THE SHORT-TERM EFFECTIVENESS OF WRITTEN DRIVER KNOWLEDGE TESTS

by

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ABSTRACT

Highway Safety Program Standard 5, Driver Licensing, issued by the U. S. Department of Transportation requires the states to test applicants for a renewal of their operator's license on rules of the road at least once every four years. The cost of additional manpower to administer and score these tests, the expense of expanding existing facilities to deal with nearly one million additional applicants per year, and the cost of test materials led the state of Virginia to request a waiver of the testing portion of the standard until evidence could be presented to show that knowledge testing had the desired safety benefit.

The state, in requesting this waiver, proposed to conduct a study of the efficacy of knowledge testing as an accident/conviction reduction countermeasure. The test subjects comprised four groups of drivers: a control group receiving no treatment, a group that received only a driver's manual, a group that received a manual and a test to be completed at home, and a group that received a manual and were requested to take a test in the examining station at the time of application for license renewal.

Comparisons between groups were made of accidents, major convictions, minor convictions, accidents with an associated conviction, and administrative actions taken as a result of points accumulated under the Driver Improvement Program. For the two groups administered a knowledge test, comparisons involved those who passed, failed, or refused to take the test. (Since Virginia statutes do not require knowledge testing for every renewal applicant, there was the probability of a refusal group.)

The study findings are to be presented in two reports. This report covers the first six months of driving exposure for each applicant and deals with the short-term effects of the program. A second report, to be prepared at the end of two year's driving exposure, will deal with long-term effects.

The short-term findings of the study can be summarized under two broad categories: comparisons where statistical differences were not proven to exist, and comparisons where a statistical difference between groups did exist. The comparisons within each of these categories are: the control group compared to an experimental group, two experimental groups compared to each other, and when performances on a knowledge test are compared.

Of the 135 comparisons carried out, there were no statistical differences which reached significance, $p \leq .05$, in 125 of them. Of

the 10 comparisons in which a statistical difference was found, 7 involved applicants who refused to take the home test. In each case their driving records were worse than the records of those in the group to which they were compared. These findings for applicants refusing to take the home test do not provide state licensing officials with meaningful data for the implementation of a knowledge retesting program. In addition, 2 of the other 3 comparisons where a significant difference was found involve accident with conviction data where the sample size is very small and thus limits the practical effects of the statistical results.

Because of the number and nature of the categories that were different, it is concluded that knowledge testing does not improve short-term driving performances as measured in terms of accidents, convictions, and administrative actions.

FINDINGS

The research reported here was designed to provide answers to five questions by using accident, conviction, and driver improvement program administrative action data as measures of effectiveness for the various experimental test conditions. Each of the questions is dealt with below.

1. For the in-station test group, is there a difference in the subsequent driving records of those who passed, failed, or refused to take the knowledge test?

   On the basis of accidents, major convictions, minor convictions, and administrative actions, no differences were found for the three subgroups. For accidents with convictions, the one statistical difference found involved such a low frequency event, less than 1%, as to be of no practical significance.

   The general conclusion is that there are no differences in the subsequent driving records of applicants who either passed, failed, or refused to take a test for knowledge in the examining station.

2. For the at-home test group, is there a difference in the subsequent driving records of those who passed, failed, or refused to take the knowledge test?

   No differences were found on the measures of accidents, major convictions, and administrative actions. For accidents with convictions and minor convictions, the practical importance of the two differences of statistical significances is limited by the small number of individuals involved.

   It can generally be concluded that there are no differences in the subsequent driving records of applicants who either passed, failed, or refused to take a test for knowledge at home.

3. Do applicants who receive only a Virginia Driver's Manual have a different driving record than applicants in the control group? In the other treatment groups?

   For all the measures of effectiveness, there were no differences in the subsequent records of those who

received a manual and those in the control group. When the manual only group was compared with the other experimental groups there were no differences on the accident, accident with conviction, major conviction, and administrative action criteria; while for minor convictions, only one statistical difference was found.

The general conclusion is that there are no differences in the subsequent driving records of applicants who received a Virginia Driver's Manual and those in the control group or of applicants in the other treatment groups.

4. Do applicants who passed, failed, or refused to take the at-home knowledge test have a different subsequent driving record than applicants in the control group? In the other treatment groups?

When the driving records of the home test applicants and those in the control group were compared, no differences were found on the accident, accident with conviction, major conviction, and administrative action criteria. Only one statistical difference was found on the minor conviction criteria.

No differences were found on the major conviction and the administrative action criteria, when the driving records of the various treatment groups were compared. With one exception, the statistical differences found on the accident, accident with conviction, and minor conviction criteria in the comparison of treatment group driving records were due to the refusal group.

The results of this part of the study generally indicate that the subsequent driving records of applicants cannot be distinguished on the basis of whether they passed or failed a knowledge test taken at home. Except for several cases, those applicants who refused to take a knowledge test at home also are no different in their subsequent driving record.

5. Do applicants who passed, failed, or refused to take the in-station knowledge test have a different subsequent driving record than applicants in the control group? In the other treatment groups?

When the driving records of the station test applicants and those in the control group were compared, no differences were found on the accident with conviction, major conviction, minor conviction, and administrative action criteria. Only one statistical difference was found on the accident criteria.

No differences were found on the major conviction and the administrative action criteria when the driving records of the various treatment groups were compared. The statistical differences found on the accident, accident with conviction, and minor conviction criteria all involve a comparison of the driving records of applicants in the station and home test groups. These differences are the same ones which occurred under the preceding question and were primarily due to the driving records of one group.

The results of this part of the study generally indicate that the subsequent driving records cannot be distinguished on the basis of whether the applicants passed, failed, or refused to take a knowledge test at the examining station.

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INTRODUCTION

The U. S. Department of Transportation's Highway Safety Program Standard 5, Driver Licensing, mandates that each state have a program which requires "each driver to be reexamined at an interval not to exceed four years, for ... knowledge of rules of the road."(1) At present there is no firm evidence in the research literature to show that compliance with the standard has a desired safety benefit. This lack of definitive evidence led officials of the state of Virginia to take exception to the requirement for periodic written knowledge testing and to request a waiver of this provision of the standard. The waiver was granted and was predicated on an agreement that the state would conduct the study herein reported.

The testing of individuals who desire to obtain a motor vehicle operator's license has been a standard practice in Virginia for over forty years (see Appendix A). The current procedure requires the applicant for an initial license to pass a battery of tests which include (1) a knowledge test of traffic laws, signs, signals, etc., (2) a visual screening test, and (3) a vehicle operation and performance test. On the basis of their driving records, some applicants for a renewal license are also required to be tested on knowledge and/or vehicle operation. These applicants, as well as all other renewal applicants, are tested in compliance with a state statute dealing with vision requirements.

Virginia, as provided for in the 1974 Virginia Driver Improvement Act (see Appendix B for a description), conducts reexaminations on rules of the road when a person demonstrates, under the point system, that he is not safely operating a motor vehicle. This practice allows the Commonwealth to concentrate its resources on drivers who show that they need improvement rather than scattering its resources attempting to improve everyone.

The relationship between measured driver knowledge and subsequent performance on the highway has not yet been thoroughly demonstrated. A study by Uhlaner and Drucker found that "tests

developed for selection and screening of drivers are likely to be inappropriate for public licensing."(2) "In the case of selection and screening, management is interested in eliminating all but the best. In the licensing process, public officials concentrate on eliminating only the more obvious misfits."(3) The authors further state that there is a "lack of evidence ... of screening out those likely to have accidents and lack of means of getting undisputed proof in terms of accidents."(4)

Levonian, Case, and Gregory studied traffic accidents and violations in relation to a number of variables. The subjects, California fleet and commercial truck drivers, were tested on their knowledge of Interstate Commerce Commission regulations through an open book test. The results of the study did not show a correlation between knowledge score and the variance in recorded accidents. They did find that "the person with a lower knowledge of Regulations score is likely to have more recorded violations."(5) The authors made a distinction between conviction and violation. "A conviction is associated with a citing instance, whereas a violation is associated with each section of the California Vehicle Code which was cited for that instance. If a subject was stopped once but cited for speeding and failure to signal, he would receive one conviction but two violations."(6)

There are several studies reported in the literature which deal with the knowledge and performance issue. One, by J. L. Pursewell, concluded in part that the "relationships between written or machine test procedures and subsequent driving record are inconclusive...."(7)

Another study on the subject was undertaken by the California Department of Motor Vehicles in April 1972 and was authorized by California enabling legislation (Senate Concurrent Resolution 104 [1971]). The experimental program was a study of the reward effects of an automatic license extension for individuals with clean accident and conviction records, as well as an incentive procedure to encourage drivers with prior accident and conviction entries to avoid additions to their records. For clean record drivers, "the reward program had no influence on subsequent convictions but did have various negative effects upon subsequent collisions."(8) It was concluded that "a good driver population is not deemed to be a viable candidate for the program as implemented here."(9) "For drivers with prior entries, the incentive program had no reliable influence on subsequent convictions but did have various positive effects on subsequent collisions."(10) "The subsequent collision reduction evidenced by drivers with prior entries would seem to have important implications for the design of future driver improvement programs."(11)

The Highway Safety Research Center at the University of North Carolina and the North Carolina Department of Motor Vehicles evaluated a North Carolina law which went into effect on June 1, 1974, and eliminated the requirement for renewal driver license applicants to take a written exam. Part of the evaluation involved a comparison of two groups of drivers of about 40,000 applicants each. To assess driver performance, the driving records of each group were monitored during the months subsequent to their assignment to study groups. "Generally the evaluation has examined ... the impact of the law on violations and accidents ...."[12] As a result of the study, the researchers recommended that "the test waiver program should remain in effect for operator applicants with the exception of drivers below the age of 25."[13] The North Carolina results seem to indicate that, except for young drivers, applicants for a renewal drivers license do not benefit from a retesting on knowledge of driving rules.

OBJECTIVE

In this study of the effectiveness of written reexaminations the primary objective is to test the relationship between knowledge, as measured by a written test given selected applicants for a renewal license, and the number of accidents, convictions, and administrative actions resulting from subsequent driving performance. The results of this study should provide both the National Highway Traffic Safety Administration and the Commonwealth of Virginia with information as to the feasibility of implementing retesting on a statewide basis.

METHODOLOGY

Study Population

With the exception of individuals who were specifically identified by Virginia statute or Division of Motor Vehicles (DMV) regulation as requiring a specialized retesting procedure, the license renewal applicants were randomly selected and assigned to four study groups from the statewide renewal population. Individuals who had to pass a written knowledge test because they had accident/conviction records which fit defined categories were not eligible for participation in this study. In addition, the population from which the sample was drawn did not include individuals

who had had their licenses revoked for driving while intoxicated or other major offenses which required them to apply for a new license. This group is required by statute to pass a complete visual, written knowledge, and road performance test prior to relicensing.

The mandatory licensing requirements mentioned above excluded only a small number of Virginia drivers from the population from which the study groups were drawn. Table 1 presents data, current at the time the project was initiated, on the relicensing of operators for which a written examination was required by statute or regulation.

Table 1

Operators Required by Law to Take a Written Exam

	Jan.-Dec. 1974	Percent	Jan.-May 1975	Percent
Written exam only	13,819	1.91	7,956	2.57
Written and road tests	5,564	0.77	0	0.00
Total written tests	19,383	2.68	7,956	2.57
Total operators	723,040	100.00	309,516	100.00

Study Groups

Four groups of subjects were involved in the study — a control group and three experimental groups. The control group was identified for statistical purposes only. Members of this group were not given any materials, written examination, or other special treatment. They did, however, receive the standard renewal notice and take the vision test as required by Virginia statute.

Applicants in experimental group I received the standard Virginia Driver's Manual at the same time they received their renewal notice. Although this group was not tested with a written examination at the time of renewal, a notice (see Appendix C) was attached to the Driver's Manual encouraging the applicant to study the manual. Members of this group took the vision test when they applied for their license.

Experimental group II applicants received a copy of the Virginia Driver's Manual and a written test (see Appendix D) to be completed at home and returned to the examining station at the time they applied for their operator's permit. A notice (see Appendix E) from DMV asked them to study the manual and then take the test. These applicants also took the vision test at the time of renewal. If for some reason the test received by a group II applicant was lost or destroyed, the applicant could obtain another one from any examining station in the state. The applicant then completed this test and returned at a later time for license renewal.

Experimental group III applicants were mailed a copy of the Virginia Driver's Manual and a notice (see Appendix F) asking them to study the manual. The applicants were informed that a written examination would be administered at the time of application for an operator's permit. This group also took the vision test.

Each experimental group was chosen to test a specific application or treatment. Table 2 is a summary of the control and experimental test conditions which applied to each group of subjects. Experimental group I tests the adequacy and effectiveness of instructional materials alone to bring about a change in driving performance. Experimental group II tests the ability of a take home test to effectuate change in driving performance. Experimental group III was designed to be synonymous with the federal standards for reexamination and tests whether in-station knowledge testing can be used to improve the subsequent driving performance of individuals.

The knowledge test used for this study was designed by the Virginia Division of Motor Vehicles. Even though this examination was not tested for validity (it does possess face validity) and reliability, it is the same examination that Virginia would administer to all drivers if the state were to comply with the requirements of Highway Safety Program Standard 5.

Applicants in the two groups for which a knowledge test was part of the experimental condition were not required to pass the test prior to being relicensed. Those individuals who did not pass the in-station or the at-home test were licensed anyway and the driver history file indicated this action. A number of applicants refused to take the knowledge test. They also were licensed and this refusal to take the test was recorded on their file. Accident and conviction data and administrative action data were tabulated according to whether the applicant passed, failed, or refused to take the knowledge test.

Table 2

Test Subject Experimental Condition Summary

Condition	Experimental Group I	Experimental Group II	Experimental Group III	Control Group
Vision Test	Yes	Yes	Yes	Yes
Renewal Notice	Yes	Yes	Yes	Yes
Driver's Manual	Yes	Yes	Yes	No
Test Notice	No	Yes	Yes	No
At-Home Test	No	Yes	No	No
In-Station Test	No	No	Yes	No
Acc./Conv. Data	Yes	Yes	Yes	Yes
Administrative Actions	Yes	Yes	Yes	Yes

Sampling

The determination of sample size was computed using the formula,

$$n = \frac{2\ t^2\ p\ q}{d^2}$$

where

n = sample size,
p = probability of occurrence,
q = (1 - p),
t = statistical precision as an interval value, and
d = expected change (in percentage points).

In computing study group sample size, the assumptions made on rates of involvement were on the conservative side. A 5% probability of only being involved in an accident, a 7% probability of only being convicted for a traffic violation, and a 12% probability of being involved in an accident and/or being convicted for a traffic violation were used. These are the same rates which occurred during 1973, the most current year prior to the development of the study proposal for which data were available. An expected reduction of 10% relative to each category (e.g., 5.0% to 4.5%) also was used in the computations.

The calculated sample sizes for the categories are 10,283 for accidents, 7,190 for convictions, and 3,969 for accidents and/or convictions. Because the largest sample size was needed for determining a reduction in the accident category, this determined the size of the study groups. Because of attrition of subjects due to factors beyond study control, e.g., death and moving from the state, more applicants were selected for each group than were calculated as being needed.

Each month a list of individuals was generated from the population of those persons due for renewal of their operator's license during that month. The generation of the list occurred in a systematic way with every n th individual being chosen from the computer tape listing renewal applicants. After the list had been obtained, individuals were systematically assigned to one of the experimental or control groups previously described. The first person selected was assigned to the control group, the second to experimental group I, the third to experimental group II, etc. By this procedure 2,084 subjects were placed into each study group for each of seven months (see Table 3).

Table 3

Sample Assignment

Months	Control Group	Experimental Group I	Experimental Group II	Experimental Group III	Monthly Total
First	2,084	2,084	2,084	2,084	8,336
Second	2,084	2,084	2,084	2,084	8,336
Third	2,084	2,084	2,084	2,084	8,336
Fourth	2,084	2,084	2,084	2,084	8,336
Fifth	2,084	2,084	2,084	2,084	8,336
Sixth	2,084	2,084	2,084	2,084	8,336
Seventh	2,084	2,084	2,084	2,084	8,336
Group Total	14,588	14,588	14,588	14,588	58,352

Research Framework

An independent tape file accessed by a special identifier was developed for use in this project. The tape contained the test score and the number of knowledge items incorrectly answered by each applicant. This file was matched to the driver history file to obtain data for program analysis.

For a period of six months from the date an applicant renewed his operator's license, DMV files were flagged and the following data accumulated:

1. Convictions for traffic violations. (Both major* convictions and minor** convictions are included as separate categories.)

2. Accident involvement. (Because fault in an accident is not determined by DMV, the category includes all operators involved.)

3. Operators involved in an accident and who are convicted of a violation in connection with their accident involvement.

4. Driver Improvement Program administrative actions (advisory letters, group interviews, personal interviews, clinics and probations) and suspensions. For this study, suspensions were not counted for failure to pay fine, failure to file or maintain insurance, failure to attend driver improvement interviews, etc.

Comparisons between the control group and the experimental groups were carried out for the above four categories of data. For the control group and experimental group I, the total number of individuals involved were used for analysis. In experimental groups II and III, the comparisons were carried out for those who passed, failed or refused to take the test. Because administrative actions are a direct artifact of the conviction experience of drivers, comparisons along these lines are concerned with only the total figures for each category. Accident/conviction comparisons

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*Mandatory and 6-point convictions are considered as major convictions.

**Minor convictions are those with 4- or 3-point values.

were made using total figures, and where the data were available, individuals with multiple entries were also evaluated.

Figures 1 and 2 are schematic diagrams presenting the comparison frameworks that are used in seeking answers to the questions listed below. The first two questions involve the comparison of data within each of the study groups, while the remaining three questions involve the comparison of data between the various study groups.

1. Is there a difference in the subsequent driving record of those who pass the in-station test and those who fail or refuse to take the in-station test?

2. Is there a difference in the subsequent driving record of those who pass the at-home test and those who fail or refuse to take the at-home test?

3. Do applicants who receive only the instructional material (Driver's Manual) have a different subsequent driving record than applicants in the no-treatment group or applicants in the other treatment groups.

4. Do applicants who pass, fail, or refuse to take the at-home test have a different subsequent driving record than applicants in the no-treatment group or those in the other treatment groups?

5. Do applicants who pass, fail, or refuse to take the in-station test have a different subsequent driving record than applicants in the no-treatment group or those in the other groups?

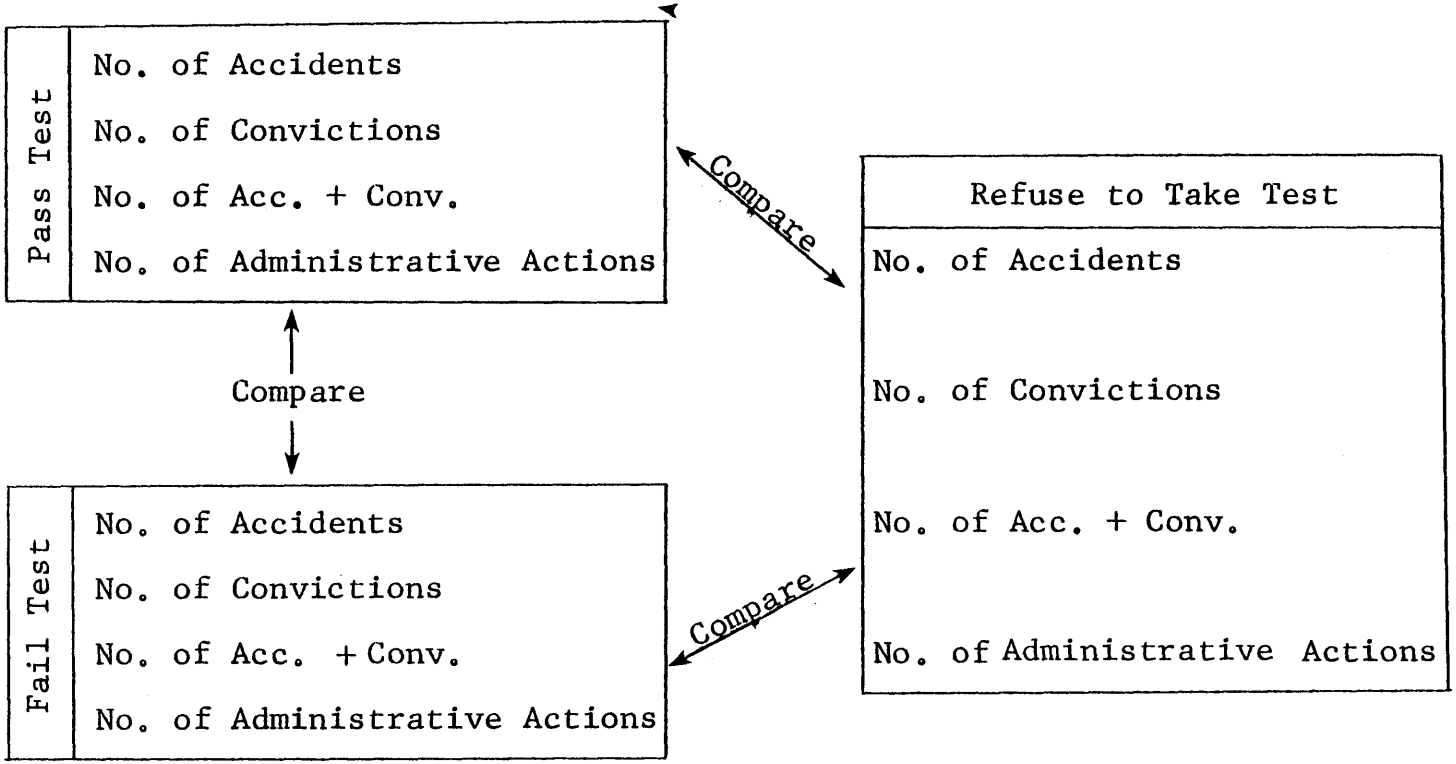

Figure 1. Framework for within group comparisons.

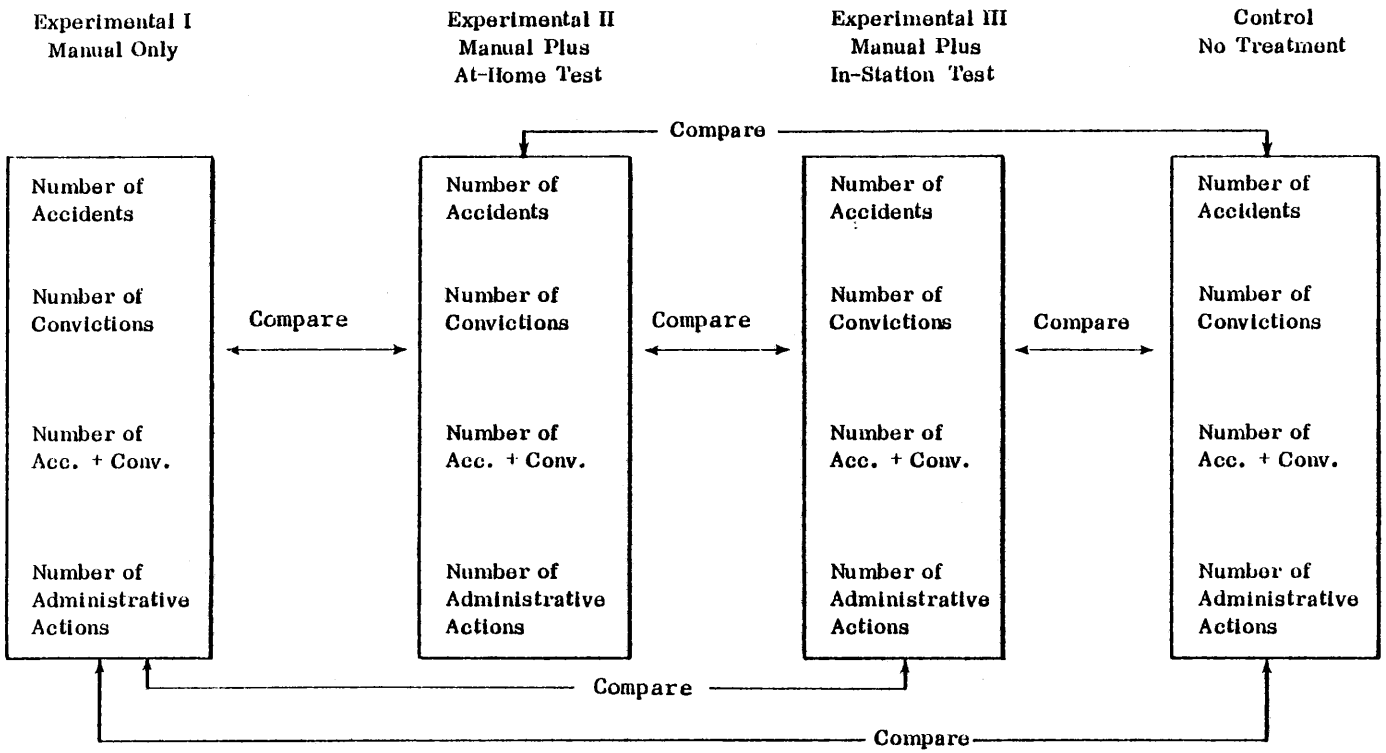

Figure 2. Framework for between group comparisons.

ANALYSIS

There were 14,588 applicants assigned to each of the study groups, but not all of them actually renewed their license within 90 days of the required date. Anyone who does not obtain a license within this time frame is required by statute to be retested as an original license applicant. Records were kept not only on those originally assigned to the study groups, but also on applicants who renewed their licenses and whether they passed, failed, or refused to take the test to which assigned. Accidents, convictions, and administrative actions posted on an individual's driver history file were accessed and tabulated by categories. Table 4 presents the numbers and Table 5 the percentages of these entries for each of the study groups.

The study has three experimental groups and a control group. Two of the experimental groups, those involving the taking of a test, have three major divisions each, i.e., pass, fail, and refuse. Accident/conviction data are divided into two levels, 2 or more and total. The six categories of administrative actions include only figures for the totals.

Because of the design of the study, a large number of comparisons are theoretically possible. At the end of the first six months of vehicle operation subsequent to an applicant's license renewal, there were not sufficient data for the computation of chi-square values for every one of the possible comparisons. Total violation data were available in every minor conviction and accident category, most of the accident with conviction categories, and slightly over half of the major conviction categories. Data were available for only six comparisons in two or more minor convictions and 2 or more accidents. Only for advisory letters, group interviews, and suspensions, were there any data for the computation of chi-square values, and even in these cases the data are not complete.

Table 4

Number of Accidents, Convictions, and Administrative Actions

Number / Category		Control Group	Experimental I (Manual Only)	Experimental II (At-Home Test)			Experimental III (In-Station Test)		
Assigned		14,588	14,588	14,588			14,588		
Renewals		12,123	12,066	Pass	Fail	Refuse	Pass	Fail	Refuse
				10,693	350	707	8,861	691	2,179
With Major Conviction	Total	42	61	44	1	5	33	4	10
	2 or More	2	0	1	0	0	1	0	0
With Minor Conviction	Total	418	449	366	17	38	286	26	85
	2 or More	25	20	23	0	1	12	1	4
With Accidents	Total	327	317	279	8	26	222	25	50
	2 or More	22	19	13	0	1	7	0	3
Accident With Conviction	Total	50	48	37	2	6	34	6	5
	2 or More	0	0	1	0	0	0	0	0
With Advisory Letters	Total	43	41	50	2	3	30	4	9
With Group Interviews	Total	42	35	33	2	5	26	1	7
With Personal Interviews	Total	2	4	4	0	1	6	0	0
With Clinics	Total	1	2	1	0	0	2	0	0
With Probation	Total	1	2	1	0	0	2	0	0
With Suspension	Total	8	12	10	1	1	11	1	1

Table 5

Percent of Accidents, Convictions, and Administrative Actions

Number / Category		Control Group	Experimental I (Manual Only)	Experimental II (At-Home Test)			Experimental III (In-Station Test)		
Assigned		14,588	14,588	14,588			14,588		
Renewals		83.10	82.71	Pass 73.29	Fail 2.39	Refuse 4.84	Pass 60.74	Fail 4.73	Refuse 14.93
With Major Conviction	Total	0.34	0.50	0.41	0.28	0.70	0.37	0.57	0.45
	2 or More	0.01	—	—	—	—	0.01	—	—
With Minor Conviction	Total	3.44	3.72	3.42	4.85	5.37	3.22	3.76	3.90
	2 or More	0.20	0.16	0.21	—	0.14	0.13	0.14	0.18
With Accidents	Total	2.69	2.62	2.60	2.28	3.67	2.50	3.61	2.29
	2 or More	0.18	0.15	0.12	—	0.14	0.07	—	0.13
Accident With Conviction	Total	0.41	0.39	0.34	0.57	0.84	0.38	0.86	0.22
	2 or More	—	—	—	—	—	—	—	—
With Advisory Letters	Total	0.35	0.33	0.46	0.57	0.42	0.33	0.57	0.41
With Group Interviews	Total	0.34	0.29	0.30	0.57	0.70	0.29	0.14	0.32
With Personal Interviews	Total	0.01	0.03	0.03	—	0.14	0.06	—	—
With Clinics	Total	—	0.01	—	—	—	0.02	—	—
With Probation	Total	—	0.01	—	—	—	0.02	—	—
With Suspension	Total	0.06	0.09	0.09	0.28	0.14	0.12	0.14	0.04

Accident Data

The accident data were analyzed with respect to three major divisions: all applicants who had had an accident, those who had been involved in two or more accidents, and all individuals who had been convicted of a violation in connection with their accident involvement. Each of these divisions of data was additionally split into comparisons made within each of the groups assigned to take a knowledge test and comparisons made between the various study groups. The framework for comparisons were presented in Figures 1 and 2 and the divisions of data were discussed at that time.

Appendix Table G-1 presents the results of statistical analyses performed in cases of applicants who were involved in an accident. No differences were found in the number of accidents between the groups who passed, failed, or refused to take the in-station test. In addition there were no differences in the number of accidents of those who passed, failed, or refused to take the at-home test.

When between group comparisons were carried out, in only the one case involving applicants who refused to take the at-home test was a difference found. In the other 21 comparisons, statistical differences were not established. In the case where a statistical difference was found the practical significance is of limited value for state motor vehicle administrators.

In Appendix Table G-2 the results of the analyses of applicants who were involved in two or more accidents are presented. There were not sufficient data for computing chi-square statistics in every comparison category. Of the six comparisons which could be carried out, applicants who passed the in-station test had better records than those in the control group. This is the only finding over the first six months of the study with practical value to driver licensing officials. It must be pointed out, however, that both the rates and numbers of multiple accidents are very small and are subject to random variations associated with small sample sizes.

The results of the statistical analyses of applicants convicted of a violation in connection with their accident involvement are presented in Appendix Table G-3. Of the three comparisons carried out for the in-station group, only in the case of those who refused to take the test when compared with those who failed the test did a statistical difference occur ($p \leq .05$). The refusal group had more entries on their driver history files than the

failure group. For applicants who received a test to be completed at home, data existed for only one comparison. Those who refused to take the test had a worse record, i.e. more entries of an accident combined with a conviction, than did applicants who passed the test.

Of the 17 comparisons carried out between the various groups, two reached statistical significance ($p \leq .05$). One case, that of applicants who failed the in-station test when compared with those who passed the at-home test, is of no practical importance to an operational driver licensing program. The other, a comparison of applicants who refused to take the at-home test with those who refused to take the in-station test, leads to an interesting question of why the at-home refusal group had the worse record.

Out of the 21 total between and within group comparisons computed, the majority (17) did not reach statistical significance ($p \leq .05$) in the number of applicants who had an accident combined with a conviction entry on their driver history files. Although statistical differences were found in 4 cases, the frequency of occurrence did not exceed 1% of those applicants in any category. In interpreting these data a note of caution must be interjected. A minor change in the count significantly affects the ratio and could change the statistical values. Because of this low frequency rate, coupled with a small numerical count (6 or fewer individuals), these statistical differences have little practical operational value. The collection of data over a longer time span, the second phase of this study, should alleviate the sample size problem.

Conviction Data

The conviction data were analyzed in the same manner as that used for the accident data. The three main divisions of the data are major convictions, minor convictions, and two or more minor convictions. Comparisons for each of these data divisions were computed for applicants assigned to the in-station knowledge test and who either passed, failed, or refused to take the test. A second set of comparisons were computed for applicants assigned to the at-home knowledge test and who either passed, failed, or refused to take the test. A third set of comparisons, those between the various study groups and subgroups, were also carried out.

The results of the statistical analyses of applicants with a major conviction on their driving records are presented in Appendix Table G-4. Sufficient data existed for computing chi-square values in 15 cases. Significant differences, $p \leq .05$, were not established in any of the within group or between group comparisons carried out.

Appendix Table G-5 presents the results of the analyses with respect to minor conviction data. There were no statistical differences, $p \leq .05$, in the number of minor convictions of those who passed, failed, or refused to take the in-station test. For applicants in the at-home knowledge test group, more of those who refused to take the test had minor conviction entries on their driving records than did applicants who passed the test. There were no differences in the number of minor convictions in the other two at-home test comparisons.

A total of 22 comparisons were computed between the various study groups and subgroups to determine if there were differences in the number of minor convictions. In 19 cases no statistically significant difference, $p \leq .05$, was established. In the remaining 3, a larger percentage of applicants who refused to take the at-home test had entries on their driver history files when compared with applicants in the control group, those who received only instructional materials, or those who passed the in-station test.

The results of the analyses of applicants who received two or more minor convictions are presented in Appendix Table G-6. Sufficient data were available for computing chi-square values in only 6 cases. Statistical differences, $p \leq .05$, were not proven to exist in any of these comparisons.

From the major and minor conviction data collected during the first six months of this study, the taking and passing of a knowledge test, whether in-station or at-home, does not appear to have improved the subsequent conviction performance of the majority of vehicle operators. In those cases where the passing of a test, failing a test, or receiving instructional materials were compared to the control group or to each other, statistical differences did not equal or exceed $p \leq .05$.

In four minor conviction cases where applicants who refused to take the at-home test were compared with those in other groups statistical differences were found. Although these differences are important from a statistical point of view, they have limited application in an operational setting.

Administrative Action Data

Under the Virginia Driver Improvement Program there are six levels of administrative actions: advisory letters, group interviews, personal interviews, improvement clinics, probations, and suspensions. The number of applicants receiving each of these actions was analyzed with respect to the within group and between group categories previously discussed in this report.

There were insufficient data to make any comparative analyses in three of the administrative action levels. The number of individuals who received personal interviews, improvement clinics, and probations during the first six months of this research study were so few that statistical values could not be computed.

The results of the advisory letter analyses are contained in Appendix Table G-7. No differences were found to exist in any of the comparisons performed. The comparative analyses of the number of study group applicants who had to attend a group interview are presented in Appendix Table G-8. Where data existed for the computation of chi-square values, there were no results which were statistically significant at $p \leq .05$. The results for the final set of data analyzed, those for the number of study group applicants who had had their operator's license suspended, are contained in Appendix Table G-9. In those cases where sufficient data existed for computing statistical values, differences were not proven to exist. Out of a total of 31 comparisons computed on data obtained as a result of administrative actions pursuant to points accumulated under the driver improvement program, no comparison showed a statistical difference at the level set for significance, $p \leq .05$.

The finding that a higher percentage of applicants who refused to take the at-home test had entries on their driver history files associated with a conviction (6 out of the 10 statistically significant results) is an interesting phenomenon from a research point of view. It could be an indication of the role of attitude in driving performance. The applicant was asked to take a test which had no time limits and for which no penalty was assigned for poor performance and refused to participate. This same applicant has a series of rules and regulations, stop signs, speed limits, etc., to adhere to in his driving performance. A legitimate question is, Does he also refuse to obey these mandates?

From an operational point of view, these findings associated with the refusal to take the home test have no practical use under the current statutes of the Commonwealth. There is little way for an administrator to issue or to deny renewal operator licenses based on the applicant's refusal to take the at-home test.

SUMMARY

This project was carried out to determine the effectiveness of written driver knowledge tests. It is a two-phased study, the first of which was designed to evaluate the short-term effects and is reported here. These short-term effects are restricted to a period of six months' driving exposure by each group of applicants. The second phase will cover the long-term effects and will be reported at the end of two years' driving exposure by the applicants.

The evaluation consisted of four study groups: a control, those issued a driver's manual only, those given an at-home test, and those examined at the station. In the two groups administered knowledge tests, applicants are categorized by pass, fail, or refuse to take the test. The three major categories of data are accidents, convictions, and administrative actions.

A total of 135 comparisons were carried out for this phase of the study and involved the testing of differences between study groups as well as within the groups administered knowledge tests. Table 6 briefly describes the comparisons that were carried out, the reasons for making the comparisons, and the results obtained based on accident, conviction, and administrative action data available on the driver history file of each study group applicant.*

Table 6

Summary

Comparisons Carried Out	Reason for Comparison
A. Control group with each of the experimental groups.	A. Does treatment reduce accidents and convictions when compared with no treatment?
B. Each experimental group with each other.	B. Is any part of the experimental program effective or more effective than any of the other parts?
C. Pass, fail, and refuse on each test.	C. Does performance on a test give an indication of the subsequent accident and conviction record?

		Results
Accidents	1. Total	A.* No Difference B. Refuse Station vs. Refuse Home C. No Difference
	2. Two or More	A. Control vs. Pass Station B. No Difference C. Insufficient Data
	3. With Convictions	A. No Difference B. Fail Station vs. Pass Home, Refuse Station vs. Refuse Home C. Fail Station vs. Refuse Station, Pass Home vs. Refuse Home
Convictions	1. Major	A. No Difference B. No Difference C. No Difference
	2. Minor	A. Control vs. Refuse Home B. Pass Station vs. Refuse Home, Manual vs. Refuse Home C. Pass Home vs. Refuse Home
	3. Two or More Minor	A. No Difference B. No Difference C. Insufficient Data
Administrative Actions	1. Advisory Letters	A. No Difference B. No Difference C. No Difference
	2. Group Interviews	A. No Difference B. No Difference C. No Difference
	3. Suspensions	A. No Difference B. No Difference C. Insufficient Data

*Letters refer to comparisons and reasons listed above.

*See Appendix H for alternate method of tabulating findings.

Accidents

1. For the total number of applicants in each group who had had an accident, there were no statistical differences between each of the comparisons of the control group with the 7 experimental groups and subgroups. There also were no differences between those who passed, failed, or refused to take the at-home test, nor between those assigned to the in-station knowledge test and who either passed, failed, or refused to take it.

   In 14 comparisons between the various experimental groups no statistical differences were proven to exist. Only in the case of applicants who refused to take the home test compared with those who refused to take the in-station test was there a difference. The group who refused to take the home test had a greater number of accidents.

2. For applicants who had had two or more accidents, no differences were established between the various comparisons of the experimental groups. There were not enough data for the computation of chi-square values between those who passed, failed or refused to take the in-station test, nor between those in the at-home test group.

   Only in one case, applicants in the control group compared with those who passed the in-station test, was there a statistical difference when the control group was compared with the experimental groups. The control group had more applicants with 2 or more accident entries on their driving records.

3. For accidents with conviction data, no differences between the control group and each of the 7 experimental groups and subgroups was established. In the other between groups comparisons, 15 did not reach statistical significance. Two between group comparisons did reach significance: a greater number of applicants who refused to take the home test had entries on their records when compared to those who refused to take the in-station test, and a greater number of those who failed the in-station test had an accident with conviction record when compared with those who passed the home test.

   In the within group comparisons, there were more applicants who refused to take the in-station test who had had accidents with convictions than those who failed the test, and there were more applicants who refused to take the test at home that had accidents with convictions than those who passed the home test.

Convictions

1. For major convictions and 2 or more minor convictions, none of the between group or within group chi-square values that could be computed reached significance.

2. For minor conviction data, a greater number of applicants who refused to take the at-home test had entries on their driver history files than applicants in the following four groups: control, received only the manual, passed the in-station test, and passed the at-home test.

3. There were an additional 19 between group and 5 within group minor conviction comparisons carried out where statistical differences were not proven to exist.

Administrative Actions

1. There were no statistically significant differences in the number of applicants who received advisory letters, group interviews, or suspensions when the control group was compared with each experimental group, or when the experimental groups were compared to each other, nor within each of the groups assigned to take a knowledge test.

2. For applicants who received personal interviews, improvement clinics, and probation, there were insufficient data for computing between group and within group chi-square values.

CONCLUSIONS

The analysis of the data collected to this point in the study leads to the conclusion that the waiver of the mandate of Standard 5 that requires the knowledge testing of renewal applicants should be continued. Unless there are changes in the data which reverse the preliminary findings of no difference in the majority of cases by the end of the study period, the federal government should initiate procedures to permanently delete the knowledge retesting mandate from the standard.

ADMINISTRATIVE EVALUATION

Richard E. Spring, the Driver Services Administrator of the Virginia Division of Motor Vehicles, had the responsibility for the administrative evaluation phase of the project. This phase involved a monitoring of activities and certain administrative judgements. Even if a research project shows that a knowledge testing program is effective as an accident/conviction countermeasure, it must also be administratively feasible on an operational basis before the state can fully commit itself to implementation.

The initial criteria for conducting this study required mandatory participation with DMV agreeing to refuse to issue a driver's license if a renewal license applicant refused to participate. Numerous complaints were received by DMV within five days after the September renewal notices were mailed to the licensees. The majority of complaints charged discrimination, since some applicants were required to take a written test and some were not. Several persons threatened lawsuits to prevent DMV from requiring a written test unless all persons were required to take the written test. In addition to citizen complaints, DMV received inquiries from members of the state legislature concerning the project.

Due to the number of complaints, DMV made the decision not to require applicants to participate in the testing program. Applicants who refused to participate in the testing program were encouraged to reconsider after a detailed explanation of the purpose and value of the study. If applicants still refused to participate, their statistics file was noted as "refused" and they were allowed to renew their license.

Additional problems were encountered in the September test groups with an inconsistency in the data conversion of test scores and a high percentage of renewal notices (25%) which were returned undelivered to DMV. Because of DMV's decision not to require mandatory participation in the testing program and the other problems outlined above, the decision was made by DMV and National Highway Traffic Safety Administration (NHTSA) personnel that the September test group data should not be used.

Extensive changes were made in the letters which accompanied the material sent to the October test groups. Due to time constraints, NHTSA approval of the content of the revised letters could not be obtained. After all letters to the October test group were mailed, NHTSA personnel suggested several revisions to the letters. With the revisions required in the letters and a continuing inconsistency in data conversion, a decision was made by NHTSA and DMV personnel not to use the October 1975 data.

The project was formally revised to begin the testing phase in November 1975, and to continue through April 1976 with the months of September and October 1975 being considered as a pilot to the testing project. Concerns continued to be expressed about a significant number of renewal notices being returned undelivered and the number of persons who were refusing to participate in the testing phase.

In February 1976 DMV reemphasized to all of its driver licensing personnel the importance of this project and the absolute necessity of encouraging citizens to participate and take the written tests. An immediate drop in the number of persons who refused to take the tests was noted. Even though the number of persons taking the tests increased significantly, the increase was not quite enough to achieve a 95% degree of confidence in the results of the project. Due to the importance of the 95% degree of confidence, the testing phase was extended one month to run through May 1976.

The problems enumerated above should be anticipated in any large-scale project that deals with the public in a sensitive area such as driver licensing. The final administrative evaluation will deal with the costs of the testing phase and the benefits, if any, that could be expected through mandatory testing.

ACKNOWLEDGEMENTS

Thanks are expressed to Richard E. Spring, Administrator, Driver Services Administration, Division of Motor Vehicles, and to Rosemary M. Henderson, Richard Edwards, and Joe Augeri of that office for their assistance in the retrieval of the data used in the preparation of this report, as well as their overall activity and involvement in getting the project initiated and running smoothly.

Acknowledgement also is made of the valuable role played by the examiners in each of the DMV Branch Offices. Without the cooperation and effort of these individuals it would have been impossible to conduct the study. They met the public and administered and/or collected the knowledge tests.

Also the author appreciates the efforts of Toni Thompson, who typed the several drafts of the report, and those co-workers who reviewed and commented upon the report. The report was edited by Harry Craft and the final manuscript was typed by Jean Vanderberry.

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APPENDIX A *

A BRIEF HISTORY OF DRIVER LICENSE TESTING IN VIRGINIA

The first requirement to successfully complete a written examination before receiving a driver's license was written into law more than forty-one years ago and became effective on July 1, 1933. Modifications to this early statute have been made on several occasions during the subsequent years. Effective July 1, 1956, persons convicted of two moving violations or having been involved in two accidents within a twelve-month period were required to successfully pass a written examination immediately, or have their driver's licenses suspended (§ 46.1-383). Effective July 1, 1968, any person convicted of more than one moving violation during the four-year period preceding the expiration of his license was required to successfully complete a written examination before his license was renewed (§ 46.1-380.1(e)). Effective January 1, 1970, § 46.1-380.1 was amended to require persons (based on age groups) to pass a vision test prior to renewing their driver's license. The same law contains the provision that effective July 1, 1975, the vision examination will be required for each operator's license renewal (four year license) and for each fourth chauffeur's license renewal (one year license).

The state's driver license testing program is currently a many-faceted program. It tries to isolate and test only those persons who have demonstrated their inability to safely operate a motor vehicle. The following shows data on reexaminations given in 1972 to 851,305 renewal applicants.

I. 202,637, or 23.8%, received no test of any kind.

II. 634,595, or 74.5%, received a vision test only.

III. 10,721, or 1.3%, received a vision and written test.

IV. 3,352, or 0.4%, received a vision, written and road test.

These are renewal applicants only and do not include those persons who received a license revocation for driving while intoxicated or other major offenses requiring them to apply for a new license at reinstatement time. This category of revocation requires a complete vision, written and road test before receiving a license. There were 14,298 such examinations given in 1972, which were in addition to the renewal group mentioned above.

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* Spring, Richard E., Virginia Division of Motor Vehicles, December 1974.

APPENDIX B *

VIRGINIA DRIVER IMPROVEMENT PROGRAM

The 1974 Virginia General Assembly enacted the Virginia Driver Improvement Act. It is believed that this Act, which became effective on January 1, 1975, is the most complete Driver Improvement Program in the country. Although the program contains no new or unique elements, we are not aware of any other state in the country whose program embraces all of these elements. Since the purpose of this program is to identify and rehabilitate dangerous drivers before they lose their licenses, a series of administrative actions has been designated for drivers who receive a certain number of points.

Advisory Letters

When a driver has accumulated at least 6 points during a 12-month period or 9 points during a 24-month period, he will receive an advisory letter from DMV. This letter will alert the driver to the fact that he has accumulated sufficient violation points that he may be in danger of losing his license if additional points are accumulated. No appearance by the driver will be required, and no further action will be taken at this point unless additional convictions are received.

Group Interviews

When a driver has accumulated at least 8 points during a 12-month period, or 12 points during a 24-month period, he will be required to attend a group interview. Groups consist of approximately 8 to 12 drivers. During the one-hour interview, a DMV Driver Improvement Analyst will review each driver's record to make sure there are no errors. He will also explain what action DMV will be required to take, and the hardships of living without a driver's license, if any additional convictions take place. Finally he will present information on safe driving and discuss ways in which each driver can avoid future violations.

Personal Interviews

When a driver has received at least 12 points during a 12-month period or 18 points during a 24-month period, he will have a personal interview with a DMV Driver Improvement Analyst. At this stage, some administrative action must be taken against the driver. Depending upon his individual record and his attitude, he will be placed on probation for a period of 3 to 12 months. The driver may:

(1) be required to attend a Driver Improvement Clinic in addition to being placed on probation.

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* From a brochure published by the Virginia Division of Motor Vehicles.

(2) have his license suspended for up to 6 months.

Driver Improvement Clinics

Driver Improvement Clinics consist of 8 hours of classroom instruction held in 4 weekly sessions with a written examination at the end of the course. Instruction is based on the National Safety Council's Defensive Driving Course with some modifications based on local driving needs.

The purpose of this clinic is to make the driver more aware of the hazards of unsafe driving and to teach him the techniques of avoiding and preventing accidents. He is required to attend all classes in succession and pass a test to complete the course successfully.

Although the clinics are primarily for drivers who have reached a high level of point accumulation, any driver may attend the clinic voluntarily. Successful completion earns 5 safe driving points to be applied against current or future demerit points.

License Probation

A license probation is a trial period during which a driver's traffic record is watched closely. During this time the driver is given another chance to prove that he can be a law-abiding driver before the more serious action of license suspension or revocation is taken.

Any convictions received during a probationary period result in a driver's license suspension for a period of up to one-half of the probationary period.

License Suspension

The Driver Improvement Program provides drivers with a series of warnings, consultations and remedial learning opportunities. Drivers have been given several chances to change their unsafe driving habits as a result of:

(1) An advisory letter at the 6-point level (9 points in 2 years).

(2) A group interview at the 8-point level (12 points in 2 years).

(3) A personal interview at the 12-point level (18 points in 2 years).

(4) The Driver Improvement Clinic.

(5) License probation.

In addition to these Division of Motor Vehicles actions, the driver has had numerous court appearances. If he still fails to respond to the program, the Division has no alternative but to suspend or revoke his license.

APPENDIX C

NOTICE TO GROUP I

2363

VERN L. HILL, COMMISSIONER

J. C. SKELTON
FIELD SERVICES ADMINISTRATOR

R. E. SPRING
DRIVER SERVICES ADMINISTRATOR

L. F. TOWERS
VEHICLE SERVICES ADMINISTRATOR

R. P. VAN BUREN
MANAGEMENT OPERATIONS ADMINISTRATOR

COMMONWEALTH of VIRGINIA

Division of Motor Vehicles

2220 West Broad Street

MAIL ADDRESS
P. O. BOX 27412
RICHMOND, VIRGINIA 23269

Dear Motorist:

Your driver's license renewal card and a copy of the Virginia Driver's Manual are enclosed.

Please take a few minutes to study this manual since many changes have been made in the laws that cover driving during the past few years. Virginia has enjoyed a lower than average fatality rate on our highways for many years and it is our sincere hope that the few minutes spent reviewing changes in our laws will make our highways even safer. Thank you.

Sincerely,

R. E. Spring

R. E. Spring, Administrator
Driver Services Administration

RES:lmj

Enclosures

APPENDIX D*

KNOWLEDGE TEST

1. Who must agree to either a breath or an alcohol blood test in Virginia?

   A. No one. Virginia has no way to administer such tests
   B. Anyone appearing to be drunk
   C. Anyone operating a vehicle in Virginia
   D. Anyone having an accident

2. The acceleration lane on an interstate highway is used:

   A. To allow you to make repairs to your vehicle
   B. To allow large trucks to pass
   C. To adjust your speed to the speed of traffic
   D. For detours when the highway is not passable

3. When the vehicle in front of you has stopped for a stop sign and then proceeds, you should:

   A. Continue if the way is clear
   B. Continue at the same rate of speed
   C. Come to a complete stop and proceed when safe
   D. Stop only if pedestrians are coming

4. If you desire to change traffic lanes while driving on a four lane divided highway, you should:

   A. Check for oncoming traffic
   B. Move up close to the vehicle in front of you
   C. Turn sharply into the desired lane
   D. Give proper signal and change lanes when safe

5. When two vehicles approach an unmarked intersection at the same time, which vehicle has the right-of-way?

   A. The vehicle on the left
   B. The vehicle on the right
   C. Neither vehicle has the right-of-way
   D. The first vehicle to enter the intersection

6. You should signal for a turn:

   A. In sufficient time to permit motorists to react
   B. After slowing down for a turn
   C. As you begin to turn your steering wheel
   D. Only if there is oncoming traffic

---

*Virginia Division of Motor Vehicles, 1975.

2366

7. If the rear of your vehicle is skidding to the left you should:

A. Rapidly move the steering wheel back and forth
B. Turn your steering wheel to the left
C. Keep steering wheel from moving until out of the skid
D. Turn your steering wheel to the right

8. A flashing red traffic light at an intersection means:

A. Proceed at the same speed
B. Come to a complete stop before entering or proceeding
C. There is detour ahead
D. Make a turn to the right

9. Your driving privileges can be revoked or suspended if convicted of:

A. Driving while under the influence of alcohol
B. Driving while under the influence of drugs
C. Racing on the highway
D. Any of the above

10. If you are driving on a highway separated by a physical barrier or unpaved area and meet a stopped school bus loading or unloading children, you should:

A. Proceed with caution at normal speed
B. Come to a complete stop
C. Pull over to the right and wait for the school bus to be set in motion
D. Turn on your headlights

11. A pedestrian has the right-of-way:

A. Where cross walks are clearly marked
B. In all locations in the state
C. If he is blind or deaf
D. All of the above

12. When driving in fog or rain at night, you should use your:

A. High beam headlights
B. Parking lights
C. Low beam headlights
D. Four-way flashers

13. How are highways marked when passing is not allowed in <u>either</u> direction:

A. By a broken white line
B. By a broken yellow line
C. By a double solid yellow line
D. By a solid yellow line and a broken yellow line

14. If you exit at the wrong place on an interstate highway you should: 2367

A. Back onto the main interstate and continue when safe
B. Turn your vehicle around, stay on the shoulder, and drive back down the exit ramp
C. Park your vehicle on the shoulder and walk back to get a closer look at the signs
D. Continue until you are off the exit ramp and look for a way to reenter the interstate

15. You should drive in the right lane of a four lane highway when:

A. Driving slower than traffic in other lanes
B. You are preparing to exit on the left
C. When you see traffic entering the highway from the right
D. You want to pass other vehicles on the highway

16. Turn signals are:

A. Not required when turning at an uncontrolled intersection
B. Not required when turning at a traffic light
C. Not required when pulling into an alley or parking space
D. Required for all turns

17. A flashing yellow or amber traffic light at an intersection means:

A. Stop before entering the intersection
B. Proceed rapidly through the intersection
C. Continue at normal speed because you have the right-of-way
D. Slow down and proceed with caution

18. When you are driving in bad weather conditions and water on the windshield reduces your visibility you should:

A. Speed up and get off the road quickly
B. Increase your following distance
C. Drive in the lane closest to oncoming traffic
D. Turn your headlights on high beam

19. Before making a left turn at night, you should:

A. Be in proper lane giving correct signal and yield to oncoming traffic and pedestrians
B. Sound your horn and yield to oncoming traffic
C. Be in proper lane and flash your headlights
D. Speed up and make turn quickly

20. If you hear a siren or see an emergency vehicle following you with blinking lights, you should:

A. Proceed with caution
B. Slow down and keep to the right
C. Speed up so you can get out of the way
D. Pull over to the right and stop your vehicle

PLEASE PRINT

NAME _____
FIRST INITIAL LAST

SOCIAL SECURITY NO. _____ _____ _____

BIRTH DATE ____/____/____ _____
MO DAY YR SIGNATURE

FOR DMV USE ONLY

DATE ____/____/____
MO DAY YR

LOCATION _____

SCORE _____ EXAMINER _____

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

APPENDIX E

NOTICE TO GROUP II

2269

VERN L. HILL, COMMISSIONER

J. C. SKELTON
FIELD SERVICES ADMINISTRATOR

R. E. SPRING
DRIVER SERVICES ADMINISTRATOR

L. F. TOWERS
VEHICLE SERVICES ADMINISTRATOR

R. P. VAN BUREN
MANAGEMENT OPERATIONS ADMINISTRATOR

COMMONWEALTH of VIRGINIA
Division of Motor Vehicles
2220 West Broad Street

MAIL ADDRESS
P. O. BOX 27412
RICHMOND, VIRGINIA 23269

Dear Motorist:

Your driver's license renewal card and a copy of the Virginia Driver's Manual are enclosed.

We are currently engaged in a study to determine how we can improve our safety record. More than one thousand persons lost their lives on Virginia highways last year due to automobile accidents. Most of these accidents occurred because someone committed a traffic violation and in most cases the people involved in these accidents had no record of prior accidents or convictions of traffic violations.

Your driving record shows no accidents or traffic violations recently and we would like you to participate with us in this study by reviewing the Driver's Manual very carefully and taking a short test when you go into our office to renew your license. You should be able to complete the test in thirty minutes or less and if you review the Driver's Manual thoroughly, you should have no problem passing this test.

Your participation in this study will assist us in developing an imposed driver licensing program and should be very helpful to you. If you have any questions concerning this study, please contact the Manager of the DMV Branch Office that is closest to you or contact me at 804-786-3063. Please remember to bring the enclosed renewal card with you when you renew your license.

Sincerely,

R. E. Spring

R. E. Spring, Administrator
Driver Services Administration

RES: lmj

Enclosures

APPENDIX F

NOTICE TO GROUP III

2371

VERN L. HILL, COMMISSIONER

J. C. SKELTON
FIELD SERVICES ADMINISTRATOR

R. E. SPRING
DRIVER SERVICES ADMINISTRATOR

L. F. TOWERS
VEHICLE SERVICES ADMINISTRATOR

R. P. VAN BUREN
MANAGEMENT OPERATIONS ADMINISTRATOR

COMMONWEALTH of VIRGINIA

Division of Motor Vehicles

2220 West Broad Street

MAIL ADDRESS
P. O. BOX 27412
RICHMOND, VIRGINIA 23269

Dear Motorist:

Your driver's license renewal card, a copy of the Virginia Driver's Manual and a short written test are enclosed.

We are currently engaged in a study to determine how we can improve our safety record. More than one thousand persons lost their lives on Virginia highways last year due to automobile accidents. Most of these accidents occurred because someone committed a traffic violation and in most cases the people involved in these accidents had no record of prior accidents or convictions of traffic violations.

Your driving record shows no accidents or convictions recently and we would like you to participate with us in this study by reviewing the Driver's Manual very carefully and taking the enclosed written test. When you go to our office to renew your license, one of our license examiners will review the test with you and you should be able to renew your license in less than thirty minutes.

Your participation in this study will assist us in developing an improved driver licensing program and should be very helpful to you. If you have any questions concerning this study, please contact the Manager of the DMV Branch Office that is closest to you or contact me at 804-786-3063. Please remember to bring the enclosed renewal card and the written test with you when you renew your license.

Sincerely,

R. E. Spring

R. E. Spring, Administrator
Driver Services Administration

RES: lmj

Enclosures

APPENDIX G-1

2373

ACCIDENTS

Between Groups Comparisons

Comparison Performed	Chi-square	Probability
Control vs. Pass Station	0.74	0.61
Control vs. Fail Station	2.07	0.15
Control vs. Refuse Station	1.17	0.28
Control vs. Pass Home	0.17	0.68
Control vs. Fail Home	0.22	0.64
Control vs. Refuse Home	2.40	0.12
Control vs. Manual	0.12	0.74
Pass Station vs. Pass Home	0.21	0.65
Pass Station vs. Fail Home	0.07	0.79
Pass Station vs. Refuse Home	3.56	0.056
Pass Station vs. Manual	0.30	0.59
Fail Station vs. Pass Home	2.54	0.11
Fail Station vs. Fail Home	1.34	0.25
Fail Station vs. Refuse Home	0.004	0.95
Fail Station vs. Manual	2.46	0.11
Refuse Station vs. Pass Home	0.72	0.60
Refuse Station vs. Fail Home	0.0001	0.99
Refuse Station vs. Refuse Home	3.98	0.04[a]
Refuse Station vs. Manual	0.81	0.63
Manual vs. Pass Home	0.007	0.93
Manual vs. Fail Home	0.16	0.70
Manual vs. Refuse Home	2.82	0.09
In-Station Group Comparisons		
Pass vs. Fail	3.15	0.07
Pass vs. Refuse	0.32	0.58
Fail vs. Refuse	3.61	0.054
At-Home Group Comparisons		
Pass vs. Fail	0.14	0.71
Pass vs. Refuse	2.91	0.09
Fail vs. Refuse	1.46	0.23

[a]Statistically significant beyond the 0.05 level.

APPENDIX G-2

TWO OR MORE ACCIDENTS

Between Groups Comparisons

Comparison Performed[a]	Chi-square	Probability
Control vs. Pass Station	3.90	0.046[b]
Control vs. Pass Home	1.33	0.25
Control vs. Manual	0.21	0.65
Pass Station vs. Pass Home	0.86	0.64
Pass Station vs. Manual	2.54	0.11
Manual vs. Pass Home	0.52	0.52

[a]The ones where sufficient data existed.

[b]Statistically significant beyond the 0.05 level.

APPENDIX G-3

ACCIDENTS WITH CONVICTION

Between Groups Comparisons

Comparison Performed	Chi-square	Probability
Control vs. Pass Station	0.11	0.74
Control vs. Fail Station	3.12	0.07
Control vs. Refuse Station	1.61	0.20
Control vs. Pass Home	0.66	0.58
Control vs. Fail Home	ID[a]	—
Control vs. Refuse Home	2.93	0.08
Control vs. Manual	0.32	0.85
Pass Station vs. Pass Home	0.19	0.67
Pass Station vs. Fail Home	ID	—
Pass Station vs. Refuse Home	3.40	0.06
Pass Station vs. Manual	0.03	0.87
Fail Station vs. Pass Home	4.71	0.03[b]
Fail Station vs. Fail Home	ID	—
Fail Station vs. Refuse Home	0.002	0.97
Fail Station vs. Manual	3.43	0.06
Refuse Station vs. Pass Home	0.76	0.61
Refuse Station vs. Fail Home	ID	—
Refuse Station vs. Refuse Home	5.39	0.02[b]
Refuse Station vs. Manual	1.41	0.23
Manual vs. Pass Home	0.41	0.53
Manual vs. Fail Home	ID	—
Manual vs. Refuse Home	3.23	0.07

In-Station Group Comparisons

Pass vs. Fail	3.61	0.054
Pass vs. Refuse	1.18	0.28
Fail vs. Refuse	5.61	0.02[b]

At-Home Group Comparisons

Pass vs. Fail	ID	—
Pass vs. Refuse	4.46	0.03[b]
Fail vs. Refuse	ID	—

[a]Insufficient data for computing chi-square.

[b]Statistically significant beyond the 0.05 level.

APPENDIX G-4

MAJOR CONVICTIONS

Between Groups Comparisons

Comparison Performed	Chi-square	Probability
Control vs. Pass Station	0.10	0.75
Control vs. Fail Station	ID[a]	—
Control vs. Refuse Station	0.65	0.57
Control vs. Pass Home	0.64	0.57
Control vs. Fail Home	ID	—
Control vs. Refuse Home	2.38	0.12
Control vs. Manual	3.61	0.054
Pass Station vs. Pass Home	0.19	0.67
Pass Station vs. Fail Home	ID	—
Pass Station vs. Refuse Home	1.86	0.17
Pass Station vs. Manual	2.03	0.15
Fail Station vs. Pass Home	ID	—
Fail Station vs. Fail Home	ID	—
Fail Station vs. Refuse Home	ID	—
Fail Station vs. Manual	ID	—
Refuse Station vs. Pass Home	0.10	0.75
Refuse Station vs. Fail Home	ID	—
Refuse Station vs. Refuse Home	0.64	0.57
Refuse Station vs. Manual	0.08	0.77
Manual vs. Pass Home	1.09	0.30
Manual vs. Fail Home	ID	—
Manual vs. Refuse Home	0.53	0.53

In-Station Group Comparisons

Pass vs. Fail	ID	—
Pass vs. Refuse	0.34	0.57
Fail vs. Refuse	ID	—

At-Home Group Comparisons

Pass vs. Fail	ID	—
Pass vs. Refuse	1.36	0.24
Fail vs. Refuse	ID	—

[a]Insufficient data for computing chi-square.

APPENDIX G-5

MINOR CONVICTIONS

2377

Between Groups Comparisons

Comparison Performed	Chi-square	Probability
Control vs. Pass Station	0.77	0.62
Control vs. Fail Station	0.19	0.66
Control vs. Refuse Station	1.12	0.29
Control vs. Pass Home	0.01	0.91
Control vs. Fail Home	1.12	0.29
Control vs. Refuse Home	7.24	0.007[a]
Control vs. Manual	1.31	0.25
Pass Station vs. Pass Home	0.57	0.54
Pass Station vs. Fail Home	2.81	0.09
Pass Station vs. Refuse Home	9.23	0.003[a]
Pass Station vs. Manual	3.67	0.052
Fail Station vs. Pass Home	0.23	0.64
Fail Station vs. Fail Home	0.70	0.59
Fail Station vs. Refuse Home	2.08	0.15
Fail Station vs. Manual	0.003	0.95
Refuse Station vs. Pass Home	1.22	0.27
Refuse Station vs. Fail Home	0.71	0.60
Refuse Station vs. Refuse Home	2.84	0.09
Refuse Station vs. Manual	0.17	0.69
Manual vs. Pass Home	1.46	0.23
Manual vs. Fail Home	1.22	0.27
Manual vs. Refuse Home	4.98	0.02[a]
In-Station Group Comparisons		
Pass vs. Fail	0.58	0.55
Pass vs. Refuse	2.44	0.11
Fail vs. Refuse	0.03	0.86
At-Home Group Comparisons		
Pass vs. Fail	2.08	0.15
Pass vs. Refuse	7.39	0.007[a]
Fail vs. Refuse	0.13	0.72

[a]Statistically significant beyond the 0.05 level.

2078

APPENDIX G-6

TWO OR MORE MINOR CONVICTIONS

Between Groups Comparisons

Comparison Performed[a]	Chi-square	Probability
Control vs. Pass Station	1.47	0.22
Control vs. Pass Home	0.02	0.88
Control vs. Manual	0.52	0.52
Pass Station vs. Pass Home	1.73	0.19
Pass Station vs. Manual	0.32	0.58
Manual vs. Pass Home	0.71	0.60

[a]The ones where sufficient data existed.

APPENDIX G-7

ADVISORY LETTERS

Between Groups Comparisons

Comparison Performed	Chi-square	Probability
Control vs. Pass Station	0.04	0.84
Control vs. Fail Station	ID[a]	—
Control vs. Refuse Station	0.17	0.68
Control vs. Pass Home	1.78	0.18
Control vs. Fail Home	ID	—
Control vs. Refuse Home	ID	—
Control vs. Manual	0.04	0.84
Pass Station vs. Pass Home	1.98	0.16
Pass Station vs. Fail Home	ID	—
Pass Station vs. Refuse Home	ID	—
Pass Station vs. Manual	0.0002	0.99
Fail Station vs. Pass Home	ID	—
Fail Station vs. Fail Home	ID	—
Fail Station vs. Refuse Home	ID	—
Fail Station vs. Manual	ID	—
Refuse Station vs. Pass Home	0.12	0.73
Refuse Station vs. Fail Home	ID	—
Refuse Station vs. Refuse Home	ID	—
Refuse Station vs. Manual	0.28	0.60
Manual vs. Pass Home	2.33	0.12
Manual vs. Fail Home	ID	—
Manual vs. Refuse Home	ID	—
In-Station Group Comparisons		
Pass vs. Fail	ID	—
Pass vs. Refuse	0.28	0.61
Fail vs. Refuse	ID	—
At-Home Group Comparisons		
Pass vs. Fail	ID	—
Pass vs. Refuse	ID	—
Fail vs. Refuse	ID	—

[a]Insufficient data for computing chi-square.

APPENDIX G-8

GROUP INTERVIEWS

Between Groups Comparisons

Comparison Performed	Chi-square	Probability
Control vs. Pass Station	0.45	0.51
Control vs. Fail Station	ID[a]	—
Control vs. Refuse Station	0.03	0.85
Control vs. Pass Home	0.25	0.63
Control vs. Fail Home	ID	—
Control vs. Refuse Home	2.38	0.12
Control vs. Manual	0.61	0.56
Pass Station vs. Pass Home	0.04	0.84
Pass Station vs. Fail Home	ID	—
Pass Station vs. Refuse Home	3.47	0.06
Pass Station vs. Manual	0.002	0.96
Fail Station vs. Pass Home	ID	—
Fail Station vs. Fail Home	ID	—
Fail Station vs. Refuse Home	ID	—
Fail Station vs. Manual	ID	—
Refuse Station vs. Pass Home	0.01	0.92
Refuse Station vs. Fail Home	ID	—
Refuse Station vs. Refuse Home	1.92	0.16
Refuse Station vs. Manual	0.06	0.80
Manual vs. Pass Home	0.07	0.79
Manual vs. Fail Home	ID	—
Manual vs. Refuse Home	3.72	0.051

In-Station Group Comparisons

Pass vs. Fail	ID	—
Pass vs. Refuse	0.05	0.83
Fail vs. Refuse	ID	—

At-Home Group Comparisons

Pass vs. Fail	ID	—
Pass vs. Refuse	3.17	0.07
Fail vs. Refuse	ID	—

[a]Insufficient data for computing chi-square.

APPENDIX G-9

SUSPENSIONS

Between Groups Comparisons

Comparison Performed[a]	Chi-square	Probability
Control vs. Pass Station	1.91	0.16
Control vs. Pass Home	0.55	0.53
Control vs. Manual	0.82	0.63
Pass Station vs. Pass Home	0.42	0.52
Pass Station vs. Manual	0.28	0.60
Manual vs. Pass Home	0.02	0.88

[a]The ones where sufficient data existed.

Summary of Findings by Comparison Group

A. Categories where a statistical difference was not proven to exist in any comparison carried out.

1. When the control group was compared to an experimental group:

   a. total accidents
   b. accidents with conviction
   c. major convictions
   d. 2 or more minor convictions
   e. advisory letters
   f. group interviews
   g. suspensions

2. When two experimental groups were compared to each other:

   a. 2 or more accidents
   b. major convictions
   c. 2 or more minor convictions
   d. advisory letters
   e. group interviews
   f. suspensions

3. When performances on a knowledge test were compared:

   a. total accidents
   b. major convictions
   c. advisory letters
   d. group interviews

   Insufficient data existed for comparisons involving:

   a. 2 or more accidents
   b. 2 or more minor convictions
   c. suspensions

B. Categories where a statistical difference was found in at least one of the comparisons carried out.

1. When the control group was compared to an experimental group:

   a. 2 or more accidents (1) [a]
   b. minor convictions (1)

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[a] Number of statistical differences in the group.

2. When two experimental groups were compared to each other:

   a. total accidents (1)[a]
   b. accidents with conviction (2)
   c. minor convictions (2)

3. When performances on a knowledge test were compared:

   a. accidents with conviction (2)
   b. minor convictions (1)

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[a]Number of statistical differences in the group.