13.4%
American Indian	26.7%	12.3%	45.9%
Native Hawaiian or Other Pacific Islander	8.3%	1.0%	27.0%
Asian	8.8%	1.9%	23.7%
Multi-racial	0.0%	0.0%	70.8%
Other/Unknown	4.9%	1.4%	12.2%
Age at End of Supervision			
<14 years	2.9%	0.1%	14.9%
14 years	0.9%	0.0%	5.0%
15 years	4.4%	2.0%	8.2%
16 years	9.7%	6.8%	13.4%
17 years	8.2%	6.0%	10.9%
18 years	10.1%	7.8%	12.8%
19+ years	31.4%	24.5%	38.9%
Fiscal Year at End of Supervision			
FY 14-15	8.3%	5.5%	12.1%
FY 15-16	9.3%	6.4%	12.9%
FY 16-17	7.8%	5.2%	11.3%
FY 17-18	9.4%	6.1%	13.6%
FY 18-19	9.8%	6.1%	14.7%
FY 19-20	16.6%	12.3%	21.6%
FY 20-21	11.1%	6.9%	16.6%
FY 21-22	9.5%	4.7%	16.8%

Charts 5A through 5E below visually present recidivism rates stratified by the characteristics referenced in the table above, as well as 95% confidence intervals.

Sonoma County Probation uses the Positive Achievement Change Tool (PACT) assessment to determine the level of risk to reoffend. As expected and shown in Chart 5A, youth assessed as high risk experienced the highest rates of recidivism, followed up by moderate, and then low risk youth. Recidivating events were relatively rare among low risk youth, who represented the largest group of youth on supervision during the analysis period. There was a very small number of youth (n=14) who did not have an assessed risk level, and none of these youth experienced a recidivating event. Given that none of the 95% confidence interval bars overlap for the rates of new referrals or new adjudications, we can be fairly confident that a real difference is being observed.
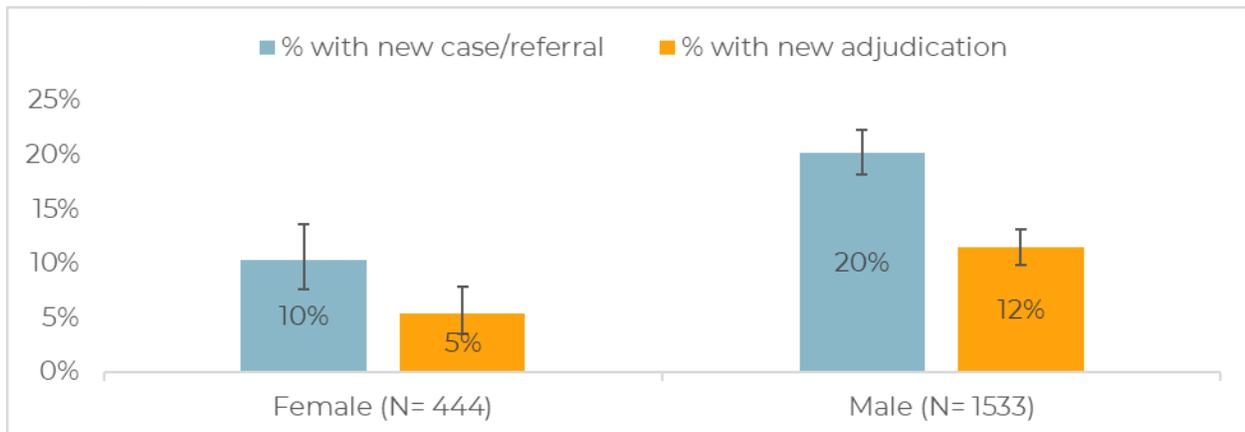
Chart 5A. Recidivism Rates During Supervision by Assessed Risk Level with 95% Confidence Levels
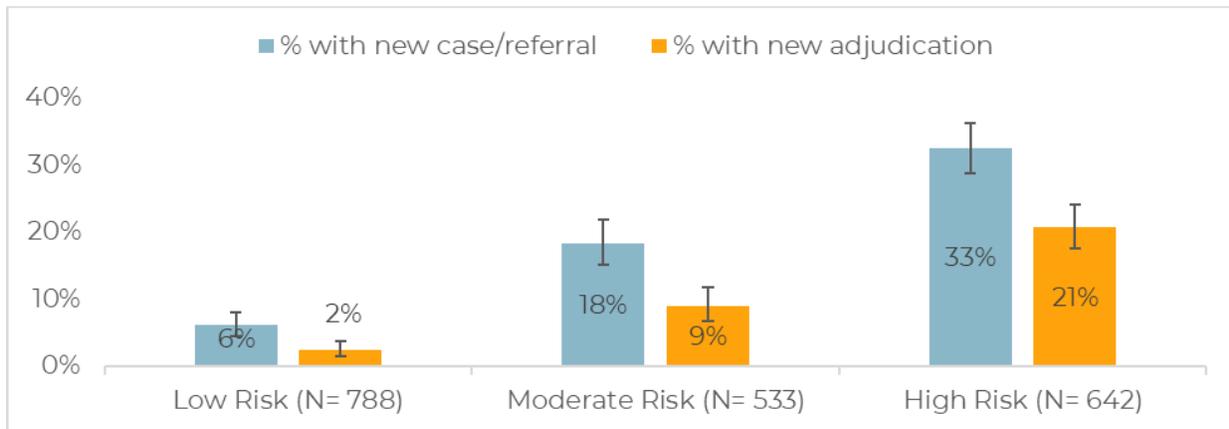
The recidivism rates for males were roughly twice that of females, for both new cases and new adjudications, as shown below in Chart 5B. Given the that the 95% confidence interval bars do not overlap for either new referrals or new adjudications, we can be fairly confident that a real difference is being observed between males and females.

Chart 5B. Recidivism Rates During Supervision by Gender with 95% Confidence Intervals

Overall, Hispanic youth, who accounted for roughly half of the population, experienced higher rates of recidivism compared to white youth (14% of white youth had a new case during supervision, compared to 21% of Hispanic youth). Black youth experienced close to twice the rate of recidivism compared to white youth, and American Indian youth recidivated at a rate more than twice those of white youth. Rates for Asian and Native Hawaiian or Other Pacific Islander youth were comparable to whites. The relatively short confidence interval bars for white and Hispanic youth shown in Chart 5C indicate that the range of recidivism rates we might find in the future is fairly narrow, leading to high confidence that the recidivism rates will be similar next time we check. For the remaining racial/ethnic groups which are smaller, we have less confidence that the observed rate will be similar next time we check. The lack of overlap in confidence intervals for the rate of new referrals between white and Hispanic youth, white and Black youth, and white and American Indian youth indicate that a real difference in rates is being observed among between these groups.

A long confidence interval bar with high upper bounds does not indicate a group is necessarily more likely to recidivate. It only means the level of confidence in the observed rate, based on the numbers observed, is very low. Very small counts can be cause for concern about potentially revealing the identity of youth. In this analysis there were only three observations of multi-racial youth. Identification concerns are alleviated for this group through the understanding that there are many more multi-racial youth observed, but that they are included under other categories.

Chart 5C. Recidivism Rates During Supervision by Race/Ethnicity with 95% Confidence Intervals
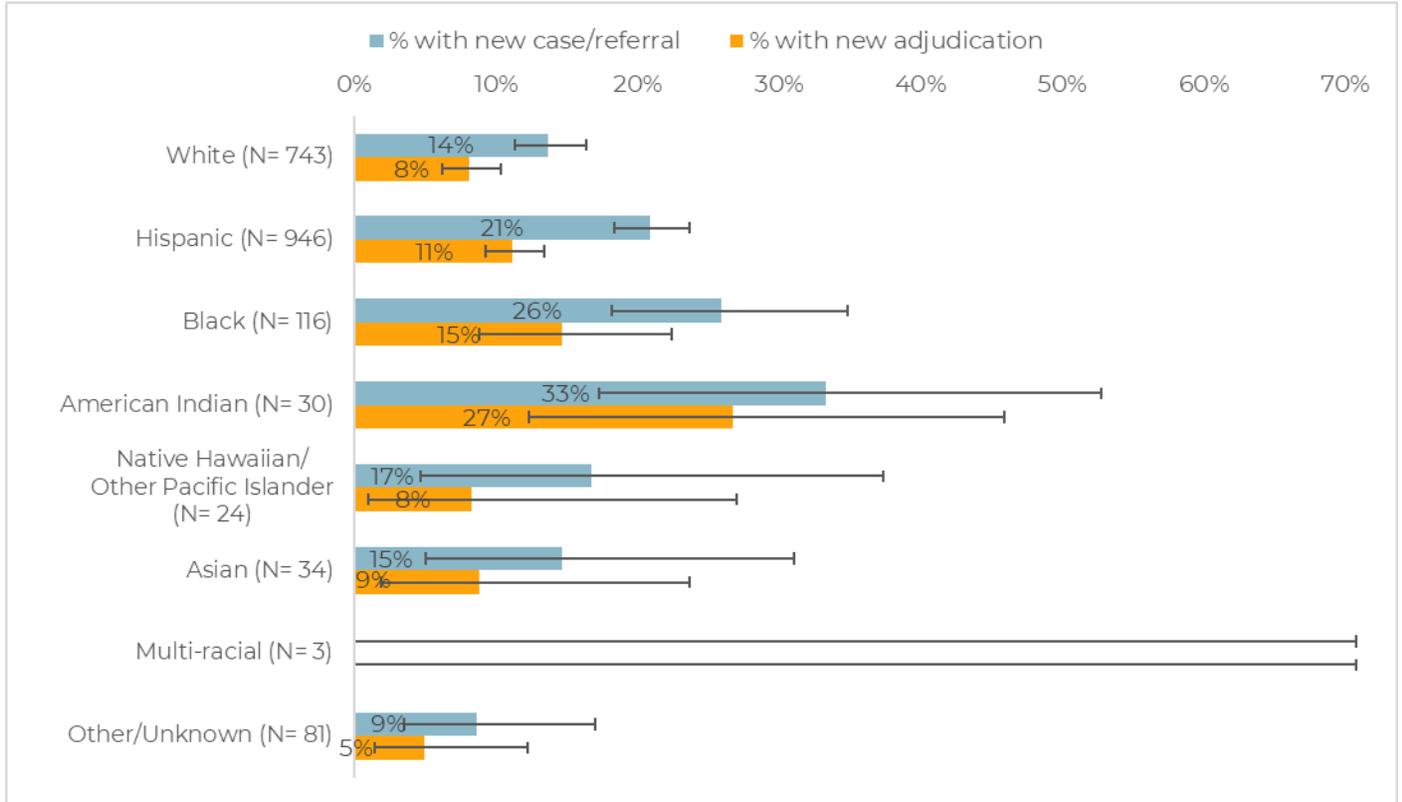

Chart 5D below presents recidivism rates by age at the end of supervision. Overall, as the age at the end of supervision increased, the rates of recidivism increased, the exception being the small number of youth under the age of 14 (n=35), who recidivated at a higher rate than those who finished supervision at age 14, though confidence in this comparison is low as indicated by the overlapping confidence interval bars. Youth who ended supervision after 19 years old or greater experienced the highest rates of recidivism, with nearly half (46%) picking up a new case. This may be explained by the fact that youth who pick up new cases while on supervision tend to remain on supervision longer, and end supervision at an older age. Given that the confidence intervals for youth ending supervision at 19 years and older do not overlap with any other age groups for both rates of new referrals and new adjudications, we can be fairly confident that a real difference in rates is being observed for youth ending supervision at age 19 and up.

Chart 5D. Recidivism Rates by Age at End of Supervision
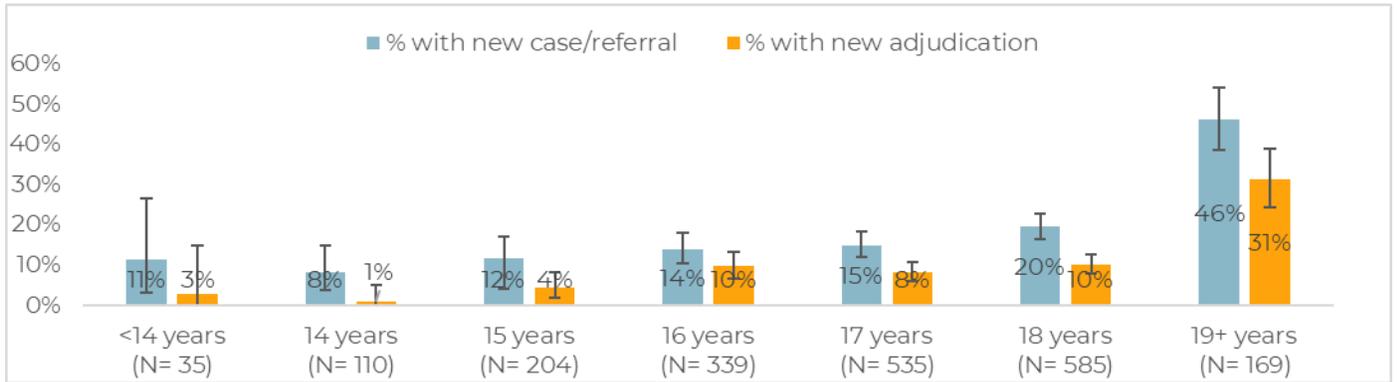
As shown in Chart 5E below, recidivism rates vary for groups of youth ending supervision in each year, peaking at FY 19-20. The overlapping 95% confidence interval bars for all years for new referrals gives us less confidence however that a real difference is being observed. The only confidence intervals that do not overlap, indicating confidence in a real difference in the rates, are for the rate of new adjudications between FY 16-17 and FY 19-20.

Chart 5E. Recidivism Rates During Supervision by Fiscal Year with 95% Confidence Intervals
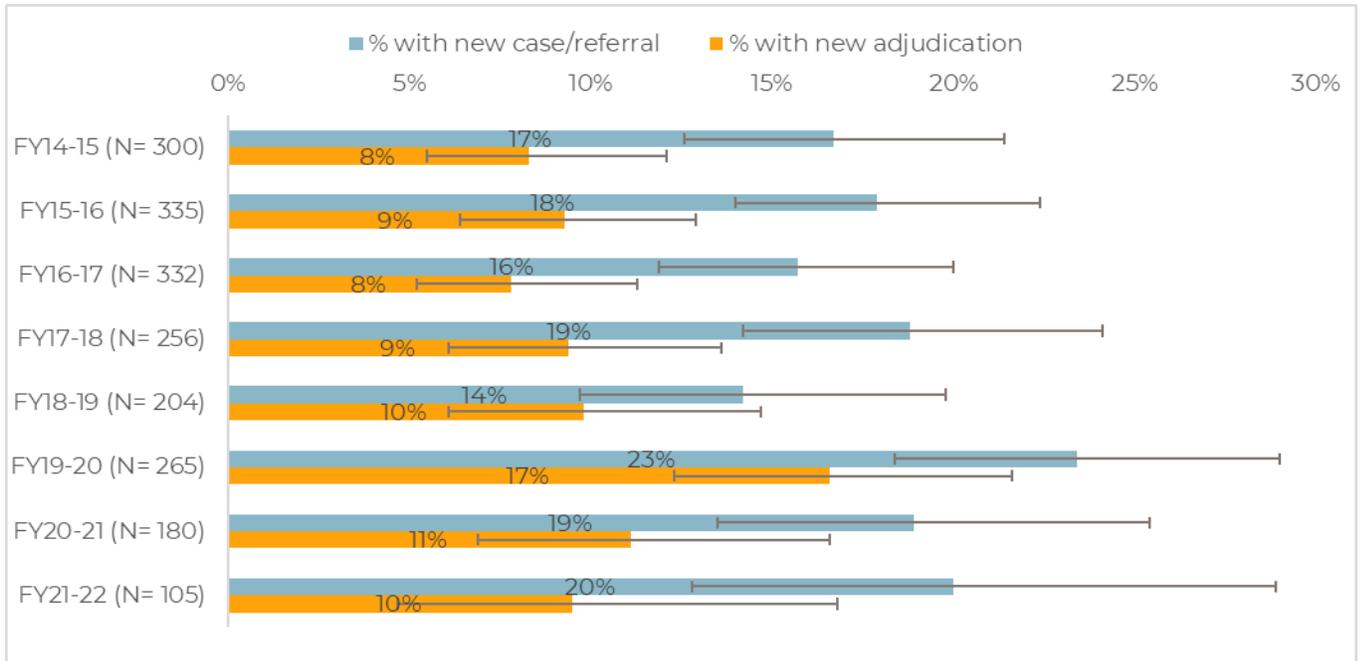
Future reporting will examine characteristics of the youth that had a recidivating event, including characteristics of recidivating events such as charge level and type. Additionally, future reporting will include an analysis of recidivism by supervision type.

A note of caution when comparing recidivism outcomes to other jurisdictions

While the CPOC unified measure of recidivism has been adopted by 58 counties in California and other counties have published their recidivism findings using the same measure,[5] we should be extremely cautious when comparing Sonoma's recidivism outcomes to other jurisdictions. A number of factors may contribute to differences in reported recidivism rates. In addition to potential differences in methodology even while adhering to the CPOC Unified Recidivism definition, jurisdictions may have fundamentally different populations under supervision based on varying law enforcement practices or judicial practices with respect to who is placed on supervision. Jurisdictions likely also have differences in availability of programming, community supports, and supervision practices, all of which could impact recidivism outcomes. For these reasons, drawing comparisons between Sonoma's recidivism rates other counties is not advised.

PART II: RECIDIVISM AFTER SUPERVISION

Two methods of analysis are used to examine recidivism after supervision end: rate calculations and survival analysis. The rate calculations show the percentage of youth observations with new referrals or adjudications – with these recidivism events defined the same as in the prior section – during one or two years following supervision end. Survival analysis examines the length of time from supervision end to a recidivism event – again defined the same as in the prior section – and compares the experiences of groups of youth.

Recidivism Rates After Supervision

Calculation of recidivism rates observes youth during the year after the end of supervision on 654.2(A) Informal Supervision, Deferred Entry of Judgement, Formal Probation, Wardship, or DJJ Parole, between July 1, 2014 and June 30, 2021. This allows for a one-year observation period for all youth, including those ending supervision on June 30, 2021. Each supervision end for a youth is examined separately, so that a youth who ended supervision more than once between July 1, 2014 and June 30, 2021 will be observed and counted multiple times. Where recidivism is reported for two years following supervision, supervision periods ending between July 1, 2014 and June 30, 2020 are included to allow for a two-year observation period for all.

As in the prior section, supervision is made up of uninterrupted periods of supervision on one of these supervision types, and each uninterrupted period of supervision may be made up of different supervision types on multiple cases.

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[5] Examples of publicly available reports from other counties that utilize the CPOC Unified Measure for Recidivism include San Luis Obispo's annual statistical FY 20-21 report and Santa Clara's CY 2021 JJCPA and YOBG Annual Evaluation report.

Recidivism events include new misdemeanor or felony cases during the year after supervision, and adjudications for a misdemeanor or felony where the case originated during the one or two years after supervision.

Because some of the rates are based on small counts and therefore subject to wide fluctuation with small changes in the counts, estimates of confidence are provided along with the rates, similar to the prior section of the report. The actual rate of recidivism is shown, and the 95% confidence interval[6] shows the range of rates that can be expected 95 times out of 100 based on the group size and recidivism rate. This allows a statement such as "American Indian youth reoffended at 11%. Based the numbers we can estimate that between 2% and 28% will reoffend." This example reflects a wide 95% confidence interval, and helps guide interpretation of the observed recidivism rate. Again, this analysis does not examine causes, but instead points to areas for further inquiry. It cannot be assumed that higher recidivism is a feature of any racial/ethnic or other group. Critical examination of policies, practices and community conditions must be explored to understand root causes of the differences.

Overall Recidivism After Supervision

Table 4 below shows rates of recidivism following supervision for all youth who ended supervision during the reporting period, along with estimated low-to-high ranges using the 95% confidence intervals. The ranges do not account for community or policy factors that may influence future changes in the rates, and are based solely on the observed numbers. Observed rates of recidivism during the year after supervision ends are one-fifth to one-third of the rates observed during supervision. Two-year recidivism rates after supervision end are closer to the during supervision rates, but still lower. Time on supervision is often longer than one or two years so the longer observation probably contributes to the rate differences. Recidivism can also lengthen time on supervision, which further extends the during-supervision observation period, and also may contribute to rate differences.

Table 4. Recidivism Following Supervision – All Youth

One Year After Supervision	The recidivism rate was. . .	Next time we check it might be as low as. . .	or as high as. . .
New case/referral	6.2%	5.1%	7.3%
New adjudication	3.5%	2.7%	4.4%
Two Years After Supervision	**The recidivism rate was. . .**	**Next time we check it might be as low as. . .**	**or as high as. . .**
New case/referral	10.8%	9.4%	12.3%
New adjudication	6.3%	5.2%	7.4%

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[6] A one-sample binomial success rate (Klopper-Pearson) confidence interval method is used.

Graphic representation of the rates and 95% confidence intervals in Chart 6A below provides for visual comparisons. Where confidence interval bars do not overlap, there can be strong confidence that the groups are actually having a different recidivism experience. Where the confidence interval bars overlap (which they do not in this example), and the more they overlap, the difference may be more the result of chance as opposed to a real difference in recidivism between the groups. But even where there is overlap between groups, the low-high range for each group provides useful information about that group's experience with recidivism.

Chart 6A. Recidivism After Supervision With 95% Confidence Intervals – All Youth
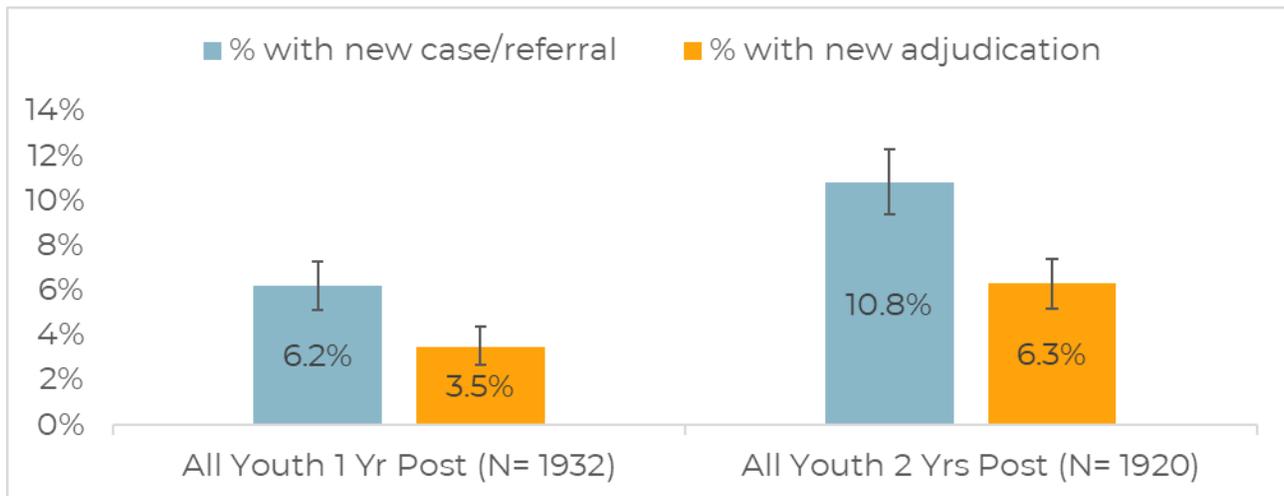
Stratified Recidivism After Supervision

Using similar presentations as above, recidivism rates with 95% confidence intervals are shown for groups among the following categories: risk level, gender, race/ethnicity and year of supervision end[7]. Recidivism over two years after supervision is consistently higher than recidivism over one year. To reduce repetition, recidivism breakouts are shown for recidivism in the first year after supervision end. Table 5 presents recidivism rates disaggregated among the categories mentioned above, and shows low-to-high ranges based on 95% confidence intervals. New case/referral rates are shown for all groups, followed by adjudication rates for all groups.

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[7] Examining recidivism by supervision type is also a goal but further development is needed to report it accurately. This will come in a future report.

Table 5. Recidivism During First Year After Supervision: Risk Level, Gender, Race/ethnicity, Fiscal Year

| New case/referral	The recidivism rate was. . .	Next time we check it might be as low as. . .	or as high as. . .
Risk Level			
Low Risk	3.4%	2.3%	5.0%
Moderate Risk	7.0%	5.0%	9.6%
High Risk	9.0%	6.9%	11.6%
Gender			
Female	5.2%	3.3%	7.7%
Male	6.4%	5.2%	7.8%
Race/Ethnicity			
White	6.1%	4.5%	8.1%
Black	5.3%	2.0%	11.1%
Hispanic	6.7%	5.2%	8.6%
American Indian	7.1%	0.9%	23.5%
Other/Unknown	3.8%	0.8%	10.6%
Native Hawaiian or Other Pacific Islander	0.0%	0.0%	15.4%
Asian	3.0%	0.1%	15.8%
Multi-Racial	0.0%	0.0%	70.8%
Fiscal Year at End of Supervision			
FY14-15	4.9%	2.7%	8.0%
FY15-16	6.4%	4.0%	9.7%
FY16-17	9.5%	6.5%	13.1%
FY17-18	4.4%	2.2%	7.7%
FY18-19	6.0%	3.1%	10.2%
FY19-20	5.8%	3.3%	9.3%
FY20-21	5.1%	2.4%	9.4%
New adjudication	**The recidivism rate was. . .**	**Next time we check it might be as low as. . .**	**or as high as. . .**
Risk Level			
Low Risk	1.8%	1.0%	3.0%
Moderate Risk	3.8%	2.3%	5.8%
High Risk	5.6%	3.9%	7.7%
Gender			
Female	2.7%	1.4%	4.7%
Male	3.8%	2.8%	4.8%

New adjudication (continued)	The recidivism rate was. . .	Next time we check it might be as low as. . .	or as high as. . .
Race/Ethnicity			
White	3.4%	2.2%	5.0%
Black	4.4%	1.4%	9.9%
Hispanic	3.7%	2.6%	5.1%
American Indian	7.1%	0.9%	23.5%
Other/Unknown	2.5%	0.3%	8.7%
Native Hawaiian or Other Pacific Islander	0.0%	0.0%	15.4%
Asian	0.0%	0.0%	10.6%
Multi-Racial	0.0%	0.0%	70.8%
Fiscal Year at End of Supervision			
FY14-15	3.1%	1.4%	5.9%
FY15-16	3.4%	1.7%	6.0%
FY16-17	5.5%	3.3%	8.5%
FY17-18	2.4%	0.9%	5.1%
FY18-19	4.5%	2.1%	8.4%
FY19-20	2.7%	1.1%	5.5%
FY20-21	2.8%	0.9%	6.5%

The following charts present the above data graphically, with bars representing the 95% confidence intervals to assist with interpreting recidivism rates. Chart 6B below shows higher rates of recidivism as risk level increases, as we would expect. The separation between risk level groups is small however, and some comparisons of rates within a recidivism type have overlapping 95% confidence interval bars, providing less confidence that a real difference is being observed. Confidence is high that low risk youth are less likely to receive a new case/referral in the year following supervision than moderate risk or high risk youth. Confidence can also be high that low risk youth receive a new adjudication at lower rates than high risk youth. Overlapping confidence interval bars on other comparisons lower confidence that a real difference is being observed. This does not mean the PACT assessment is not performing as it should. Questions of PACT performance should be answered through a local validation study.

Chart 6B. Recidivism First Year After Supervision With 95% Confidence Intervals – By Risk Level
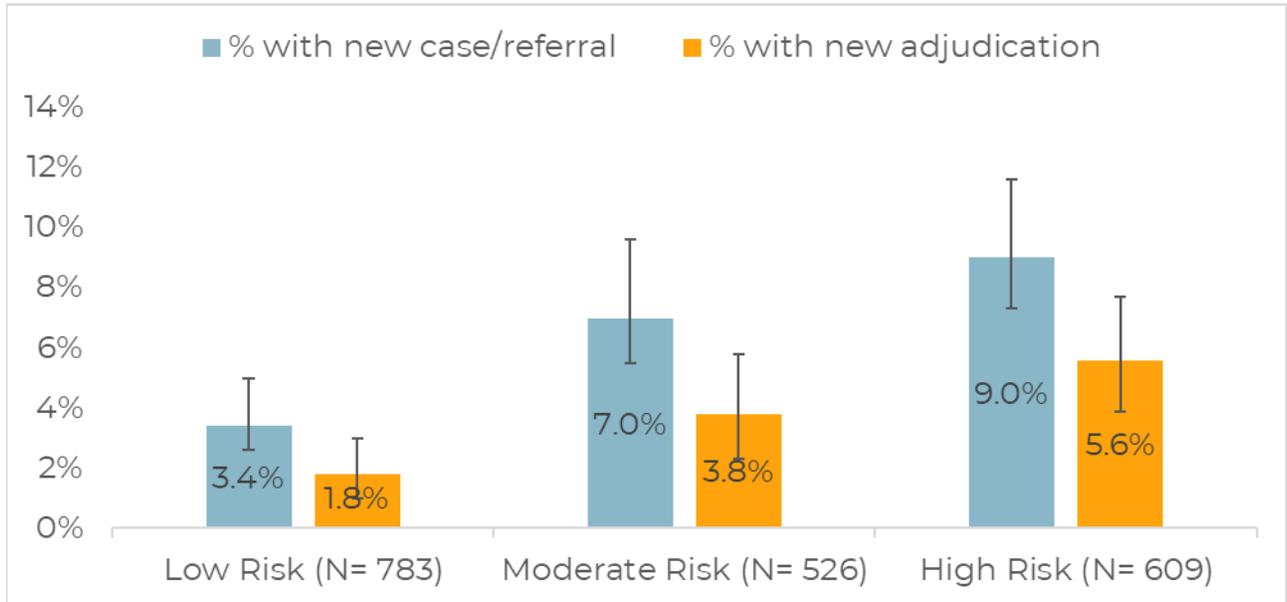
In Chart 6C below, comparing post-supervision recidivism between gender groups shows rates that appear higher for males using both recidivism measures, but overlapping confidence interval bars that suggest the rate comparisons will not necessarily come out the same next time we check.

**Chart 6C. Recidivism First Year After Supervision With 95% Confidence Intervals – By Gender**
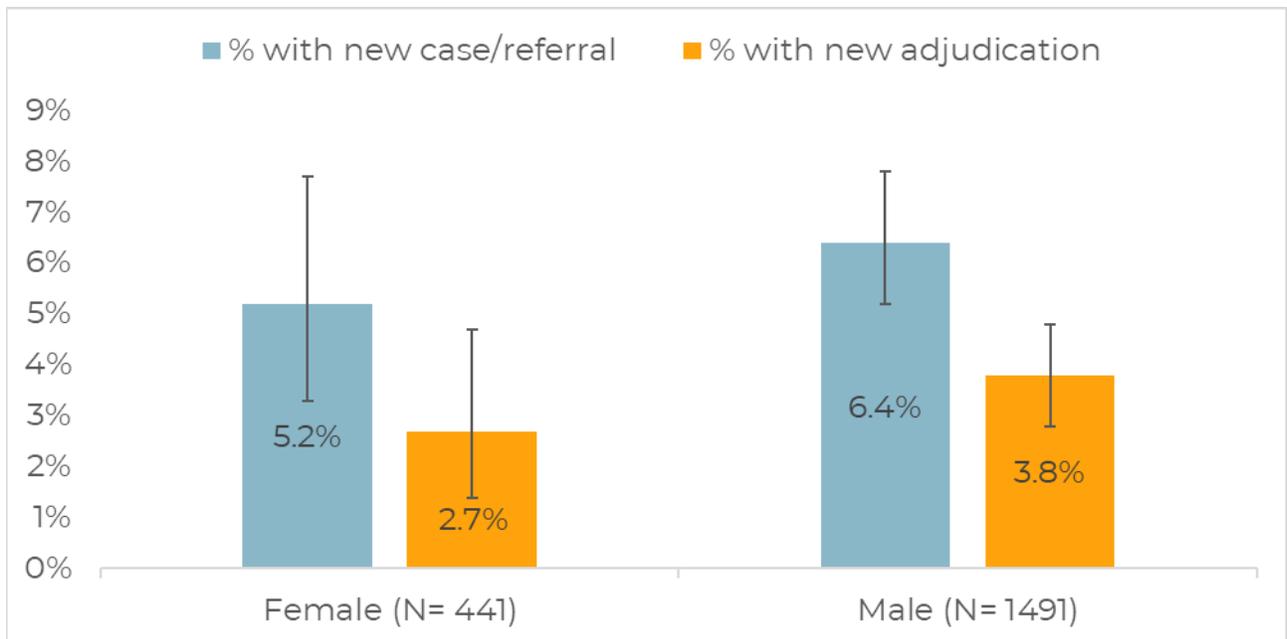
As seen in Chart 6D below, observed rates for white, Black, Hispanic and American Indian youth were fairly close, except that the adjudication rate for American Indian youth was about double the rate for white, Black and Hispanic youth. The short confidence interval bars for white and Hispanic youth mean the range of recidivism rates we might find in the future is fairly narrow, leading to high confidence that the recidivism rates will be similar next time we check. Where group sizes are small, confidence that the observed rate will be similar next time is lower, as shown by the long confidence interval bars for Black, American Indian, Other/Unknown, Native Hawaiian/Other Pacific Islander and Asian youth.

Chart 6D. Recidivism First Year After Supervision With 95% Confidence Intervals – By Race/Ethnicity
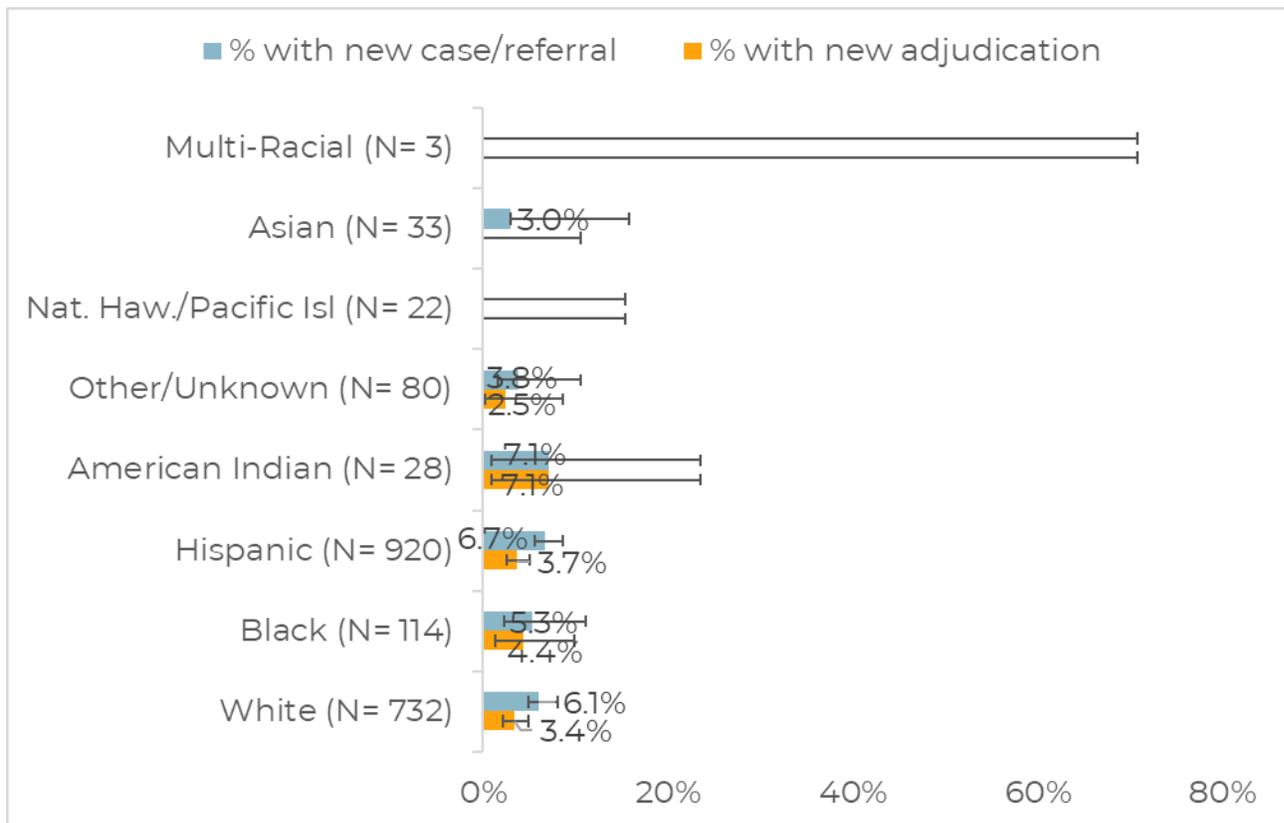
Recidivism rates by year of supervision end held fairly stable except for those whose supervision ended in Fiscal Year 16-17, whose recidivism rates were higher than other years. 95% confidence interval bars show that rates may be two to four points higher or lower based on group size and the percentages recidivating.

Chart 6E. Recidivism First Year After Supervision With 95% Confidence Intervals – By Year of Supervision End
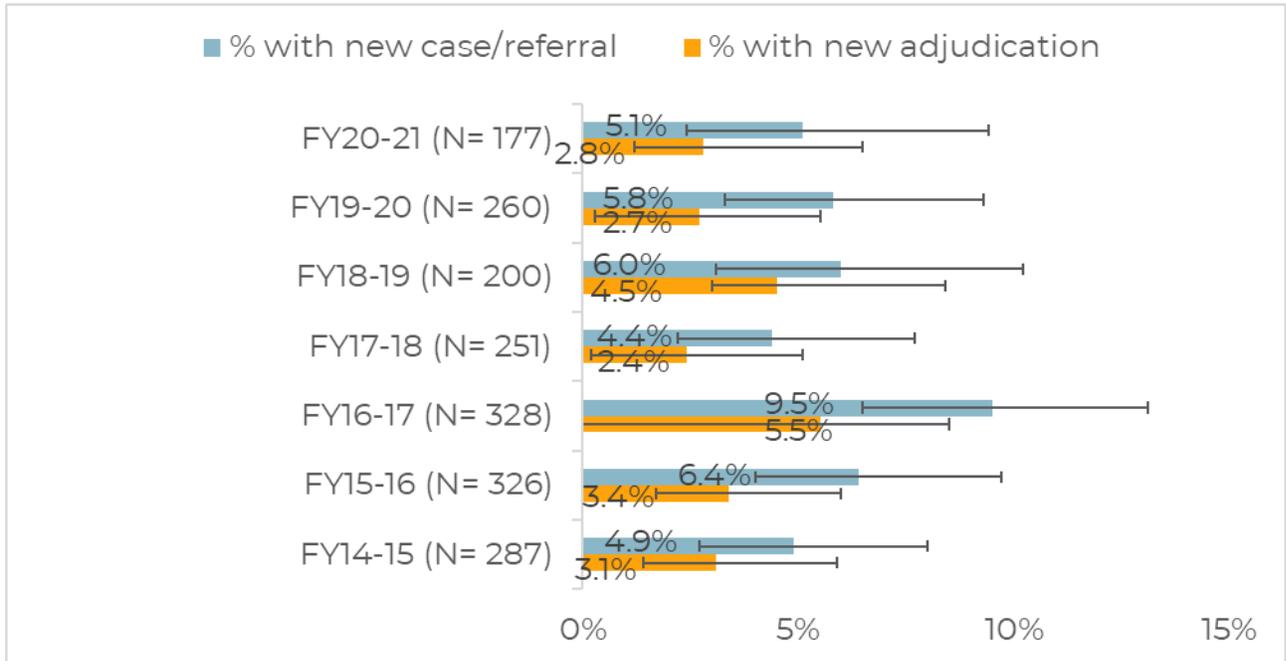
Survival Analysis

Survival analysis is a technique that examines the amount of time it takes for a given outcome to occur. In this case, the analysis examines the amount of time until a youth recidivates in the community. If a person does not recidivate, they are considered to have "survived" the entire timeframe under analysis. Based in public health research (hence the "survival" terminology), this is a useful approach for comparing outcomes across groups where different individuals have had different periods of time during which an outcome could occur. See the Appendix for detailed description of the analysis.

Two types of recidivating events are included in the survival analysis: (1) New cases/referrals, and (2) New adjudications. Only recidivism events in the community are included. New recidivism events that occur in the adult system are included as well. Recidivism events with cases originating in other counties but not transferred to Sonoma County are not included. Future analysis can include data from the California Department of Justice on recidivism events that occur in other California counties.

Who is observed for recidivism: For this analysis, youth are observed after ending supervision on Wardship, DEOJ, Formal Probation, 654.2(A) during the date ranges described in the following Observation Period.

Observation period: The survival analysis includes a 2 year observation period for youth who ended supervision between July 1, 2014 and June 30, 2020 to allow the full

two-year observation period for all. Time spent in custody (either in Juvenile or Adult) is excluded from the observation period. This is the concept of a "community year." For example, when checking for a new adjudication, if a person receives a new charge after supervision ends and stays in detention for 30 days but is not adjudicated on the charge, the observation time will be extended by 30 days to allow checking for recidivism events during the full 365 days in the community.

Presentation of results: Recidivism comparisons between groups are made by comparing lines on survival graphs. As time passes and some people recidivate, the line bends down to represent fewer people still remaining recidivism free. A line that reaches the .8 mark at 730 days means that, 80% of people are likely to remain recidivism free at the two-year mark. Comparisons are shown where confidence can be had that comparisons reflect actual differences between groups as opposed to chance. Excluding a group from comparisons means survival analysis is not useful for that group, and could be misleading. For these groups recidivism rates with confidence intervals in the section above provide a better way of understanding recidivism than survival analysis. Groups compared include risk level, gender, and race/ethnicity.

Survival Analysis Results – Risk Level

Risk Level is determined by the last PACT risk-need assessment done before the end of supervision. The PACT shows the likelihood of an adjudication for a new offense occurring within a year of the assessment. This analysis does not follow that method exactly – for various reasons the last assessment is done some time before supervision ends. But as expected, the survival lines for lower-risk individuals decline more gradually than the lines for higher-risk individuals.

Chart 7A below shows the difference between the risk level groups is only 2%-5% after 730 days, but the lines for the groups are in the hoped-for order, with very high confidence (p = <.001) that the differences are real. The small amount of separation between the groups suggests it may be helpful to further investigate how the PACT assessment is performing. This can be done via an assessment validation study. The lack of separation does not necessarily mean the PACT assessment is not performing as hoped: the methodology here is not the same as that used in a validation study.

Chart 7A. Two-year Survival Results by Risk Level – New Adjudication

Adjudication on Misdemeanor or Felony
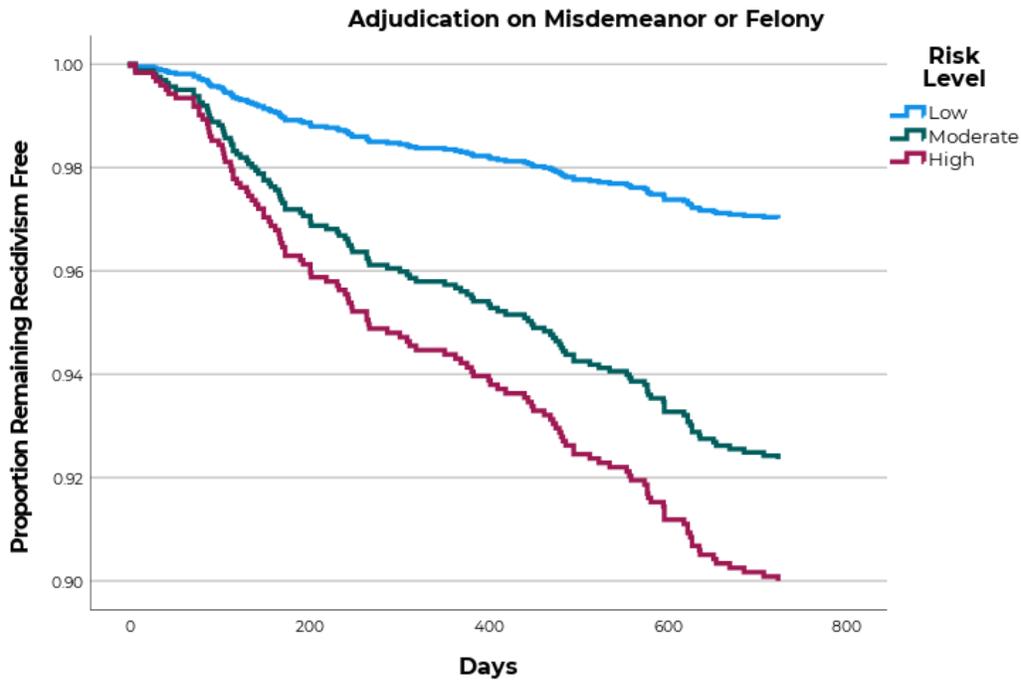
As shown in Chart 7B below, recidivism measured using the misdemeanor or felony referral measure produces survival lines that fall more steeply (as expected, since not all cases result in found-true charges), and the difference between risk levels is wider.

Chart 7B. Two-year Survival Results by Risk Level – New Case/Referral


New Misdemeanor or Felony Referral
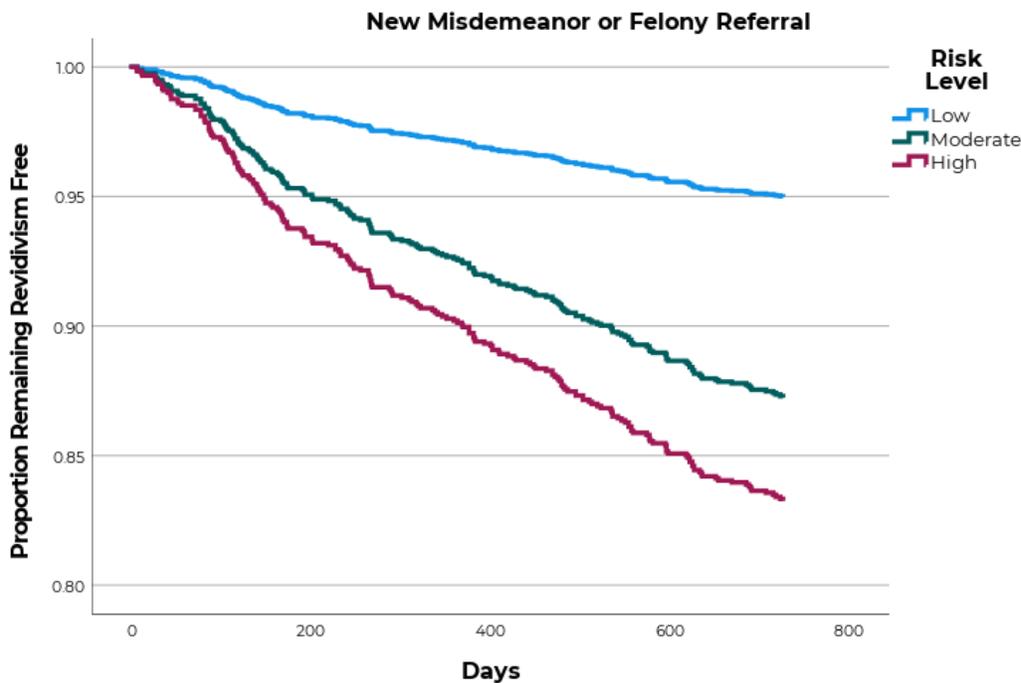
Similar to the Risk Level graphs above, the adjudication measure for the following breakouts consistently yields lower recidivism compared with the misdemeanor or felony referral measure, and differences between referral and adjudication groups are similar but compressed. The following survival comparisons show any results for either the new case/referral or new adjudication method where the result allows confidence that the comparison shows actual differences between groups vs. chance. The Appendix provides statistical comparisons of the following groups for both the Referral and Adjudication recidivism measures: all youth, risk level, gender, and race/ethnicity.

Survival Analysis by Race/Ethnicity

Some racial/ethnic groups in the study are small, lowering confidence in their survival analysis results. Only new case/referral results for Hispanic and white youth are shown here because the survival analysis results for other racial/ethnic groups did not allow for confidence that the comparisons were due to actual differences between the groups and not chance. Chart 7C below shows the survival analysis results for new case/referral received while in the community over a two year observation period. The estimates show that Hispanic youth experience a new case/referral after supervision more often than white youth, and that by the end of two years 88% of Hispanic youth are likely to remain recidivism free compared with 91% of white youth. The difference is small, but likely real and not due to chance. Again, this analysis does not examine causes, but instead points to areas for further inquiry. It cannot be assumed that higher recidivism is a feature of the Hispanic ethnicity. Critical examination of policies, practices and community conditions must be explored to understand root causes of the difference.

Chart 7C. Two-year Survival Results by Race/Ethnicity – New Case/Referral
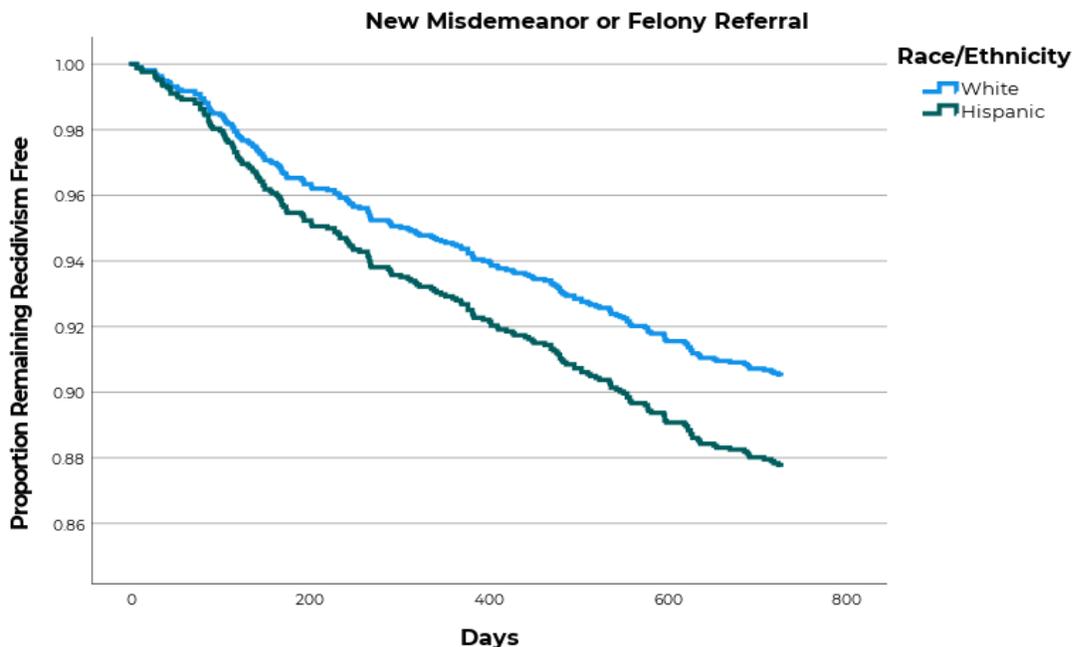
Survival Analysis by Gender

Comparing survival results by gender yields confidence that there is a real difference in recidivism between females and males using the new adjudication measure, but not using the new case/referral measure. Chart 7D below shows the survival line for females falls less steeply than for the line for males, who at the end of two years are 93% likely to remain without a new adjudication on a misdemeanor or felony, compared with almost 96% for females. Again the difference is small, but confidence in the difference is high.

Chart 7D. Two-year Survival Results by Gender – New Adjudication

Adjudication on Misdemeanor or Felony
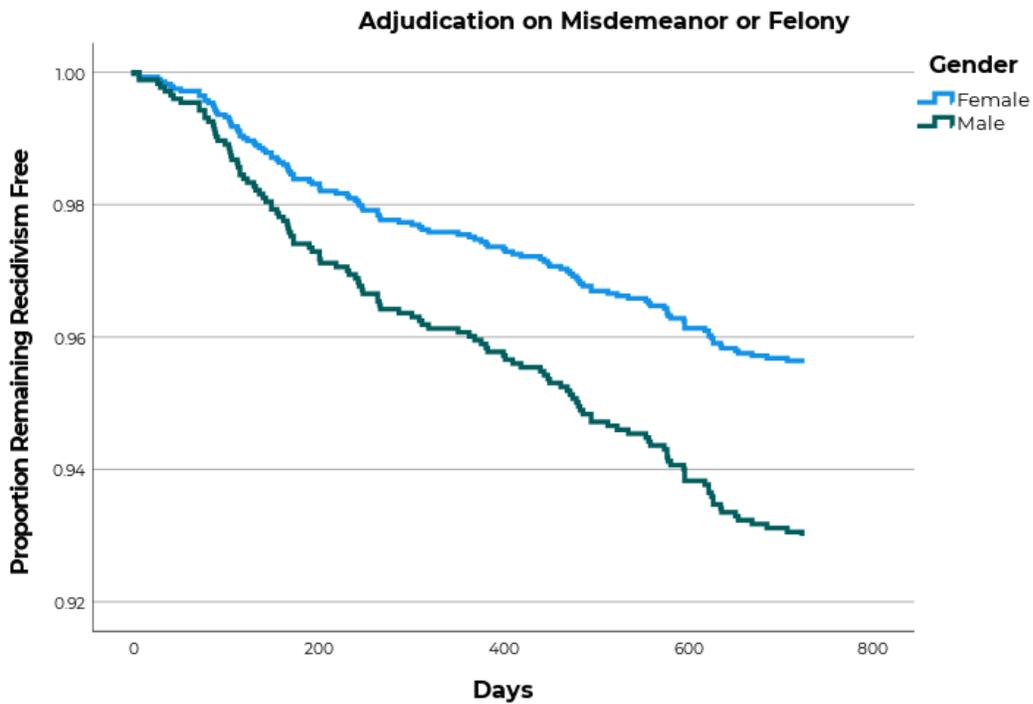
APPENDIX: SURVIVAL ANALYSIS DETAILS

Cox Regression

Applied to recidivism, Cox regression provides estimates of the likelihood of recidivism based on observations of how long members of different groups remain recidivism free. Survival lines, hazard ratios and statistical significance work together to help us understand how long different groups of people are likely remain recidivism free, how wide differences in likelihood may be, how confident we can be in the estimate of likelihood.

Three things affect confidence in differences between groups: how many people are in the groups, how much variance there is in how long they remain recidivism free, and how wide the differences between the groups are.

Comparisons are made to a single reference group. Taking Risk Level for example, Low Risk was selected as the reference group. If confidence in the comparison result is high, statements can be made like *High Risk people are 3.6 times as likely to receive a new misdemeanor or felony referral compared with Low Risk people, and Moderate Risk people are 2.7 times as likely.*

The comparison of likelihood calculated in Cox regression analysis is called a **hazard ratio** (HR), often represented as Exp(B). A hazard ratio of greater than one means more likely than the reference group to recidivate, so that HR = 3.6 means 3.6 times as likely. Less than one means less likely – that is, HR = .34 means only 34% or about a third as likely as the reference group. The hazard ratio is shown only for groups compared to the reference group, and is blank for the reference group.

Calculation of the Hazard Ratio uses the change in the odds of recidivism compared to the reference group, or the **regression coefficient**, usually shown as B. Positive regression coefficients mean a group's odds of recidivism are higher than that of the reference group. Negative coefficients mean lower odds of recidivism.

Confidence in the result is represented as a P value, often shown as Sig. for **statistical significance**, with values of .05 or less meaning that there is high probability that the comparison shows a real difference and not just the results of chance. Calculation of the P value considers the combination of group size, variance in time to recidivism and the separation between the results for groups. Confidence in the difference in results can decline when groups are small, when there is more variance in the time to recidivism, and when the difference between the results is small. But the three work together, and one area can compensate for another. For instance, a large group size can compensate for a narrow separation between in results. Or a large separation between results can compensate for more variance in the groups.

Standard error (SE) assists in understanding what's behind the P value. It considers variance and group size. Where the standard error is low but the P value is high, the reason for the lack in statistical significance is mostly because of a narrow separation

between the results. Where the standard error is high and the P value is less than .05, statistical significance is achieved because of a wider separation between the results.

Cox Regression Results

The following Cox Regression results show the probability of recidivism during a two year observation period, followed by the previously described values:

- B: regression coefficient
- SE: standard error
- Sig.: statistical significance or P value
- Exp(B): hazard ratio

Risk Level

Recidivism Probability After Two Years:

	Low Risk	Moderate Risk	High Risk
Referral	5%	13%	17%
Adjudication	3%	8%	10%

Referral: Differences are statistically significant (p<.001). Low is the reference group. Using the hazard ratio Exp(B), Moderate is 2.7 times as likely to have a new referral as Low. High, 3.6 times as likely.

	B	SE	Sig.	Exp(B)
Low Risk			<.001	
Moderate Risk	.976	.201	<.001	2.654
High Risk	1.271	.189	<.001	3.563

Adjudication: Differences are small but statistically significant (p<.001). Low is the reference group. Using the hazard ratio Exp(B), Moderate is 2.6 times as likely to have a new referral as Low. High, 3.5 times as likely.

	B	SE	Sig.	Exp(B)
Low Risk			<.001	
Moderate Risk	.964	.263	<.001	2.621
High Risk	1.245	.246	<.001	3.473

Gender

Recidivism Probability After Two Years:

	Female	Male
Referral	8%	11%
Adjudication	4%	7%

Referral: The difference is not quite statistically significant (Sig.=.094). Female is the reference group. Using the hazard ratio Exp(B), Males appear 1.4 times as likely to have a new referral as Females.

	B	SE	Sig.	Exp(B)
Male	.301	.180	.094	1.351

Adjudication: Difference is nearly statistically significant (Sig.=.055). Female is the reference group. Using the hazard ratio Exp(B), Males appear 1.6 times as likely to have a new referral as Females.

	B	SE	Sig.	Exp(B)
Male	.480	.250	.055	1.616

Race/Ethnicity
Recidivism Probability After Two Years:

	Referral	Adjudication
Native Hawaiian or Other Pacific Islander	4.2%	4.2%
Asian	6%	0%
Multi-Racial	0.0%	0.0%
Other/Unknown	6.2%	5%
White	9.5%	5.5%
Black	11.9%	8%
Hispanic	11.9%	7%
American Indian	14%	10.3%

Referral: White is the reference group. Only one difference, for Hispanic people, is nearly statistically significant (Sig.=.077). No other differences are statistically significant. Using the hazard ratio Exp(B), Hispanic people appear 1.3 times as likely to have a new referral as white people.

	B	SE	Sig.	Exp(B)
White			.314	
Black	.266	.293	.365	1.304
Hispanic	.271	.153	.077	1.311
American Indian	.413	.514	.422	1.511
Other/Unknown	-.431	.463	.352	.650
Native Hawaiian or Other Pacific Islander	-.825	1.007	.413	.438
Asian	-.474	.717	.509	.623
Multi-Racial	-8.885	155.299	.954	.000

Adjudication: White is the reference group. No differences are statistically significant.

	B	SE	Sig.	Exp(B)
White			.796	
Black	.369	.369	.317	1.446
Hispanic	.241	.202	.233	1.273
American Indian	.671	.599	.262	1.956
Other/Unknown	-.109	.524	.835	.896
Native Hawaiian or Other Pacific Islander	-.279	1.012	.783	.757
Asian	-10.891	169.804	.949	.000
Multi-Racial	-10.893	556.521	.984	.000