The Pace of Recidivism in Illinois

SURVIVAL ANALYSIS: AN OVERVIEW

Survival analysis is a methodology that has been developed and applied mainly in medical and engineering research. It analyzes data on which "terminal events" or "failures" occur for a given population or group. Survival analysis has been used, for instance, to assess the rates over time in which cancer symptoms appear for a group of patients and to compare the rates across subgroups of patients receiving different treatments. The technique has also been used to assess "product life" or to compare rates at which different instruments break down in field settings.

Within the last decade, survival analysis has been used increasingly outside the fields of medicine and engineering. In criminal justice, for instance, it has proved valuable in assessing recidivism rates. If you consider the cancer treatment example above, the logic becomes clear. With recidivism, the observation period begins with each inmate's release from prison. The occurrence of recidivism—whether it be an arrest, conviction, or incarceration—marks the onset of "symptoms," or the failure. In effect, the three definitions of recidivism represent various levels in the severity of recidivist activity. So just as a medical researcher develops different measures of success or failure based on different criteria used to define a symptom, the criminal justice researcher must choose the definition of recidivism that is most appropriate for answering the questions of his study.

Survival analysis provides many advantages over a "fixed interval observation," the methodology most often applied in recidivism studies. This method measures simply the proportion of a sample who recidivate by the end of a given period, typically a year. This traditional approach might reveal that 30 percent of the sample most studies of recidivism measure only the percentage of former offenders who return to crime by the end of a specified follow-up period (for example, a year). What these studies fail to account for is what the rate of recidivism was across that period. Did most repeat offenders recidivate during one part of the follow-up period, or did they recidivate at an even pace throughout the period? Are there specific and identifiable "critical periods" in which offenders, or certain types of offenders, are likely to recidivate? Are some subgroups within a sample of offenders more likely to recidivate sooner than other subgroups?

To help answer these and other questions about the pace of recidivism in Illinois, the Illinois Criminal Justice Information Authority decided to analyze repeat offenders using a methodology called "survival analysis." This bulletin employs this technique to examine the rate at which former inmates "survive" following their release from State prison—that is, the rate at which they do not recidivate for each month following release. By plotting these survival rates (and corresponding "failure" rates) throughout the follow-up period, we can uncover not only how many former prison inmates are apt to recidivate by the end of the period, but also the pace at which they are likely to recidivate during that period.

This bulletin is the second in a series of reports from the Authority's Repeat Offender Project (ROP), a multi-faceted study of recidivism among a group of former inmates released from Illinois prisons during a three-month period of 1983. The first ROP bulletin, released in November 1986, analyzed the criminal activity of the inmate sample during the first 18 to 20 months following their release. The first report also discussed survival analysis briefly and presented some relevant findings. This bulletin uses survival analysis to examine a wider scope of issues, including a comparison of recidivism rates among various subgroups of the ROP sample. In addition, the survival analyses presented in this bulletin are based on the most recent arrest and incarceration data available (17 to 29 months following release).
The ROP Sample

The Repeat Offender Project is tracking the criminal activity of a cohort of 789 inmates who were released from custody of the Illinois Department of Corrections (IDOC) between April 1, 1983 and June 30, 1983. This time period provided a three-month "window" of varying release dates.

The ROP sample also contains inmates who received a variety of release types, including parole, other types of conditional release, and unconditional release.

So far, analysis has been limited to 539 of the 789 releases in the full ROP sample. Excluded have been 230 releases who were previously on parole at the time of release, persons convicted of fixed observation method. As the

The forced-release program was in effect from June 1980 until July 12, 1983, when the Illinois Supreme Court struck down the practice. Under the program, the Illinois Department of Corrections could award to selected inmates (usually non-violent, property offenders) additional increments of good time, parole, other types of conditional release, and unconditional release.

In addition, the composition of the ROP sample probably was affected by two major criminal justice policies that were in place when the sample was drawn: the IDOC's "forced-release" program and the admission of misdemeanants in the general prison population.

The forced-release program was in effect from June 1980 until July 12, 1983, when the Illinois Supreme Court struck down the practice. Under the program, the Illinois Department of Corrections could award to selected inmates (usually non-violent, property offenders) additional increments of good time, parole, other types of conditional release, and unconditional release.

So far, analysis has been limited to 539 of the 789 releases in the full ROP sample. Excluded have been 230 releases who were previously on parole at the time of release, persons convicted of fixed observation method. As the

Survival analysis is also a more practical approach for several reasons. First, the technique provides some advantages over the fixed observation method. As the ROP study has shown, individuals in a sample often are not exposed to the risk of recidivism for the same period of time. While fixed interval methods do not control for different exposure times, survival analysis does. (This feature is discussed further in this bulletin.)

Survival analysis, on the other hand, specifies the proportion of releases who survives by not recidivating (by arrest) within one year after release from prison.

But does the sample recidivate at the same pace across the follow-up period? That is, did the same proportion of non-arrested individuals get arrested in each successive month during the follow-up period? Or, is recidivism more likely to occur during some part of that period? Fixed period observations do not address such questions.

Survival analysis, on the other hand, specifies the proportion of releases who survives by not recidivating (by arrest) within one year after release from prison.

However, survival analysis provides more precision and specificity than does the fixed observation method.

DEFINING AND MEASURING RECIDIVISM

Applying Recidivism Definitions for Survival Analysis

Generally, recidivism refers to the recurrence of criminal behavior following a given event, usually a correctional event such as release from prison. The length of time before an individual recidivates depends on both the starting event and the terminal event, or how recidivism is defined. Recidivism has been defined in various ways. The event that initiates the follow-up period, for instance, may be a release from prison, the onset of a probation term, or the completion of a community treatment program. Likewise, the event that defines the recurrence of criminal behavior may be an arrest, conviction, or incarceration that occurs during a specified follow-up period.

The events that define the "survival time" depend largely on the purpose of the study and the available data. For example, if a study is evaluating how well probationers perform, it may consider every violation of probation conditions or every arrest during probation as an act of recidivism. However, if the study is trying to determine what effect the probationers' recidivism has on prison population, the terminal event would be more narrowly defined as "return to prison." Of course, any approach is feasible only to the extent that an accurate, reliable, and complete source of data is available.

For the ROP study, recidivism activity was defined both in terms of arrest convictions and incarcerations in State prison that occurred during the specified follow-up period and were recorded on the Statewide Computerized Criminal History (CCH) system.1 Analysis of recidivism based on conviction was impossible because of the extent of missing conviction information on the CCH system. Therefore, the ROP analysis includes two in

1. CCH system records contain history and serious misdemeanor arrests that are not retrievable from the Department of State Police (DPS). These records do not necessarily contain all the arrests for an individual, since local serious arrests are excluded and because the DSS may experience delays in receiving or posting information to the CCH system. In- currences within the ROP study are therefore limited to the Illinois Department of Corrections (IDOC) facilities. Commitments to local jails or Federal facilities do not routinely appear on the CCH system and were excluded from the study.
Controlling where the individual was incarcerated for a technical violation of conditional release.) Thus, cases that had experienced an interval were considered as "surviving," yet it would be inaccurate to count the case as a terminal event. Survival analysis statistically controls for censoring by treating them as withdrawing, but not terminating, from the sample at the point where they can no longer be considered at risk.

As in the medical example above, individuals in the ROP sample also may have been "withdrawn" from the sample before terminating. It is likely that certain individuals, either at death or by other events (such as an individual no longer residing in the State), were no longer at risk of being arrested or incarcerated. Unadjusted survival data were not available to determine these cases.

Censored observations were relevant in the ROP because of the three-month window of release dates used in selecting the sample. Given this three-month window and the fixed end date of August 28, 1985, actual exposure/survival time for those cases that survived the entire follow-up period, without any incarceration ranged between 27 and 29 months.

To give each surviving person credit for only that amount of time he or she was exposed to arrest or incarceration, the entire follow-up period was considered as surviving for the entire time the individual was at risk, based on the same censored observation technique.

The daily survival times were collapsed into monthly (30-day) intervals for each individual. Each monthly interval is consistently used in recidivism research. Thus, cases that had experienced an arrest or incarceration between 1 and 30 days following release were considered as having been censored at the present analysis (the first 30 days of the follow-up period) found that the rate was not constant across the 27- to 29-month follow-up period. Generally, the decrease in the proportion of individuals surviving (indicated by the slope of the survival curve) during this three-month interval was greatest during the earlier intervals. These findings are consistent with the previous ROP analysis (based on an 18- to 20-month follow-up period). The "critical period" for arrest occurs in the first months following release, and the rate of arrest recidivism levels off after that time. The current analysis showed the leveling trend persists for at least an additional 18 months.

Re昨晚: 0.5

Reidvidim Rates and Measures

Incorporating "censored observations" into survival analysis controls for the possibility that certain cases may withdraw, or cease to be exposed to risk, for reasons other than terminal events. In medical research, for instance, if a cancer patient died as a result of medical causes before the onset of cancer-related symptoms, the individual should be considered as surviving up to that point. The individual should not be scored as "alive," yet it would be inaccurate to count the case as a terminal event. Survival analysis statistically controls for censoring by treating them as withdrawing, but not terminating, from the sample at the point where they can no longer be considered at risk.

As in the medical example above, individuals in the ROP sample also may have been "withdrawn" from the sample before terminating. It is likely that certain individuals, either at death or by other events (such as an individual no longer residing in the State), were no longer at risk of being arrested or incarcerated. Unadjusted survival data were not available to determine these cases.

Censored observations were relevant in the ROP because of the three-month window of release dates used in selecting the sample. Given this three-month window and the fixed end date of August 28, 1985, actual exposure/survival time for those cases that survived the entire follow-up period, without any incarceration ranged between 27 and 29 months.

To give each surviving person credit for only that amount of time he or she was exposed to arrest or incarceration, the entire follow-up period was considered as surviving for the entire time the individual was at risk, based on the same censored observation technique.

The daily survival times were collapsed into monthly (30-day) intervals for each individual. Each monthly interval is consistently used in recidivism research. Thus, cases that had experienced an arrest or incarceration between 1 and 30 days following release were considered as having been censored at the present analysis (the first 30 days of the follow-up period) found that the rate was not constant across the 27- to 29-month follow-up period. Generally, the decrease in the proportion of individuals surviving (indicated by the slope of the survival curve) during this three-month interval was greatest during the earlier intervals. These findings are consistent with the previous ROP analysis (based on an 18- to 20-month follow-up period). The "critical period" for arrest occurs in the first months following release, and the rate of arrest recidivism levels off after that time. The current analysis showed the leveling trend persists for at least an additional 18 months.

Reexplicit rates are the proportion "surviving" across successive monthly intervals of the follow-up period.

Another measure used in survival analysis is the hazard rate. The hazard rate measures the likelihood that an individual who survived to the beginning of an interval would terminate during that interval. As was the case for the ROP analysis, the hazard rate measures the proportion of the at-risk population (those who previously have not been censored or terminated) who failed sometime during a given interval.

PATTERNS OF RECIDIVISM FOR THE ROP SAMPLE

During the 27- to 29-month period following release, approximately 60 percent of the ROP prison releases in the ROP sample were arrested, while approximately 42 percent of the sample were incarcerated either for a new offense or a violation of conditional release. The fixed interval method would have yielded only the proportion "surviving" at the end of the entire follow-up period, not the proportion surviving at each monthly period. By adjusting survival rates across the follow-up period, survival analysis produces more detailed and revealing findings.

As Figure 1 shows, the survival curve for arrest recidivism indicated that the rate was not constant across the 27- to 29-month follow-up period. Generally, the decrease in the proportion of individuals surviving (indicated by the slope of the survival curve) during this three-month interval was greatest during the earlier intervals. These findings are consistent with the previous ROP analysis (based on an 18- to 20-month follow-up period). The "critical period" for arrest occurs in the first months following release, and the rate of arrest recidivism levels off after that time. The current analysis showed the leveling trend persists for at least an additional 18 months.

Reexplicit rates are the proportion "surviving" across successive monthly intervals of the follow-up period.

Another measure used in survival analysis is the hazard rate. The hazard rate measures the likelihood that an individual who survived to the beginning of an interval would terminate during that interval. As was the case for the ROP analysis, the hazard rate measures the proportion of the at-risk population (those who previously have not been censored or terminated) who failed sometime during a given interval.

PATTERNS OF RECIDIVISM FOR THE ROP SAMPLE

During the 27- to 29-month period following release, approximately 60 percent of the ROP prison releases in the ROP sample were arrested, while approximately 42 percent of the sample were incarcerated either for a new offense or a violation of conditional release. The fixed interval method would have yielded only the proportion "surviving" at the end of the entire follow-up period, not the proportion surviving at each monthly period. By adjusting survival rates across the follow-up period, survival analysis produces more detailed and revealing findings.

As Figure 1 shows, the survival curve for arrest recidivism indicated that the rate was not constant across the 27- to 29-month follow-up period. Generally, the decrease in the proportion of individuals surviving (indicated by the slope of the survival curve) during this three-month interval was greatest during the earlier intervals. These findings are consistent with the previous ROP analysis (based on an 18- to 20-month follow-up period). The "critical period" for arrest occurs in the first months following release, and the rate of arrest recidivism levels off after that time. The current analysis showed the leveling trend persists for at least an additional 18 months.

Reexplicit rates are the proportion "surviving" across successive monthly intervals of the follow-up period.

Another measure used in survival analysis is the hazard rate. The hazard rate measures the likelihood that an individual who survived to the beginning of an interval would terminate during that interval. As was the case for the ROP analysis, the hazard rate measures the proportion of the at-risk population (those who previously have not been censored or terminated) who failed sometime during a given interval.

PATTERNS OF RECIDIVISM FOR THE ROP SAMPLE

During the 27- to 29-month period following release, approximately 60 percent of the ROP prison releases in the ROP sample were arrested, while approximately 42 percent of the sample were incarcerated either for a new offense or a violation of conditional release. The fixed interval method would have yielded only the proportion "surviving" at the end of the entire follow-up period, not the proportion surviving at each monthly period. By adjusting survival rates across the follow-up period, survival analysis produces more detailed and revealing findings.

As Figure 1 shows, the survival curve for arrest recidivism indicated that the rate was not constant across the 27- to 29-month follow-up period. Generally, the decrease in the proportion of individuals surviving (indicated by the slope of the survival curve) during this three-month interval was greatest during the earlier intervals. These findings are consistent with the previous ROP analysis (based on an 18- to 20-month follow-up period). The "critical period" for arrest occurs in the first months following release, and the rate of arrest recidivism levels off after that time. The current analysis showed the leveling trend persists for at least an additional 18 months.

Reexplicit rates are the proportion "surviving" across successive monthly intervals of the follow-up period.

Another measure used in survival analysis is the hazard rate. The hazard rate measures the likelihood that an individual who survived to the beginning of an interval would terminate during that interval. As was the case for the ROP analysis, the hazard rate measures the proportion of the at-risk population (those who previously have not been censored or terminated) who failed sometime during a given interval.
Recidivism Rates Based on Arrest and Incarceration Reveal Different Patterns

Figure 1: Recidivism Rates Defined by Arrest and Incarceration

![Graph showing proportion surviving at end of month over months since release]

These hazard rates underscore the information contained in the survival plots. Those intervals in which the hazard rate is high correspond to those intervals in which there are steep drops in the proportion of releasees surviving on the survival curve.

The plot of the hazard rate for recidivism defined by arrest reveals that the releasee's risk of arrest generally declined across time. Although the data plot fluctuates, the underlying pattern reveals that the longer an individual survives, the less likely that individual is to be arrested in subsequent intervals.

In this sense, the ROP sample parallels recidivism patterns revealed in other studies. As a whole, these studies suggest that the surviving portion of the sample will experience a continually diminishing risk of arrest over time. For instance, a 1977 analysis found this pattern existed for a cohort of Federal prison parolees tracked over an 18-year period. A 1984 study of IDOC parolees revealed the same phenomena, although the follow-up period—22 months—was considerably shorter.

The hazard rate for recidivism defined by incarceration indicates that the period in which the rate of return to prison is highest falls between the 6th and 18th month following release. The rate was initially low over the first several months, varied roughly between 2 percent and 4 percent for several months, and then generally diminished. Since our definition of survival time for recidivism based on incarceration is unique because it is affected by criminal justice processing time, there is little basis for comparing our findings with other studies. However, a comparison of the areas of highest risk for arrest recidivism with those for incarceration recidivism again reveals the lag caused by criminal justice processing time.

Using Models to Analyze and Project Recidivism

The ROP findings based on arrest recidivism confirm the general findings of other arrest recidivism studies.


Risk of Arrest Generally Declines over Time

Figure 2: Hazard Rate for Recidivism Defined by Arrest

![Graph showing proportion of AT-RISK population failing over months since release]

Risk of Incarceration Is Generally Highest between the 6th and 18th Months

Figure 3: Hazard Rate for Recidivism Defined by Incarceration

![Graph showing proportion of AT-RISK population failing over months since release]
studies that have used survival analysis. These studies have consistently found the rate of arrest following a correctional event is highest soon after the starting event (usually release from prison, but sometimes specific types of conditional release or the onset of probation) and that this rate progressively declines over time. While there may be variations, especially among dissimilar populations or situations (for example, habitual offenders vs. minor offenders or probation vs. prison release), the general pattern parallels these studies also support the idea that a certain proportion of any sample can be expected to "survive" without arrest for the entire follow-up period. Again, this proportion varies greatly with different populations and across different situations, but there is no evidence of a sample (or subgroup) experiencing total failure (the proportion surviving reaching zero). After tracking arrest contacts during an exhaustive 18-year follow-up period, researchers in a 1977 study found that approximately one-third of the cohort had not failed and were not expected to fail. Given these patterns, coupled with the assumption that a proportion of the sample will "survive," numerous models based on arrest have been developed to help interpret and predict recidivism rates.

The ROP arrest recidivism findings were analyzed using a model developed by Maltz (1984), they were found to be extremely close to a "normal" survival rate. Normal here connotes that there is a typical, or standard, rate of arrest to which specific findings can be compared. Its use here is analogous to that of depicting a normal distribution of a demographic variable by a bell-shaped curve. The model also projected the proportion of the sample that ultimately would be expected to fail by arrest—63 percent (or between 58 percent and 67 percent, with a 95 percent confidence interval). The projected rate indicates that of the total proportion of the sample expected to fail (63 percent), a vast majority (50 percent of the total sample) will have failed within 29 months following release, based on model projections. Very few of those individuals who had "survived" without arrest throughout the most recent update would be expected to fail at some future date.

**COMPARING RECIDIVISM RATES ACROSS SUBGROUPS**

The ROP study used survival analysis to compare recidivism rates for various subgroups of the sample. Subgroups were defined by age at release, the security level of the institution at release, violent vs. property offenders, prior arrest history, and prior incarceration history. Note that these subgroup analyses do not afford the same attention to recidivism based on incarceration as to recidivism based on arrest. This is because different definitions of recidivism have different limitations and implications. As stated, the lag in recidivism measured by incarceration resulted, at least partially, from criminal justice processing time. In this sense, incarceration recidivism is an artifact of arrest recidivism. When subgroup comparisons were run for incarceration recidivism, the effect of criminal justice processing time was not necessarily constant across all subgroups. Although criminal justice processing time had some effect on the rates of incarceration recidivism, it is impossible to determine how this factor affected incarceration time for the entire sample, nor why this effect varied across subgroups. To avoid introducing ambiguity to these subgroup analyses, the comparisons are summarily described at the end of this section. These findings should be viewed solely as a description of the rate at which these various subgroups return to prison. Comparisons should not be made across definitions of recidivism rates; for example, the age subgroup recidivism rates based on arrest should not be compared with the corresponding rates based on incarceration.

**Arrest Recidivism: Comparing Across Age Subgroups**

Figure 4 plots the rate of recidivism for three subgroups defined by age at release from prison: releases age 17 to 20 (92 individuals), age 21 to 25 (169), and age 26 and older (287). The graph shows the youngest subgroup of releases, those age 17 to 20, were the most likely to be arrested during the 27- to 29-month follow-up period and were arrested at a more rapid pace. About 76 percent of the youngest subgroup were arrested by the end of the follow-up period. A majority of this subgroup (63 percent) were arrested within the first eight months after release, as the steep drop in the proportion surviving over the first eight months following release illustrates.

---

8 Kitchner et al., 1977

9 Maltz (1984) acknowledges the utility of return to prison as a recidivate event for practical applications (that is, projects) of criminal justice practice for prisoners, but he notes that it is not appropriate from a theoretical or predictive point of view in which the focus is on the full range of criminal behavior. For these reasons, it is clear why incarceration recidivism receives scant attention in the literature, which is mostly theoretical in nature.
In contrast, the two older subgroups—those age 21 to 25 at release and those 26 and older—were less likely than the youngest subgroup to be arrested during the follow-up period. The proportion of releases arrested by the end of the follow-up period was almost identical for both subgroups: 57 percent and 56 percent, respectively.

But, while the proportions tailing and surviving at the end of 27 to 29 months were virtually identical, the two older subgroups demonstrated markedly different rates of arrest recidivism in the follow-up period, specifically during the first 16 months following release. During the first two months following release, both subgroups recidivated at a fairly equal rate. However, the 26- and older subgroup continued to recidivate at a relatively rapid pace up until the ninth month; after that, the rate of recidivism decreased markedly. Conversely, for the 21-to-25 subgroup, the survival rate declined earlier, but more evenly, after the second monthly interval. In other words, this subgroup exhibited a more constant rate of recidivism and a more gradual leveling off.

At the interval representing 16 months after release, the proportions of the two older subgroups surviving were virtually identical: 52 percent of the subgroup 26 and older and 53 percent of the 21-to-25 subgroup had been arrested. And from the 16th interval through the end of the follow-up period, the rates of recidivism for these two subgroups were almost indistinguishable.

In general, no clear relationship between age and recidivism emerged from the ROP sample. Although a relationship in the ROP sample between arrest recidivism and age at release does not suggest a direct, or linear, relationship, these findings do continue a theme common throughout criminal justice literature: youthful offenders are more criminally active than their older counterparts.

**Arrest Recidivism: Comparing Across Security Designations**

Figure 5 compares the survival rates of three subgroups of releases defined by the security level of the institution they were released from. This comparative analysis was based on 495 cases which allowed such a determination. Excluded were cases with missing information (20) and female releases (16). All females in the sample were released from the Dwight Correctional Center, which, unlike the male institutions, does not have a unique security designation. Instead, Dwight is the only state institution for female offenders across all security designations. The three institutional security levels that were compared were maximum (188 inmates), medium (256), and minimum (49).

The differences in the survival curves of these three subgroups are clear. While 65 percent of the releases from maximum-security institutions were arrested in the 27- to 29-month follow-up period, approximately 59 percent of the medium-security releases and 41 percent of the minimum-security releases were arrested. Furthermore, the distinctions in the proportions surviving at monthly intervals persist throughout the follow-up period.

Of the three subgroups, the survival curve for the maximum-security releases dropped most drastically in the early intervals and then levels off. By comparison, medium-security releases recidivated at a nearly equal rate in the initial three monthly intervals, but their recidivism rate began to slow sooner than it did for the maximum-security releases. Minimum-security releases generally demonstrated a more even rate of recidivism than the other subgroups. Finally, releases from minimum-security institutions generally recidivated at a slower rate than the others. The relative unevenness of this curve results from the low number of cases, 49. Even a minor numerical change in "survivors" in this subgroup causes a large proportional change.

These findings seem to indicate that a relationship exists between recidivism and the security level of the institution the individual was released from. Based on this sample, prisoners released from higher-security institutions are less likely to be arrested during the follow-up period than those released from lower-security institutions.

**Arrest Recidivism: Comparing Across Prior Incarceration Histories**

Figure 6 presents the arrest recidivism rates for two subgroups defined by the releasee's "holding offense." The holding offense is the offense for which the inmate was sentenced to State prison and which ultimately led to the inmate's inclusion in the ROP sample. The IDOC determines the holding offense for each inmate. When an offender is sen-
Arrest Rates Are Lowest for Releases Completing Their First Prison Terms

Figure 7: Survival Analysis to Measure Arrest Recidivism Based on Number of Prior Incarcerations

<table>
<thead>
<tr>
<th>Incarcerations</th>
<th>Proportion &quot;Surviving&quot; at End of Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>3 or more</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Proportion "Surviving" at End of Month

- Tenured for multiple offenses, the holding offense is the least serious and the longest sentence. Two subgroups were analyzed: releases with a violent holding offense (207) and releases with a property holding offense (263). Releases with holding offenses categorized as drug (19) and other (30) were excluded from this analysis because the subgroup size was insufficient to conduct survival analysis. Also excluded were 17 releases whose holding offense was missing from the COH system records.

- The subgroup of releases held for property offenses was more likely to have been incarcerated during the follow-up period, and they recidivated at a faster pace. The proportion of the property subgroup arrested by the end of the follow-up period was 76 percent, compared with 66 percent for the violent subgroup.

Incarceration Recidivism: Comparing Various Subgroups

This section describes the rates at which various subgroups of the ROP sample returned to Illinois prisons during the follow-up period. These subgroup comparisons of incarceration recidivism revealed several trends.

- The younger the inmate was upon release from prison, the more quickly he or she was likely to return to prison. When three subgroups based on age at release were compared, the Authority found that the youngest subgroup (those 17 to 20 years old) returned to prison at the most rapid rate, while the incarceration survival rates for the two older subgroups (those 21 to 25 and 26 and older) were nearly identical across the 27- to 29-month follow-up period. For both older subgroups, approximately 33% of inmates released as younger than 9 months old had been incarcerated at least once by the end of the follow-up period. The rate of incarceration continued at a relatively rapid pace. After the 17th month, the rate of the subgroup with 5 to 9 arrests grew more rapidly. Approximately 21 percent of the subgroup with 1 to 4 arrests had been incarcerated by the end of the follow-up period, compared with 40 percent of the subgroup with 5 to 9 arrests.

- Releases who had completed their first incarceration were least likely to be incarcerated during the 27- to 29-month follow-up period. 36 percent had been incarcerated in State prison by the end of the follow-up period. This subgroup also returned to prison at the slowest rate. Meanwhile, the two other subgroups analyzed, those with 2 to 4 prior incarcerations and those with 5 or more, exhibited no clear difference in incarceration recidivism rates during the first 15 monthly intervals. After that, the rate of incarceration recidivism for the subgroup with 3 or more prior incarcerations continued at a relatively rapid pace. Forty-two percent of the subgroup with 2 prior incarcerations had been incarcerated by the end of the follow-up period, compared with 56 percent of the subgroup with 3 or more.

SUMMARY AND CONCLUSIONS

Using the statistical technique of survival analysis to assess recidivism rates has revealed many findings that more traditional approaches would not. For example, survival analysis told us how quickly members of the ROP sample recidivated, in terms of both arrest and incarceration, during the
Survival Analysis Calculations

Survival analyses for the Repeat Offender Project were conducted using a procedure provided by the SPSS software package (update 7-9). This survival analysis procedure derives various measures that are based on two critical assumptions: 1) "terminal" cases cease to remain "exposed to risk" after they terminate (for ROP survival analyses, this assumption means that once a releasee recidivates, he or she is no longer at risk of "failing" again); and 2) "censored observations" are treated as non-terminating "withdrawals" when they no longer are at risk (for example, if a releasee dies, he or she is not considered to have "failed" or "survived," but is simply dropped from the analysis).

Several survival analysis measures were particularly relevant for analyzing recidivism in the ROP study:

- The proportion of arrests (or reincarcerations) in each interval measures the likelihood that an individual "surviving" to the beginning of any monthly interval will be arrested (or incarcerated) during that interval.
- The proportion of terminal events is most easily expressed for intervals without censored observations. In these instances, the proportion is simply the number of persons arrested (or incarcerated) during the interval, divided by the number of "survivors" who entered the interval. For example, suppose 1500 releasees who had not yet been arrested by the beginning of the 18th interval, 20 of them were then arrested during that interval. The proportion of terminal events would be 0.2.
- The cumulative proportion surviving measures the proportion of the total sample surviving at the end of any given interval; these values constitute the "survival curve." The cumulative proportion surviving can be described as the proportion of the total sample who have not yet been arrested (or incarcerated) at the end of any given interval. For example, the cumulative proportion surviving at the end of the 18th interval is derived by multiplying the proportion surviving for intervals 1 through 18. However, since the cumulative proportion surviving is based on the proportion surviving in each interval, it also is subject to slight adjustments if censored observations occur in any preceding intervals.
- The hazard rate measures the probability that an individual who survives to the beginning of an interval will fail during that interval. The hazard rate for any given interval is similar to the proportion terminating in the interval. However, the hazard rate computes the number exposed to risk of recidivating by adjusting the rate to assume that terminating cases fail out, on the average, halfway through the interval. (This is the same logic used to adjust for censored observations when calculating the proportion terminating.)
- Both the hazard rate and the proportion terminating estimate the probability that a releasee will fail during a given interval. The proportion terminating is based on the assumption that all non-censored cases, whether or not they terminate in that interval, are exposed to risk for the entire interval. Since terminating events normally occur at different times within an interval, and releasees are actually exposed for only a portion of the interval, the hazard rate is a more logical and precise measure. However, unless the number of cases in a sample is very large, the difference between the proportion surviving in an interval and the hazard rate will be minimal. Such is the case in the ROP study.

Initial phases of the Repeat Offender Project were funded in part by a grant from the Bureau of Justice Statistics, U.S. Department of Justice (Grant No. 83-BJ-GX-K019).

Printed by authority of the State of Illinois Printing Order Number: 86-59 Number of Copies: 2,100 March 1988
BIBLIOGRAPHY


