

NEGLIGENT-OPERATOR TREATMENT EVALUATION SYSTEM

PROGRAM EFFECTIVENESS REPORT #7 (SUMMARY OF FINDINGS)

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PREFACE

This report is the last in a series which originally began with the creation of the Post Licensing Control Reporting and Evaluation System (PLCRES) in 1976 and extended in 1983 by a modified version of that system (Negligent Operator Treatment Evaluation System).

The present report is being issued as an internal technical report of the Department of Motor Vehicles' Research and Development Section rather than an official report of the State of California. The findings and opinions may therefore not represent the views and policies of the State of California.

ABSTRACT

The Negligent-Operator Treatment Evaluation System (NOTES) has provided decision makers with biennial cost-effectiveness analyses of the Department of Motor Vehicles' negligent-operator program. This report summarizes the results of the seventh and final impact evaluation of the treatment system.

THE PROGRAM

The negligent-operator program consists of four levels: 1) warning letter; 2) notice of intent to suspend; 3) probation hearing; and 4) probation-violator suspension.

HOW THE EVALUATION WAS PERFORMED

The evaluation was based on the accumulated post-treatment records of 338,743 violators who entered NOTES between May 1991 and October 1994 and were assigned to one of the three lower-level negligent operator programs (Levels 1 to 3) or to a no-treatment control group. Level 4 was evaluated indirectly using data from Level 3 groups. At Levels 1 and 2, violators with evidence on their records of alcohol involvement received specially tailored alcohol materials.

MAJOR FINDINGS

- All four program levels produced statistically significant reductions in traffic citations.
- The treatments at all program levels except Level 2 resulted in statistically significant reductions in accidents, specifically:
 - Drivers receiving the Level-1 or Level-2 letters had fewer accidents than their control counterparts. These differences were statistically significant in the first six months after treatment for Level 1 but not for Level 2.
 - The probation-hearing treatment at Level 3 produced a statistically significant reduction in subsequent accidents, and the probation-violator suspension treatment at Level 4 resulted in an even greater reduction in accidents.
 - Except for Level 2, the treatments were effective in reducing serious accidents (those involving an injury or fatality) as well as those involving only property damage.
 - During the period covered by this report (1991-1994), it is estimated that the Negligent Operator Treatment System (NOTS) program prevented 1,500 accidents per year.
 - The total number of accidents prevented by the program was less than shown in the 1992 NOTES report (2,830 accidents prevented per year). Among the reasons for the decline is the marked reduction in the number of drivers treated and the increase (due to a legislative change) in the proportion of Level-3 drivers with California Vehicle Code section 14601 convictions (driving while suspended) on their record.

- There was some evidence that the increased use of license suspensions among drivers attending Level-3 probation hearings led to an increase in the effectiveness of the treatment.
- There was no indication that the introduction of telephone hearings at Level 3 had any adverse impact on traffic safety.
- At Level 3 there was statistically significant evidence that drivers with prior citations for driving while suspended were less responsive to the treatment (with respect to subsequent accident and citation involvement and hearing attendance).

RECOMMENDATIONS

- Ask the Legislature to reconsider the 1991 law change which raised the number of points assigned to convictions of driving while suspended (from 0 to 2) or to adopt legislation dealing with these offenders through mandatory actions outside the standard point system. This change would greatly reduce the volume and cost of the Level 3 program without any sacrifice in public safety.
- Consider returning to the original policy of using distinctly different letters at Levels 1 and 2, or at least making the Level-2 letters visually distinctive from those sent at Level 1.

- Use existing data from NOTES to address recent management questions concerning previous changes to the neg-op program (e.g., What were the effects of introducing the requirement for proof of insurance before suspended neg-ops could reinstate their licenses?). Although the use of untreated control groups was discontinued in November 1994, a considerable amount of data exists which may be used to address specific issues regarding the effectiveness of the neg-op program. Finally, in light of the absence of new control-group data, it is also recommended that the department explore innovative statistical and methodological approaches to evaluating future changes in the neg-op program.

NEGLIGENT-OPERATOR TREATMENT EVALUATION SYSTEM

Program Effectiveness Report #7

THE PROGRAM

The negligent-operator (neg-op) treatment program, administered by the Department of Motor Vehicles (DMV), consists of several levels of treatment of negligent operators (those with poor driving records). The current levels of treatment are:

- Level 1 - A warning letter (W/L)
- Level 2 - A notice of intent to suspend (N/I)
- Level 3 - A probation hearing (P/H)
- Level 4 - Suspension of probation violators (P/V)

The evidence of negligence in the driver's record and the severity of the intervention increase as the neg-op level increases. For most drivers the *prima facie* legal definition of neg-op is 4 points in one year, 6 points in two years, or 8 points in three years. Convictions of minor moving violations (e.g., speeding) and accidents for which the driver is considered at least partially responsible by DMV receive one point. Major convictions (e.g., drunk driving)¹ receive two points. The W/L is sent when a driver accumulates two neg-op points in one year; the N/I is a second warning letter that is sent when the driver's record reaches one point below the *prima facie* definition of neg-op. The N/I was originally more formal and more severe than the lower-level W/L. At present, the text of letters sent at Levels 1 and 2 are identical. The Level-3 P/H intervention is imposed when a driver has accumulated enough points to reach the *prima facie* definition of neg-op. A driver on probation at Level 3 moves to Level 4 upon receiving a traffic citation or being held responsible for an accident (or being involved in any accident during a period of suspension).

At each of the first two levels, the letter "treatments" are subdivided into two types: a) a standard letter for the majority of drivers at that level of the neg-op program, and b) a letter which includes alcohol information for drivers with a recent major (two point) conviction. The drivers eligible for the standard and alcohol treatments represent two distinct subpopulations at each of the first two levels of the neg-op program.

METHOD OF EVALUATION

The Negligent-Operator Treatment Evaluation System (NOTES) is based on a comparison of the driver records of persons with poor driving records (neg-ops) who are randomly assigned to a treatment or applicant group; treatment group receive the neg-op treatments

¹In 1991 convictions of driving while suspended (California Vehicle Code §14601) began being counted as two points; previously they received zero points.

for which they are eligible and members of the control group are not contacted. In NOTES, only Levels 1 through 3 have been under evaluation using a control group. The fourth level of treatment (P/V) was indirectly evaluated using raw data from Level-3 treatment and control drivers. These raw data contain the effects of treatments at Levels 3 and 4; by removing those incidents which were used in calculating the effect of the Level-3 treatment, the authors assume that any remaining difference between the treatment and control groups can be attributed to the Level-4 treatment.

Survival rate analyses were performed on the accident and citation data for Levels 1 through 3, applying the technique in a way which excluded nearly all of the effects of subsequent higher-level neg-op treatments. Higher-level treatments occur when a driver in the treatment group at one level accumulates enough neg-op points or incidents to become eligible for a contact at a higher level (e.g., contacts at Levels 2 through 4 are considered higher-level treatments for Level-1 drivers). Since the effects of any higher-level treatments are present in the raw data for the treatment groups at Levels 1 through 3, it is important to use a statistical technique which will, as far as possible, eliminate these effects if one is to estimate the separate impact of treatment at each level. In the case of accidents, survival rate analysis considers time to the first accident after treatment and compares the proportion of accident-free drivers in the treatment and control groups at various points in time following their scheduled treatment dates. Survival-analysis techniques are used in NOTES because they are generally considered to be the most appropriate and powerful methods of evaluating treatment effects when the subjects have differing amounts of time in a study after treatment. Additionally, they are the only methods known to the authors which allow a statistically testable segregation of higher-level treatment effects.

FINDINGS

Treatment Effects on Accidents

The results of the survival analyses for accidents are summarized in Table 1. The complete survival curves for the treatment and control group comparisons of primary interest are shown in Figures 1 through 4. In evaluating the differences in program effects on accidents, no statistically significant difference was found between the standard and alcohol interventions at Level 1 or 2 during the first six months. When the data for the standard and alcohol subpopulations were combined at Levels 1 and 2, each of the combined treatment groups showed lower accident involvement in the first six months than the corresponding control group. The results for Level 3 displayed a stronger treatment impact than those for the two lower levels. The reductions were -4.4%, -0.8%, and -11.6% at Levels 1, 2, and 3, respectively.² At each level, the cumulative survival rate

²For Levels 1 and 2, as in previous NOTES reports, all accident data are reported for the six months following treatment, and statistical tests based on this period showed significant treatment impact at Level 1 but not at Level 2. For Level 3, the accident data are reported for the full 12-month period, which has been the practice in all of the previous reports in this series.

of the treatment group was superior to that of the control group for the entire analysis period.

All tables and figures in this report are based on drivers entering NOTES after May 3, 1991, which was when computer programming was completed to implement a legislative change to increase the points assigned for convictions of driving while suspended. The total number of NOTES drivers shown in Tables 1 and 2 are considerably smaller than the totals shown in the two most recent reports (338,743 versus 535,647 in 1990 and 768,160 in 1992) because in previous reports all NOTES drivers who entered the study from January of 1985 through the end of the data collection period were included. The data presented in Tables 1 and 2 of the current report only include drivers who entered the study after April 1991. However, in order to increase the power of tests of statistical significance, earlier data were included in the statistical analyses when the results provided no evidence of a change in treatment effects over time.

There was a statistically significant reduction in accident involvement during the first six months following the Level-1 treatment ($p < .05$); however, an inspection of the Level-1 survival curves shows no indication of this effect lasting beyond six months. At Level 2, the survival curve of the treated drivers was not significantly different from that of the control group.

The treatment effect at Level 3 was highly significant statistically ($p < .001$; a difference this large would occur by chance less than one time in 1,000 samples if there were no real treatment effects). The Level-3 treatment, however, was apparently effective only for about the first nine or ten months after treatment (i.e., the difference between the survival curves did not increase after that point). A statistical test of the estimated effect of the Level-4 treatment on accidents showed it to be highly significant. The effect of the Level-4 treatment was evaluated by subtracting any accident involvement used to calculate the Level-3 treatment effect from the total number of accidents observed for each Level-3 driver; this yielded averages of 56.1 and 68.1 accidents per 1,000 drivers in the treatment and control groups, respectively. The difference in these rates (12.0 per 1,000) is highly significant statistically; this method, with minor refinements, is essentially the same approach used to evaluate the statistical significance of the Level-4 treatment effect. That effect represents a 17.6% reduction in accidents.

Separate analyses of serious accidents (those involving an injury or fatality) indicated that, except for Level 2, the treatments were effective in reducing serious accidents, as well as those involving only property damage.

The results of an impact analysis which was performed using the estimates from the survival analyses are shown in Table 3. The estimated number of accidents prevented by the Negligent-Operator Treatment System (NOTS) program has declined substantially since 1991 (2,830 in fiscal 1991/1992 versus 1,487 in 1994). While the actual number of

accidents prevented has declined, the percentage effects of the program have remained relatively stable. In the 1992 report, the percentage effects on accidents were -2.6%, -1.3%, and -10.9% for Levels 1, 2, and 3 respectively. The latest comparable results were percentage effects of -4.4%, -0.8%, and -11.6%. The reduced number of accidents prevented is due to a decline in the number of NOTS actions being taken, which is largely the result of an overall decrease in the number of convictions reported to DMV by the courts. In fiscal 1991/1992, 623,455 NOTS actions were taken. Comparatively, only 463,173 actions were taken in 1994. The corresponding numbers of convictions reported to DMV were 4,763,454 and 3,397,939.

The estimated numbers of injuries and fatalities prevented were based on separate survival analyses of serious accidents (for Levels 1 through 3) and data published by the California Highway Patrol. In Table 3, the impact of the Level-4 treatment was estimated indirectly by removing the identified impact of the Level-3 treatment from the *raw* accident data for all Level-3 drivers, which contain effects of the Level-4 treatment. This method is slightly less precise in estimating the unique contribution of the Level-4 treatment than the method used for the statistical test, because it combines estimates based on two slightly different samples of Level-3 drivers. However, the impact analysis shown in Table 3 provides the best estimate of the total impacts of the Level-3 and Level-4 programs.

Program cost estimates are not included in this report as they have been previously because accurate cost estimates were not available for Level 3. Level 3 represented 68% of the estimated total program cost in the previous report. Substantial changes have occurred at Level 3 since the original cost analysis was conducted in 1984. Postage rates, salaries, etc., have always been updated as changes occurred, but much of the original costing framework is no longer applicable.

Treatment Effects on Citations

The results of the survival rate analyses of the first three treatment levels, shown in Figures 5 through 7 and Table 2, revealed highly significant reductions in citations at each level ($p < .0001$). Combined results for the standard and alcohol subpopulations at Levels 1 and 2 indicated that the treatments reduced citations by 5.3% and 3.9%, respectively, in the first six months after treatment. The Level-3 treatment reduced citations by 12.0% in the same period. The survival curves revealed that the treatments were effective for about six to seven months. The combined treatments' effectiveness at Levels 1 and 2 was primarily attributable to the standard interventions, which had significantly larger effects than those observed for the corresponding alcohol treatments (i.e., the Level-1 and Level-2 treatments were significantly more effective in reducing citations among drivers receiving the standard letters than among those receiving the alcohol letters). Table 3 displays estimates of citation reduction credited to the program based on the survival rate analyses. The estimate of citation reduction for Level 4 was developed by essentially the same method

used for accidents; and was highly significant statistically. This estimate of the Level-4 treatment impact represents a 20.8% reduction in citations.

CHANGES TO THE NEG-OP PROGRAM

The most recent change to the neg-op program was the adoption of the telephone hearing option for Levels 3 and 4. As of July 1, 1992, the choice of either an in-person or telephone hearing is offered in the mailed notice to appear. When a driver telephones a local DMV Driver Safety office to request a hearing, he/she is generally told that a hearing can be held immediately by telephone or that a telephone hearing can be scheduled when the driver and a hearing referee are both available. For the purposes of this report, data is not yet available to adequately document the unit cost and any resulting savings from conducting neg-op hearings by telephone. A statistical analysis of treatment effectiveness (on both accident and citation involvements) shows that, compared to the previous impact, there is no indication of any lessening of treatment effects after the introduction of the telephone hearing. The results of the analysis of the treatment effect changes on accident involvement are summarized in Table 4.

Another important recent change to the neg-op program was caused by passage of AB 37 in 1990, which raised the neg-op point value of California Vehicle Code (CVC) §14601--driving with a suspended or revoked license--from 0 to 2 points. This had a marked impact on the number of drivers entering Level 3 of the neg-op program. Programming for the point change was completed in May 1991. This was followed by an immediate and substantial increase in the percentage of drivers who entered Level 3 with a prior CVC §14601 conviction (from 8.8% to 49.2% for the 12 months before and after the change). This also coincided with a 65% increase in the number of Level-3 probation/suspension notices, reversing a trend over several years of steadily declining numbers of notices. There was not, however, a corresponding increase in the number of Level-3 drivers attending hearings. This number increased only 16.3%, reflecting a drop in the appearance rate at hearings (based on notices sent) from 53% before May 1991 to 37% in the 12 months following the change. In the NOTES data there has always been a substantial difference between the rates of hearing attendance for drivers with and without prior CVC §14601 citations. Since May 1991, the data show average attendance ratios of 18% and 42%, respectively, for these groups of drivers. The number of alcohol letters mailed at Levels 1 and 2 were also increased by the change in the point value of CVC §14601 convictions, but to a lesser extent than were the notices sent at Level 3.

The impact on program workload and hearing appearance rates seems sufficient to warrant an evaluation of the traffic safety effects of raising the point value of driving while suspended, but there is another reason to examine the effects of this change. The rationale for the increase in points is somewhat questionable if one considers the fact that the ultimate effect of an increased point value is actual or threatened license suspension of drivers who have already had their licenses suspended and have driven anyway. Level-3 drivers with prior CVC §14601 citations showed significantly smaller treatment effects on

accident and citations compared to their counterparts without prior CVC §14601 citations. Figure 4 clearly shows the difference in the treatment effects on accidents within these two groups. These data show that among the drivers having prior CVC §14601 citations there was little (if any) reduction in accidents. This was confirmed by the results of the statistical test, which did not approach significance. In contrast the reduction in accidents among drivers without prior CVC §14601 citations was highly significant statistically. This issue has important program cost implications since 51% of all Level 3 drivers are comprised of CVC §14601 violators. Elimination of these drivers from Level-3 contact would result in substantial cost saving without any sacrifice in traffic safety benefits.

During the Fall of 1988, the Department of Motor Vehicles had already made important changes to the standard Level 3 treatment:

1. The group portion of the hearing was eliminated.
2. The individual portion of the hearing was extended from an average of approximately 10 minutes to about 30 minutes.
3. A substantial percentage of drivers who attended hearings had their licenses suspended in addition to being placed on probation. Prior to this change 3% of drivers had their licenses suspended after attending a hearing; subsequently, this figure increased to 51% (including drivers taking part in telephone hearings).

A comparison of Level-3 groups before and after these changes showed differences in treatment effects on accidents and citations in the expected direction (i.e., supporting the assumption that the increased use of license suspension would promote traffic safety) which approached statistical significance. Furthermore, when the results of the statistical tests for both criteria were combined the outcome was significant ($p < .05$).

The passage of the commercial driver's license law in 1988 increased the number of neg-op points assigned to offenses taking place in heavy commercial vehicles (those which require a Class A or B license to operate). Effective January 1, 1989, convictions for those offenses receive point values one and one-half times higher than previously assigned (for example, a one-point conviction now receives 1.5 points, and a two-point conviction now receives 3 points). In addition, drivers with Class A or B licenses are subject to the same neg-op point limits as other drivers unless they request and attend a hearing. Previously, drivers with Class A or B licenses were automatically allowed two additional points per year before reaching the prima facie legal definition of negligent operator. These changes have substantially increased the number of Class A and B licensees being treated in the neg-op program. Because of concerns about the safety of allowing high-risk commercial drivers to avoid neg-op treatments by entering NOTES control groups, it was decided to exclude drivers with Class A or B licenses from NOTES. Similar traffic-safety concerns prompted a decision to enforce more stringent criteria in monitoring the remaining non-

commercial drivers in the control groups. Programming to exclude commercial drivers from the evaluation samples and to impose more stringent control-group monitoring criteria was completed in July 1991. The data analysis in this report excluded commercial licensees who entered the evaluation samples before the July 1991 change.

In recent years, a series of changes have been made to the Level-1 and Level-2 warning letters. These changes have been in the direction of softening the message of the letters, which is intended to notify the recipient that their driving record is approaching that of a negligent operator. Additionally, the text and layout of the Level-1 and Level-2 warning letters are now identical. It appears that the efforts made to make the letters more palatable may have also made the Level-2 "Notice of Intent to Suspend" letter less effective. A recommendation to consider returning to the original policy of using distinctly different letters at Levels 1 and 2 is made below.

CHANGES TO THE EVALUATION SYSTEM

In November 1994, the Department decided to discontinue the use of the untreated control groups in NOTES. Subsequently, no new drivers entered these control groups, the records of drivers already assigned to these groups were reviewed, and all drivers received the neg-op treatments for which they were eligible. The absence of new control group data make the continuance of this series of evaluations impossible; therefore, this is the last NOTES report in the present form for the foreseeable future.

RECOMMENDATIONS

Based on the results of this evaluation of the neg-op program, the following recommendations are made:

1. Ask the Legislature to reconsider the 1991 law change which raised the number of points assigned to convictions of driving while suspended (CVC §14601) or to adopt legislation dealing with the offenders through mandatory actions outside of the standard point system.
2. Consider returning to the original policy of having different letters at Levels 1 and 2, or at least consider modifications to the letters at Level 2 to make them visually distinctive from the Level-1 warning letters. The identical text of the two letters and the fact that many drivers are sent letters for Levels 1 and 2 within a relatively short span of time may have contributed to the disappointing Level-2 treatment effect. One inexpensive way of possibly improving the effectiveness of the notice of intent would be to alter its content or format (e.g., use color) to make it easier for a driver to distinguish it from a Level-1 letter.
3. Use existing data from NOTES to address management's questions concerning previous changes to the neg-op program (e.g., What were the effects of introducing the requirement for proof of insurance before suspended neg-ops could reinstate their

licenses?). Although the use of untreated control groups was discontinued in November 1994, a considerable amount of data exists which may be used to address specific issues regarding the effectiveness of the neg-op program. Finally, in light of the absence of new control-group data, it is also recommended that the department explore innovative statistical and methodological approaches to evaluating future changes in the neg-op program.

Table 1
Treatment Effects on Accidents—Survival Rate Analysis

Level (Subpopulation) Group	(Sample size)	Number of accident-free drivers per 1,000 (S: survival rate)	Number of accident-involved drivers per 1,000 (F: failure rate; F = 1,000 - S)	Treatment effect (difference in failure rates; E = Treatment _F - Control _F) ^a	Percentage effect $\left(\% = \frac{E}{\text{Control}_F} \times 100\right)^a$
Level 1 ^b					
(Standard)					
Treatment	(110,618)	953.77	46.23		
Control	(27,732)	949.98	50.02	-3.79	-7.6%
(Alcohol)					
Treatment	(49,817)	974.35	25.65		
Control	(12,634)	976.60	23.40	2.25	9.6%
(Combined Standard & Alcohol) ^c					
Treatment	(160,435)	960.15	39.85		
Control	(40,366)	958.31	41.69	-1.84	-4.4%
Level 2 ^b					
(Standard)					
Treatment	(36,206)	945.63	54.37		
Control	(18,175)	944.98	55.02	-0.65	-1.2%
(Alcohol)					
Treatment	(11,005)	965.27	34.73		
Control	(5,711)	964.85	35.15	-0.42	-1.2%
(Combined Standard & Alcohol) ^c					
Treatment	(47,211)	950.37	49.63		
Control	(23,886)	949.95	50.05	-0.42	-0.8%
Level 3 ^d					
(Standard)					
Treatment	(54,742)	926.42	72.60		
Control	(12,103)	916.79	83.21	-9.63	-11.6%
All Levels					
Treatment	(262,388)				
Control	(76,355)				
Total	(338,743)				

^a A minus sign indicates that the treatment group had a lower proportion of accident-involved drivers than the control group, which is consistent with the corresponding treatment reducing accident involvement. The values shown for treatment effect are based on rates having more significant digits than are shown in the table; therefore, they are more precise than values that the reader can calculate from the rounded rates shown in the table.

^b For Levels 1 and 2 the survival rates shown are for 6 months after the driver's scheduled treatment dates. The decision to use a 6-month period was based on previous research.

^c The combined figures were computed by merging the data from standard and alcohol groups, then performing survival rate analyses.

^d For Level 3 the survival rates shown are for 12 months after the driver's scheduled treatment dates. The decision to use a 12-month period was based on previous research.

Table 2
Treatment Effects on Citations—Survival Rate Analysis
(Six-Months After Scheduled Treatment Date)

Level (Subpopulation) Group	(Sample size)	Number of citation- free drivers per 1,000 (S: survival rate)	Number of cited drivers per 1,000 (F: failure rate; F = 1,000 - S)	Treatment effect (difference in failure rates; $E = \text{Treatment}_F - \text{Control}_F$) ^a	Percentage effect $\left(\% = \frac{E}{\text{Control}_F} \times 100 \right)$ ^a
Level 1 (Standard)					
Treatment	(110,618)	774.12	225.88		
Control	(27,732)	760.02	239.98	-14.10	-5.9%
(Alcohol)					
Treatment	(49,817)	813.73	186.27		
Control	(12,634)	805.95	194.05	-7.78	-4.0%
(Combined Standard & Alcohol) ^b					
Treatment	(160,435)	786.33	213.67		
Control	(40,366)	774.30	225.70	-12.03	-5.3%
Level 2 (Standard)					
Treatment	(36,206)	715.24	284.76		
Control	(18,175)	703.15	296.85	-12.09	-4.1%
(Alcohol)					
Treatment	(11,005)	768.43	231.57		
Control	(5,711)	757.86	242.14	-10.57	-4.4%
(Combined Standard & Alcohol) ^b					
Treatment	(47,211)	728.01	271.99		
Control	(23,886)	716.86	283.14	-11.15	-3.9%
Level 3					
Treatment	(54,742)	698.72	301.28		
Control	(12,103)	657.68	342.32	-41.05	-12.0%
All Levels					
Treatment	(262,388)				
Control	(76,355)				
Total	(338,743)				

^a A minus sign indicates the that treatment group had a lower proportion of accident-involved drivers than the control group, which is consistent with the corresponding treatment reducing accident involvement. The values shown for treatment effect are based on rates having more significant digits than are shown in the table; therefore, they are more precise than values that the reader can calculate from the rounded rates shown in the table.

^b The combined figures were computed by merging the data from standard and alcohol groups, then performing survival rate analyses.

Table 3
Program Effectiveness Analysis of the Neg-Op Program—Accident Prevention

Level (Treatment)	Number of drivers treated during 1994	Estimated number of citations prevented	Estimated number of accidents prevented	Estimated number of nonfatal injuries prevented ^a	Estimated number of fatal injuries prevented ^a
1 (W/ L)	310,000	4,491	592	320	4
2 (N/ I)	87,783	1,413	38	(31) ^b	(0) ^b
3 (P/ H)	50,011	3,055	518	124	2
4 (P/ V)	14,500 ^c	5,920	339 ^d	225	3
All Levels	462,294	15,379	1,487	638	9

^aThe estimated numbers of fatal and nonfatal injuries prevented are based in part on data published by the California Highway Patrol (CHP, 1992). Injuries refer to numbers of persons injured.

^bFor Level 2, the rate of involvement in injury/ fatal accidents was slightly higher among treated drivers than among drivers in the control group; that difference in rates was used to estimate program effects even though it was not statistically significant.

^cAt Level 4, a driver may be treated up to four times as a probation violator; the actual number of treatments imposed was 26,587. The number of drivers treated was estimated using an average of 1.836 treatments per driver.

^dPart of the reductions in citations, accidents, injuries and fatalities attributed here to Level 4 might have been caused by Level-3 treatments.

Table 4
Treatment Effects on Accidents—Telephone vs. In-Person Hearings

Period	Group	(Sample size)	Number of accident-involved drivers per 100	Treatment effect	Percentage effect
In-person hearings 5/ 3/ 91 to 6/ 15/ 92	Treatment	(21,725)	74.63	-9.51*	-11.3%
	Control	(4,853)	84.13		
Transition 6/ 16/ 92 to 1/ 31/ 93	Treatment	(11,996)	72.02	-3.55	-4.7%
	Control	(2,685)	75.58		
Telephone hearings 2/ 1/ 93 to 7/ 8/ 94	Treatment	(21,021)	73.25	-16.64*	-18.5%
	Control	(4,565)	89.89		

*The difference in the magnitude of the treatment effect between period A and C (16.6 - 9.5 = 7.1) is not statistically significant.

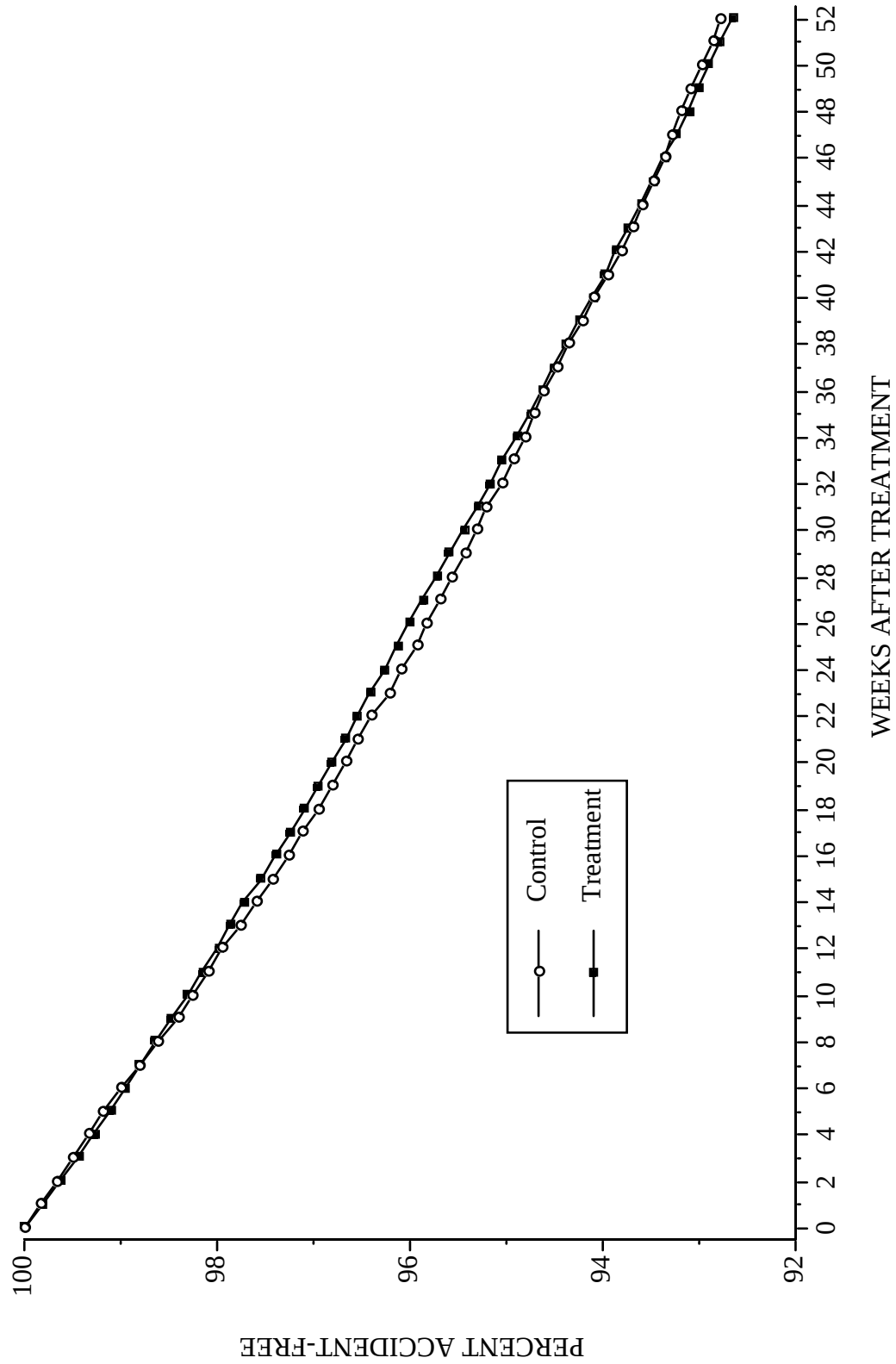


Figure 1 Survival chart for Level 1-W/L (cumulative percentage of accident-free drivers).

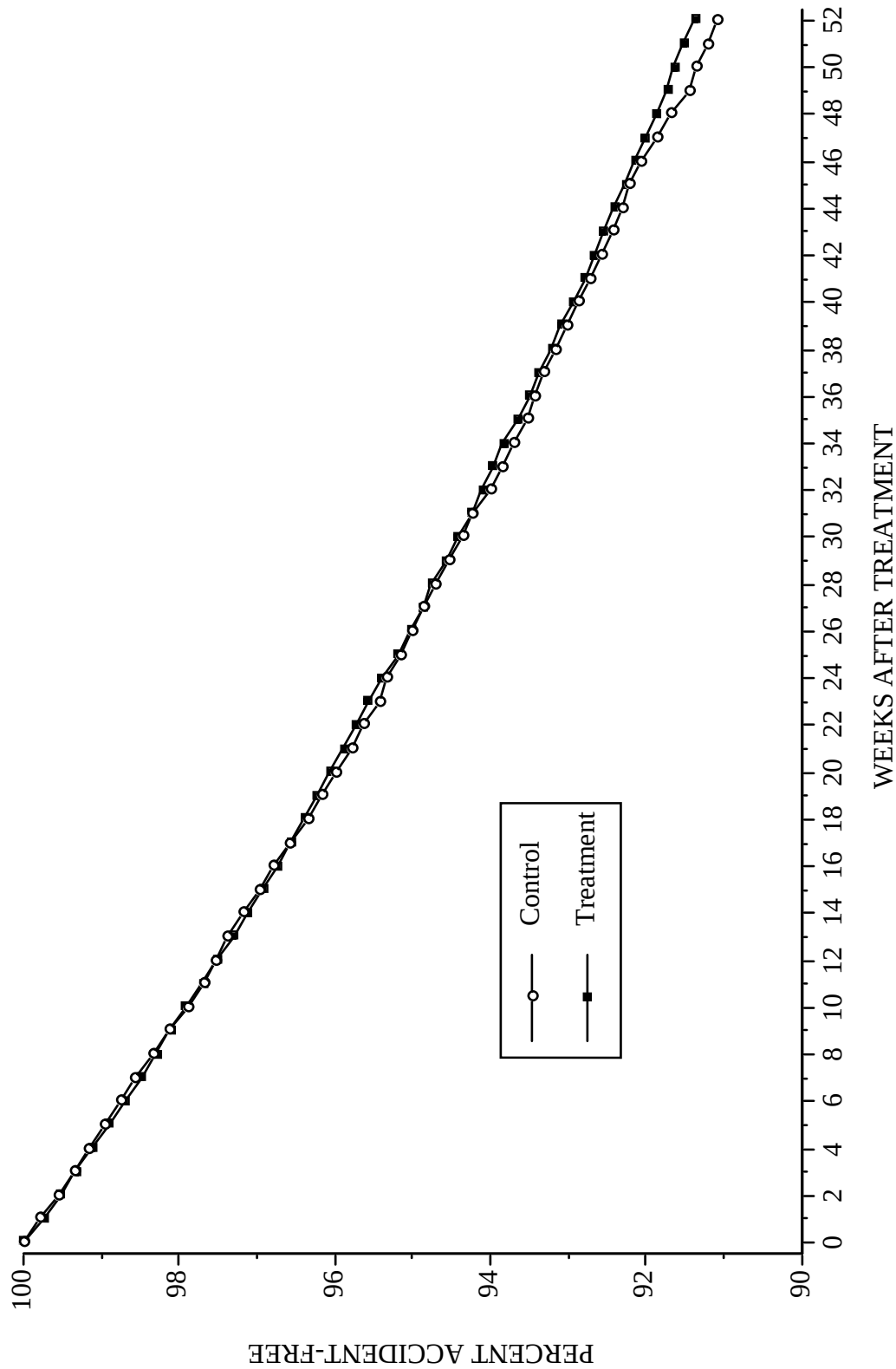


Figure 2 Survival chart for Level 2-N/I (cumulative percentage of accident-free drivers).

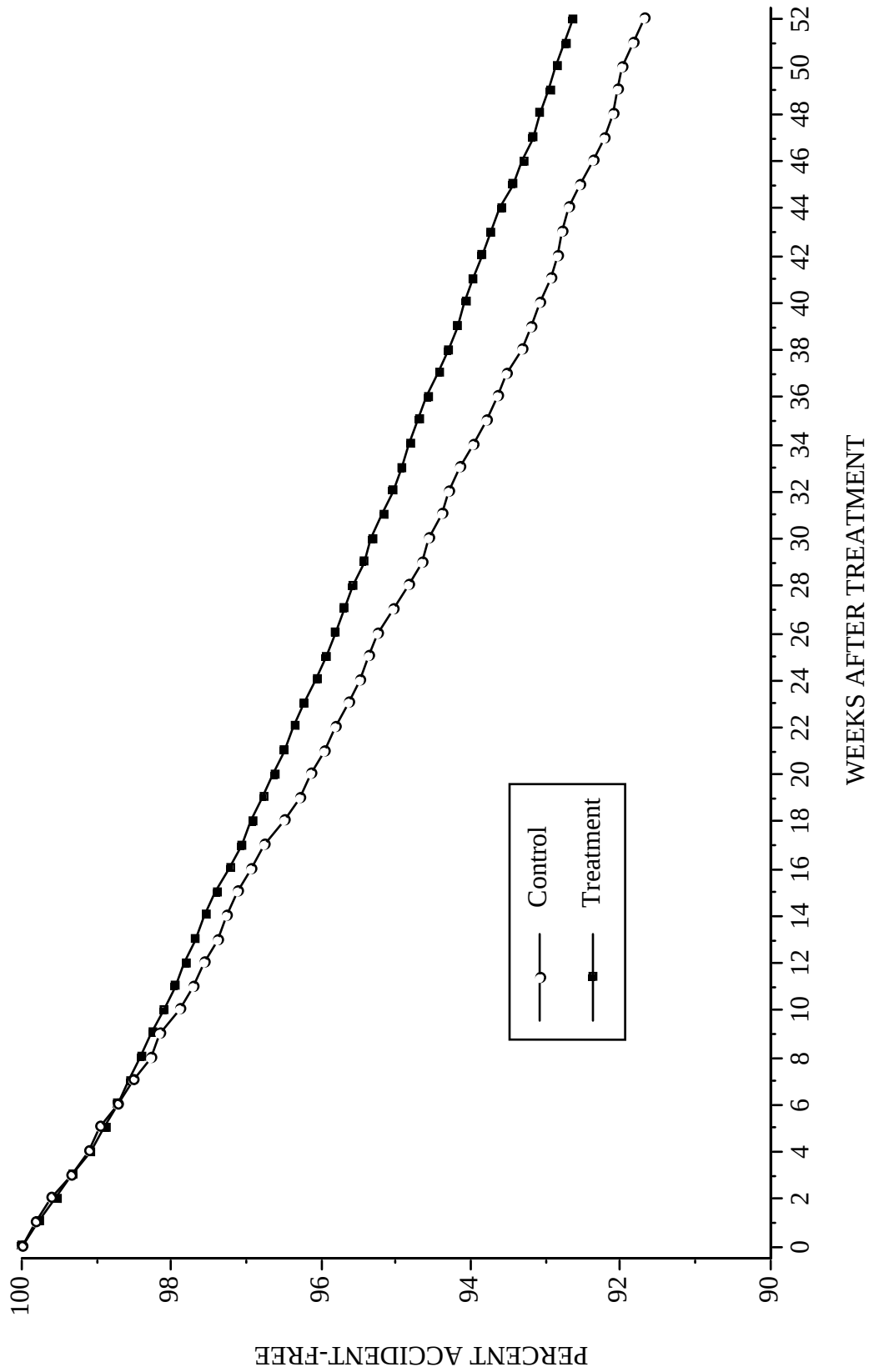


Figure 3. Survival chart for Level 3-P/Hs (cumulative percentage of accident-free drivers).

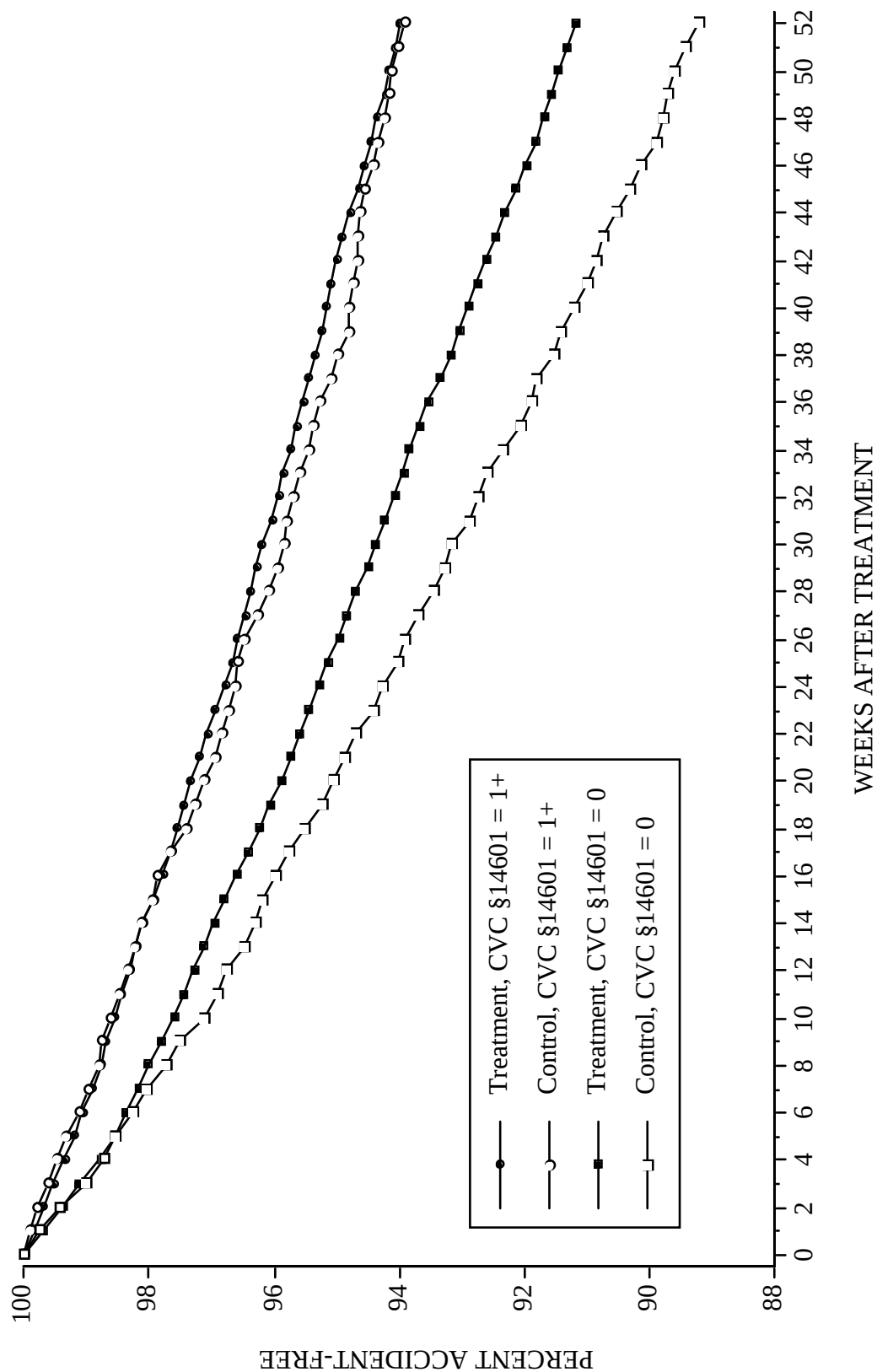


Figure 4 . Survival chart for Level 3—for drivers with and without prior CVC §14601* citations (cumulative percentage of accident-free drivers).

*driving while suspended

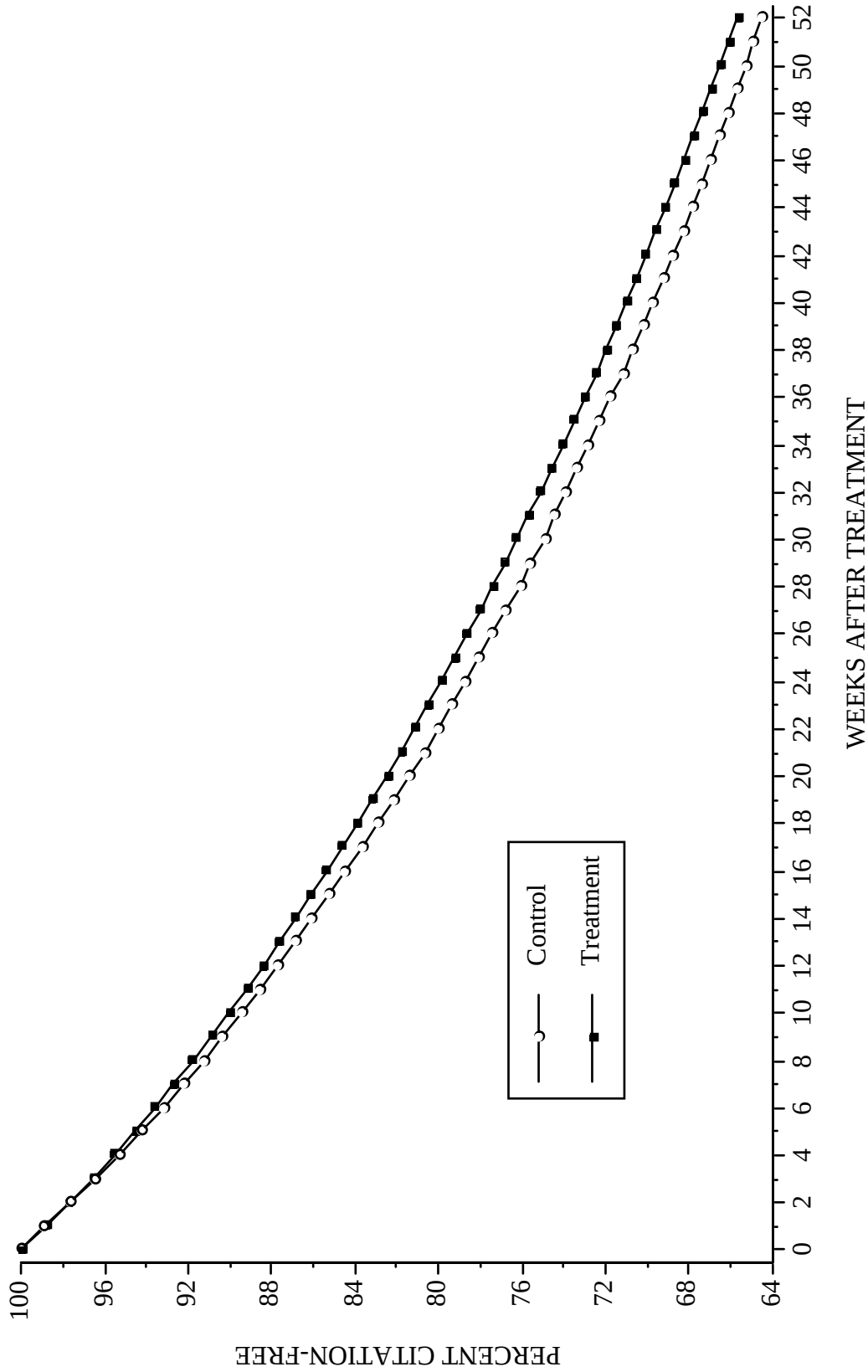


Figure 5. Survival chart for Level 1-W/L (cumulative percentage of citation-free drivers).

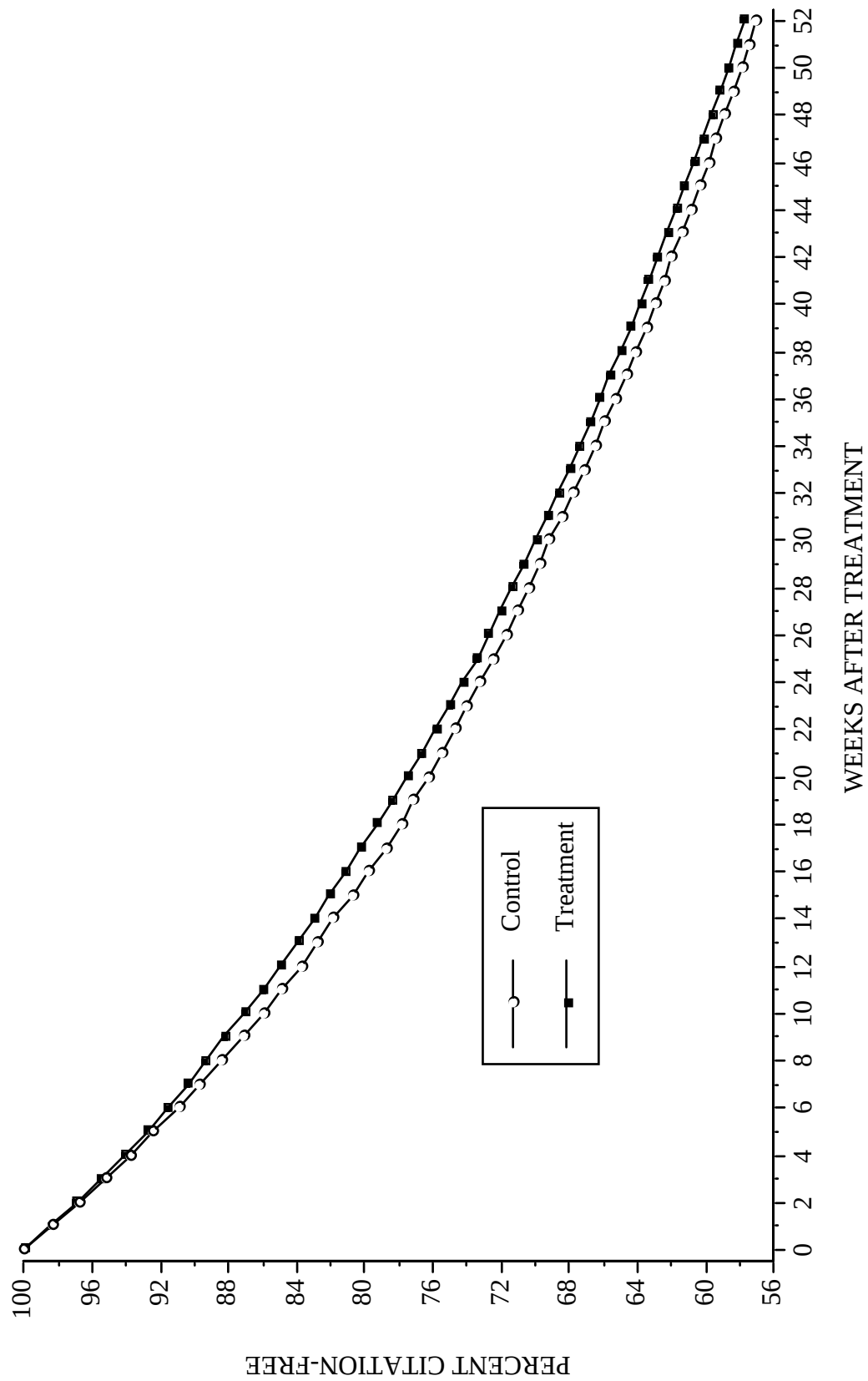


Figure 6. Survival chart for Level 2-N/I (cumulative percentage of citation-free drivers).

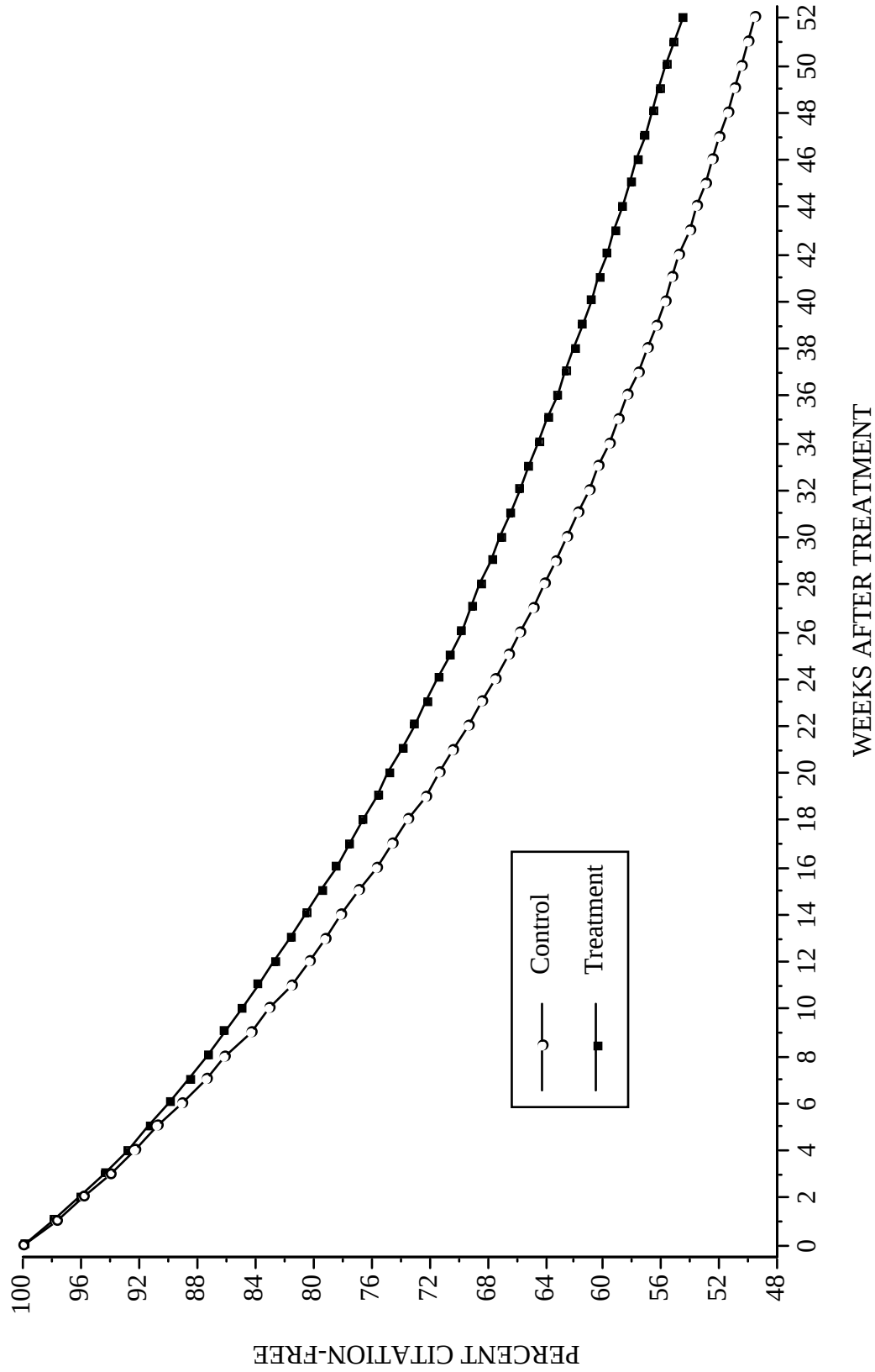


Figure 7. Survival chart for Level 3-P/Hs (cumulative percentage of citation-free drivers).