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**EVALUATION OF RETESTING IN KENTUCKY'S DRIVER LICENSE PROCESS**  
(KYSPR-98-184)

by

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16. Abstract  The objectives of this research were to first evaluate the existing practices regarding driver license renewal, driver retesting, and medical review board procedures and then identify and recommend methods that would improve these processes. The analysis of the Medical Review Board process indicated that, while it operates at an acceptable level in major urban areas, it is almost non-existent in most areas of the state. A brochure describing the process was developed for distribution to physicians. There is a universal agreement among researchers that vision has a significant role in driving performance and that visual abilities deteriorate with age. It is apparent that some type of vision screening should be implemented during the renewal process since it could identify individuals with potential deficiencies. Such screening could be achieved either with a test during the license renewal or with an eye exam prior to license renewal. In addition to the testing, a policy that identifies potential at-risk drivers should be considered. The combination of convictions (points) and crashes was considered as an appropriate means to distinguish such drivers. Special consideration should be given for older drivers at driver license renewal. In addition to the vision screening, a written test could be administered at license renewal along with a set of medical questions to determine their physical and mental status.			
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## EXECUTIVE SUMMARY

Periodic renewal of driver's license is an integral part of the driver licensing procedures for most states including Kentucky. Most states require renewal every four years. A large number requires vision testing at the time of renewal and a few require additional tests (written knowledge and road tests), while there are several states that have no examinations at the time of license renewal. The current practice in Kentucky consists of a four-year renewal policy with no testing or examination requirements at the time of renewal. It is apparent that initiating any testing at the time of driver license renewal will require either additional financial resources, redistributing of activities among the various government sections involved in the process, or restructuring of the frequency and type of renewal procedures.

There is an implicit assumption that vision and driving abilities are highly correlated since almost all the input (approximately 90 percent) that drivers use while operating a vehicle is visual. Driving requires the use of various visual cues such as the relative speed of the vehicle, the presence of pedestrians, prediction of the future position of vehicles, and awareness of traffic control devices and obstacles. There is a greater concern for elderly drivers due to their significantly increased driving population percentage and the vision deterioration which occurs as part of the ageing process.

The first phase of this project resulted in the recommendation of a revised driver license point system and indicated a need for reviewing and, possibly, revising the current process of granting and renewing a driver license. Given the relationships found between crashes and convictions, the next phase involved determining mechanisms that would identify potential problem drivers and reviewing current practices regarding license renewal and retesting. These renewal and retesting practices were considered essential, not from the standpoint of penalizing drivers, but identifying problem or impaired drivers for the general benefit of the driving public. The objectives of this research were to first evaluate the existing practices regarding driver license renewal, driver retesting, and medical review board procedures and then identify and recommend methods that would improve these processes.

The analysis of the Medical Review Board process indicated that, while it operates at an acceptable level in major urban areas, it is almost non-existent in most areas of the state. Therefore, it was considered essential to increase the awareness of physicians and police officers regarding their options and responsibilities for referring drivers with potential problems to the medical review board. Also, more emphasis should be placed in rural areas. A brochure describing the process was developed for distribution to physicians.

There is a universal agreement among researchers that vision has a significant role in driving performance and that visual abilities deteriorate with age. However, the use of an age-based vision test is not considered appropriate, due to constitutional issues and since it may create significant problems regarding the mobility of the elderly. A vision screening implemented for all license renewals is likely to be more cost effective and more appropriate to identify drivers with vision acuity problems.



It is apparent that some type of vision screening should be implemented during the renewal process since it could identify individuals with potential deficiencies. Such screening could be achieved either with a test during the license renewal or with an eye exam prior to license renewal. The eye exam should be performed by a licensed optician within a six-month period prior to the renewal date and include a peripheral vision test. To reduce the burden of these tests, a renewal by mail could also be initiated in the future when the use of digital photography becomes available (about 2005). This process would permit drivers with no points or crashes since their last license renewal to renew their license by mail every other period, i.e. every eight years. To ensure that there are no vision problems, a proof of vision could be mailed with the renewal application. Finally, a shorter renewal period for drivers over 75 could be considered, where these drivers will be required to renew their driver license every two years in person with the same vision test requirements. These changes would not significantly burden the renewal process, since the reduction from the mail renewal drivers will outweigh the increase of the elderly driver renewals.

In addition to the vision testing, a policy that identifies potential at-risk drivers should be considered. The combination of convictions (points) and crashes was considered as an appropriate means to distinguish such drivers. The analysis performed showed that the alternative that would capture a meaningful portion of the driving population, without excessively burdening the existing system, would be that of a crash and two convictions within a two year period (including traffic school attendance as a conviction). These drivers would then be required to start a review process through the Transportation Cabinet where the most appropriate action could then be taken.

Special consideration should be given for older drivers at driver license renewal. In addition to the vision screening, a written test could be administered at license renewal along with a set of medical questions to determine their physical and mental status. Since age-based point systems have shown relationships between crash rates and driver age, some considerations should be given for a shorter renewal period for older drivers, perhaps over 75 years of age.



## 1.0 INTRODUCTION

Dependence on the personal automobile to fulfill one's mobility needs has been intensified due to increased suburbanization and deterioration of public transportation services. Recent studies have shown that the automobile is the preferred and most frequently used mode of transportation for both men and women, although men show higher rates of automobile usage (1). Other lifestyle changes, such as increased longevity, disappearance of the extended family, reduction in the role of individuals in society structure, and increased affluence, are likely to increase the dependence on automobile mobility. Therefore, given these facts and within this societal context, the importance of obtaining and maintaining a driver license is one of the most important social aspects in today's society and has significantly increased in the past decades.

Periodic renewal of driver licenses is an integral part of the driver licensing procedure. However, the frequency of renewal as well as the level of requirements at the time of renewal varies greatly among the states. Most states require renewal every four years. A large number requires vision testing at the time of renewal and a few require additional tests (written knowledge and road tests), while there are several states that have no examinations at the time of license renewal. Kentucky currently has a four-year renewal policy with no testing or examination requirements at the time of renewal. It is apparent that initiating any testing at the time of driver license renewal will require either additional financial resources, redistributing of activities among the various government sections involved in the process, or restructuring of the frequency and type of renewal procedures. The benefits of reduced costs related to crashes can pay for revisions to the current system. Moreover, the financial ramifications of a renewal program have recently resulted in a number of states reducing the extent and frequency of renewal testing and permitting drivers with clean records to renew their license by mail.

The report prepared as a result of the first phase of this study (2) recommended a revised driver license point system and indicated a need for reviewing and possibly revising the current process of granting and renewing a driver license. The analysis of the driver license file identified some trends with respect to age and gender of drivers. Young males are more prone to receive citations compared to other age groups and young females. The most common citations received varied by age and sex with older drivers having a larger percentage of failing to yield the right of way convictions. Even though a relationship was observed between crashes and point accumulation, the findings indicate that removing drivers with several points from the driving population will not have a substantial impact on the number of crashes. Therefore, it is important to develop mechanisms that would identify potential problem drivers. Also, a systematic review of current practices regarding license renewal and retesting is needed.

Given these findings, the second phase of this research focused on evaluating the existing practices regarding driver license renewal, driver retesting, and medical review board procedures with the objective of recommending methods that would improve these processes. To achieve these objectives, the renewal practices of other states were reviewed and documented to establish the state of the nation with respect to driver license renewal policies. Second, a literature review

was completed to identify the rationale for license renewal policies and their impact on driver safety. The current state practices regarding driver license granting and renewal, as well as the role of the medical review board in these processes, were also identified and documented. Possible changes in the renewal process were evaluated and the potential ramifications to the existing status were identified. Based on these findings, several alternatives were identified for consideration with respect to renewal practices in Kentucky.

## 2.0 STATUS OF NATIONAL PRACTICES

Following is a summary of current practices used across the United States in addition to a literature review concerning the related subjects of driver retesting, license renewal, and the medical review board.

### 2.1 Driver License Renewal Practices

The driver licensing requirements for renewal determined for each state are summarized in Table 1 (3,4) and are presented in Appendix A. The frequency of renewal and the extent of testing are the variables used in this analysis. The data indicate 34 states (about two-thirds) have a four-year renewal period. Of these 34 states, 25 use a vision test in the renewal process with five of these states using a written test with the vision test and four having an optional written and/or road test. Similar trends were noted for the states with a five-year renewal policies. There are three states with other renewal periods requiring renewal every three years (Missouri), six years (Maine), and after the 60<sup>th</sup> birthday (Arizona).

Table 1. Renewal frequency and requirements

Requirement	Frequency (years)					All
	3	4	5	6	>6	
Vision test	1	16	6	1	1	25
Vision and written tests	-	5	1	-	-	6
Vision with optional written and/or road tests	-	4	3	-	-	7
None	-	9	4	-	-	13
Total	1	34	14	1	1	51

Four states allow renewal by mail every other period for drivers with clean records which is defined as having no citations or crashes. Almost all states have a minimum requirement of visual acuity without correction of 20/40. All vision tests performed are static tests with no state using dynamic vision tests on regular exams. Twenty five states (almost one-half) require a combined visual acuity and peripheral vision test while twelve states (about one-fourth) include a depth perception test.

There are a few states that have additional renewal requirements for senior drivers which typically reduce the renewal period. These states reduce the renewal period to two years and require vision tests, while New Mexico and Illinois reduce that period to one year for drivers over 75 and 87 years, respectively. Some of the states with special provisions for senior drivers (Illinois, Indiana, and New Hampshire) require all drivers over a certain age to take a written test while some require additional road tests at the discretion of the examiner.

The analysis of the renewal practices among states revealed two major trends. First, the most common renewal period is four years. It is obvious that, the shorter the time period between renewals, the easier it is to identify drivers with deficiencies and take action aiming to remedy such problems. It should be noted that no research was found that compared the renewal period of states to determine which period would have the most significant impact on crash rates. However, it is believed that this decision is typically based on financial issues. Second, a large number of states have some type of renewal testing ranging from a simple vision test for all ages to full examinations for specific age groups. It is apparent that vision testing allows for screening of individuals with disabilities and provides a means to identify drivers with reduced visual abilities. Past research has shown that renewal testing has an impact on crash rates but it is not clear if it is due to revoking licenses from unsafe drivers or discouraging drivers from taking the test (5). Moreover, vision tests have a significant impact on the licensing of drivers, particularly of senior drivers (6), and can be a predictor of crash involvement for senior drivers (7).

To further examine the use of vision screening in the driver license renewal procedure, each state that implements such a screening was contacted. The phone interview attempted to verify whether the screening is used with each license renewal, what equipment is used for screening, and the details of the screening (i.e. vision problems for one or both eyes, use of optometrist/ophthalmologist exam for waiver, use of corrective lenses). The phone interviews confirmed that all states that were thought to have vision screening with each renewal actually have this requirement. Therefore, there are 38 states (including the District of Columbia) that require vision screening with all driver license renewals.

In all but two of the 38 states contacted, the driver license testing is handled by either the Department of Motor Vehicles or the Driver's License Offices. The fact that the driver license renewal testing is handled centrally by a department /office that specializes in tasks for drivers and vehicles may indicate the willingness of the state to take a more active role in driver licensing. The fragmented approach in Kentucky involving three agencies may be one of the reasons that no testing is performed during a driver license renewal.

The states contacted generally perform vision assessment using the standard vision-screening equipment that test for static visual acuity and peripheral vision. Two states indicated that they use a Snellen vision chart, which is similar to the static vision test, in addition to the vision screening equipment. The use of the Optech 1000 vision screening machine was also mentioned in a few instances. All the states that participated in the phone survey use only static vision screening to conduct the test. The use of flashing lights to check peripheral vision was mentioned a few times and no respondent indicated the use of dynamic symbols to check vision.

All states contacted check each eye separately and then both together with the exception of Hawaii, Texas, and Wisconsin which only check each eye separately. The use of corrective lenses during the test is allowed by all states with the stipulation that a restriction would be placed on the license that required corrective lenses for all driving. A few states noted that a person may attempt to pass the test without corrective lenses but if they fail the screening they may retake the test using their corrective aid.

Among the 38 states that require a vision screening with each renewal, 15 (40 percent) require the screening on site and accept no other provisions for passing the screening. When a driver fails the vision screening, he/she is asked to see an ophthalmologist or optometrist to be evaluated for corrective means (glasses or contact lenses). The remaining 23 states allow some type of a doctor's certification as a substitute of the required vision screening. Among these states, eight require a special form to be filled by an ophthalmologist or optometrist, while the remaining 15 accept notes from a certified doctor.

The states with no vision screening requirements were also contacted to determine whether any steps for changing the existing status are being considered. The phone calls revealed that Virginia, which was listed as a state without a vision screening, actually has such a practice in place at each driver license renewal. Of the remaining 11 states, nine indicated that they currently do not have any vision screening practices nor do they plan to introduce any new legislation to implement vision screening in the near future. The two states that have recently passed legislation about vision testing renewal are Connecticut and Oregon. Connecticut, in 1997, started to require vision screening at each renewal, but the implementation date has been postponed to the year 2000. That state also has new legislation to test drivers over 70 on a more frequent basis. Oregon recently passed legislation requiring a vision test every 8 years for drivers over the age of 50.

A medical advisory board is provided in 38 states (8). In 33 states, these boards give advice regarding individual cases prior to licensing action. A listing and description of various mental/physical disabilities is provided by nine states with this list supplied to physicians in five states. Physicians are required to report a mental or physical disability in seven states. Also, the appropriate state agency is required to report persons having a mental or physical disability in seven states. The leading mental/physical disabilities referred to the medical review board are:

- seizures
- visual
- mental/emotional
- heart disease
- diabetes
- substance abuse
- neurological
- loss of consciousness
- musculoskeletal



Questions regarding the utilization and procedures for a medical review were also asked during the phone interviews to the states contacted for the vision screening. The questions focused on determining whether the state has such a procedure in place and what is a doctor's responsibility and potential liability for notifying the appropriate authorities. Fifteen states were found to have a law requiring doctors to report conditions that could impair driving. However, most of the states that do not require action by the doctor indicated that many doctors notify the proper authorities. Furthermore, some of those states automatically revoke a driver license upon a letter from a certified physician, even though such a letter is not required by law. The doctor's ethical responsibility seems to be very controversial in some states due to the issue of liability. For example, North Carolina does not require doctors to report the condition of their patients to authorities, but if their patient is involved in a crash, and the doctor knew that the patient had a condition that could adversely affect his/her driving ability, the doctor may be held liable. On the other hand, the state of Maine has refused to require mandatory reports from doctors because it is believed that elderly persons will avoid seeking a physician in fear of losing their license.

Based on the significance of the tests at renewal and their expected impact, a review of the literature was conducted to establish the basis for recommending a license renewal policy for Kentucky. The findings of the review are presented in the following section of the report.

## **2.2 Literature Review**

Most of the research performed to date which has attempted to relate vision deficiencies to driving record and roadway safety has focused on the older driver due to a variety of reasons. First, the population demographics indicate that people over 65 are the fastest growing segment of the U.S. population (9). At the same time, most of these persons currently hold a driver license and their percentages continue to increase. While drivers over 65 accounted for approximately 12 percent of the U.S. driving population in 1990, they are expected to comprise more than 17 percent by the turn of the century (10). Second, elderly drivers have higher crash rates compared to most younger age groups and their fatality rates have increased in the past few years, with a study using induced exposure showing elderly drivers to have the highest relative crash involvement ratio (11,12). Third, visual problems are part of the aging process and there is a wealth of studies that document the vision related deficiencies and how they affect driving (13). Finally, in addition to visual problems, elderly drivers typically experience cognitive and physical limitations that may affect driving abilities and compromise traffic safety (14).

Vision is obviously important in driving because it is the primary sensory input used for the task. There is an implicit assumption that vision and driving abilities are highly correlated, since almost all the input (approximately 90 percent) that drivers use while operating a vehicle is visual (15). According to the U.S. Department of Transportation, roughly 50 percent of all automobile crashes involving elderly drivers are related to poor vision (16). The visual skills required to perform particular driving tasks are numerous and varied. However, even though vision is essential to the driving task, most studies have found only weak correlations between visual deficiencies and vehicle crashes (17).

The correlations between crashes and vision were often statistically significant due to very large sample sizes but accounted for less than five percent of the crash variance and could not practically identify at risk drivers. Some correlations between crashes and vision were found with specialized vision tests such as dynamic vision acuity and severe visual field loss. The combination of visual acuity, horizontal visual fields, and broad contrast sensitivity criteria have been related to increasing crash involvement for older drivers. Factors contributing to the problem of documenting a strong link between visual deficits and driving include: the large number of drivers with no crashes on record; crashes are rare occurrences; poor vision may cause drivers to limit their driving and avoid challenging roadway conditions which reduces their crash risk; and studies have relied almost exclusively on visual sensory tests while ignoring perceptual and cognitive components. Controlling a vehicle takes place in a visually cluttered environment and involves the simultaneous use of central and peripheral vision and the execution of both primary and secondary visual tasks.

A recent analysis of an accident database has shown a link between visibility conditions and crashes(18). Also, results obtained using driving simulators and special road tests are proving useful for understanding which components of the overall driving task are most affected by visual acuity and visual field loss (19). Driving requires the use of various visual cues regarding the relative speed of the vehicle, the presence of pedestrians, prediction of future position of vehicles, and awareness of traffic control devices and obstacles. Visual acuity, which reflects the ability to resolve fine levels of detail, is typically not a crucial factor in driving since such fine details are not essential to safe driving. However, past research indicates that vision acuity is correlated with the likelihood of being involved in more than one crash (18). Moreover, the fact that many disorders that result in poor acuity also affect other visual functions may be of importance in detecting acuity deficiencies. Such parallel visual losses may include interference with accommodation, restriction of the visual field, increased glare, spatial localization, and distance and speed perception (19, 20).

Several studies have investigated the relationship between vision and driving performance with some finding a correlation between various types of vision problems and crashes and/or violations (21). One analysis found, for persons over 54 years of age, a relationship between both dynamic and static visual acuity and crash rates, although the correlation coefficients were small (22). The glare recovery tests was judged to have a marginally significant relationship with driving performance for those over 54. A comparison of visual acuity test scores with self-reported crashes found that drivers in the poorer visual acuity group were twice as likely to have had crashes (23). These trends persisted across the ages. An evaluation of various vision parameters found static visual acuity and dynamic visual acuity under low illumination conditions were the two attributes most consistently related to crashes (24). Poor static visual acuity under low illumination conditions was particularly related to involvement in nighttime crashes. Detection of central angular movement was third in strength of relationship to crash involvement. Another study reported crash rates were found to have significant correlations with monocular visual acuity, binocular acuity, and hyperphoria (25). Visual acuity was more strongly associated with crash rates for drivers 55 and over. Drivers with binocular visual field loss have been found to have crash and traffic violations twice as high as those for drivers with

normal visual fields (26). The incidence of visual field loss was 3.3 percent with more than half of the subjects unaware of their deficits. In a group of drivers with high crash rates, eight percent were monocular compared to a two percent incidence of one-eyed individuals seen as patients at private optometric practices (27)

The size of the useful field of view (UFOV), a test of visual attention, has been found to have high sensitivity and specificity in predicting which older drivers had a history of crash problems (17). Older adults with substantial shrinkage in the UFOV were six times more likely to have incurred one or more crashes in the previous five-year period. The types of crashes in which older drivers were over-represented seemed to implicate visual difficulties. A large sample study reported that the small subset of drivers with severe visual field loss in both eyes had crash and conviction rates twice those in the general population. Additional quotes regarding the importance of vision and how it relates to driving are included in Appendix B.

There are other tests that may be better predictors of safe driving than simple vision acuity tests. Static visual acuity tests are typically conducted for license issuing and renewal. These tests measure the ability of the driver to discriminate high contrast targets. However, these conditions do not typically challenge the driver while low contrast environments (e.g., fog, rain, dusk) are more demanding and thus may pose significant problems for drivers. Therefore, current vision tests may not adequately identify drivers with visual problems. Even though there are problems with the current tests, research has shown that there is a decline in mean annual traffic fatality rates with increased vision screening requirements (28).

A typical visual acuity test consists of reading letters from a Snellen chart which measures high contrast letters. The use of other charts that allow for evaluating visual acuity for low contrast letters has been tested for implementation in license renewal in California (29). The results of the study show that the use of a Pelli-Robson low-contrast acuity test can identify drivers with potential vision problems that could contribute to unsafe driving practices. This test uses a letter chart similar to Snellen charts but the letters progressively fade out as if they have to be read in increasingly thicker fog conditions. The research also pointed out that this test requires additional research and comparison with the existing practices to verify its impact and to use it for all license renewals irrespective of age.

The frequency of renewal varies among the states, with periods ranging between three to six years. Within such a time frame no significant changes in the visual abilities of younger drivers occur. However, vision changes for older drivers are more dramatic as the individual ages leading to one researcher recommending that, for drivers over 65, tests should be conducted every one to two years to identify potential visual disorders (26). A recent study concluded that for drivers over 70 years there is a positive reduction in their fatal crash risk with the implementation of a four-year vision screening at license renewal (30). The same study also recognized the potential for reductions in licensure of older drivers due to these tests and raised the issue of possibly restricting the driving environment of the elderly.

The data from studies comparing the effect of age-based road testing as a means to identify and remove unsafe drivers indicate that the impact of such testing is not conclusive nor does it improve the safety record of elderly drivers. A study that evaluated the impact of road tests in Illinois for drivers over 69 showed that the elimination of the test for drivers age 69 to 74 did not have any negative impact (31). Since the determination of the persons who take this test is usually done by the examiner, it is possible that those selected may already impose restrictions on where, when, and how often they drive. Similar findings were noted between drivers in Sweden and Finland, where elderly Finnish drivers have very strict renewal procedures including a full series of tests (32). The findings of this comparison showed that there was no gain from the rigorous tests in Finland, and the crash rates of elderly in these two countries were similar.

Age-based license restrictions are viewed as unconstitutional and pose numerous societal questions regarding the availability of travel alternatives for persons without a driver license. The lack of formal transportation services and public transportation in several areas in the U.S. may force examiners to review cases leniently and not enforce the appropriate standards (27). At the same time, almost all states allow for referral for re-examination by physicians, family or police and it is believed that this procedure adequately identifies those who are most at risk. Therefore, the implementation of an age-based reexamination will only tax the existing system and inconvenience several individuals who are not deficient (5). An additional issue that has been raised in the past is the responsibility and liability issues that a referring physician may face (27). In most states the referral has no legal responsibilities, since the final decision is made solely by a review board, and sometimes a testimony during a medical review board hearing may be required. Therefore, the need to explain and promote such practices to physicians is essential to continuously identify drivers with potential problems.

### **3.0 STATUS OF DRIVER TESTING**

To determine the status of the current practices in Kentucky regarding driver renewal and retesting, interviews with officials from the various agencies responsible for licensing were conducted. The purpose of these interviews was to identify and document the size of operation (i.e. personnel available, frequency of travel, locations of travel, number of tests performed, and so forth) and thus establish the existing conditions. Based on the answers provided, the status of driver testing and the resources required is described in the following.

Licensing currently involves a three-tier organization. The Kentucky Transportation Cabinet (KyTC) Division of Driver Licensing maintains the driver license file and revokes or suspends driver's licenses and is responsible for the Medical Review Board (MRB). The Circuit Court Clerks are responsible for issuing the driver license and collecting associated fees. Finally, the Kentucky State Police (KSP) conducts all testing which includes written, vision screening, and road skills. The KSP is also responsible for the Drivers Manual.

### **3.1 Kentucky State Police Testing**

The KSP Division for Driver Testing is responsible for conducting and administering driver testing. Vision and written tests are administered for all first-time applicants, defined as drivers requesting a license for a first time either because they have reached the legal driving age or because their driver license was suspended, revoked or they could not produce a license. Road tests are administered for all persons if this is their first license. The road test is also given if a driver has not had a license for over five years. The MRB can also request a road test to be administered. Also, all tests are administered whenever required by the MRB. Finally, drivers with a valid driver license from another state which is being transferred to Kentucky are not required to take any of the tests but are required to surrender their out-of-state license to obtain a Kentucky driver license.

Written tests are given in the form of multiple-choice questions and are general knowledge questions concerning everyday driving situations. Approximately one-fourth of the general driver license test deals with road sign knowledge while the remaining three-fourths consist of situational and legal issue questions. A typical written test will take approximately 20 minutes, requires an 80 percent passing grade, and is a pencil and paper test. The exception is the Louisville office where the test is computer based. There is a pool of 120 questions which are used in three versions of the test (40 questions each). The test is administered in two languages--English and Spanish. In addition to this general driver license written test, a Commercial Driver License (CDL) written test is administered by the KSP and typically takes up to one hour. Written tests are given to new drivers, drivers without a license for one year, and those referred by the MRB.

Road tests are administered under typical traffic conditions where drivers are required to demonstrate basic control of a vehicle. Potential drivers are asked to perform a series of maneuvers in traffic such as changing lanes, parallel parking, stopping at signs and signals, merging with traffic after turns, stopping and starting on an uphill, and so forth. Proper use of turning signals and lane placement are also observed by the road examiner. Tests typically last approximately 20 minutes, but they can take longer depending on the traffic conditions. A potential driver needs to inform the Circuit Court Clerk in his/her home county to set up an appointment to take the road test. Road tests are given at the end of the 180-day waiting period for persons under 21 years of age and at the end of the 30-day waiting period for persons over 21 years of age. To obtain a CDL, the road tests are more complex and thus take longer to complete ranging from 30 minutes to over one hour. To request a CDL road test, a potential driver must contact the KSP to set up an appointment to take the test at one of the nine sites throughout the state.

Vision screening is also administered by the KSP examiners using vision screening equipment that assess static acuity, peripheral vision, and basic color blindness. Vision screening is administered to initial applicants and anyone referred for retesting by the KyTC. This screening typically lasts less than five minutes and is used as the primary indicator of whether a

driver meets the minimum requirements of 20/40 static vision, peripheral vision of 110° in one eye or 160° in both eyes, and can distinguish green and red colors. An examiner cannot fail anyone based on vision screening. Drivers that exhibit problems with this screening are referred to an optometrist or the MRB for further evaluation.

The KSP Driver Testing Section currently has 112 employees. They consist of 14 employees with administrative duties, 72 civilian examiners, 9 sworn examiners (State Troopers), one civilian CDL examiner, and 16 sworn CDL examiners. All are trained to perform all three required tests. These examiners receive no formal training prior to commencing their duties and gain their experience with on the job training. In most locations where tests are conducted, one examiner is present to perform the tests. However, it should be recognized that CDL exams are more complex and each examiner receives special training for these exams.

Testing is typically performed in the local court houses except for a few areas with are permanent testing facilities. Depending on the county population, tests are performed with different frequencies: weekly in less populated counties and daily at permanent testing facilities (Louisville, Lexington, Erlanger, Owensboro, Pikeville, Bowling Green, Ashland, Catlettsburg and Hazard). CDL tests are administered in nine sites throughout the state on scheduled dates. Examiners rotate from one county/area to the next on a fixed schedule to provide and conduct these weekly exams. All phases of the testing process are administered on the day when the examiner is at the site. An individual may contact their local Circuit Court Clerk to obtain the day and time tests are given and set up an appointment to take any of the tests. The vision screening equipment is furnished by the examiner and is typically the first test performed followed by the written exam. Road tests are typically administered last but depending upon the workload, the sequence of testing may be changed to suit both the examiner and potential drivers.

### **3.2 Medical Review Board Procedures**

The KyTC is charged with the administration of the medical review process. The MRB is chaired by the Commissioner of the Department of Vehicle Regulation, or his/her representative. In order to have a “quorum” (meeting), three physicians licensed to practice medicine in Kentucky must be present. Physicians non-licensed in Kentucky could also be appointees to the MRB but they may be restricted to making decisions only in their field of expertise.

The following guidelines are used during the medical review process (33):

- The Commissioner of Motor Vehicles or the representative can suspend or refuse to issue a driver license based on one of the following circumstances, unless the suspect driver submits to an examination by a qualified physician within 45 days of notification:
  - A driver has reported that he has blacked out, lost consciousness, or suffered a seizure prior to a reportable accident;
  - A driver is named in an affidavit by at least two citizens as being physically or mentally incapable of operating a motor vehicle safely;

- A driver is reported by a physician as being physically or mentally incapable of operating a motor vehicle safely;
- A driver is reported by a law enforcement officer who has reason to believe the person is a danger because of a mental or physical disability;
- An applicant has indicated during the application process that he has a mental or physical disability which may impair driving;
- A driver's official record indicates the possibility of physical or mental impairment;
- A driver is reported by a commonwealth attorney, county attorney, county clerk, circuit clerk, sheriff, or judge; or
- A driver self reports that he/she has a physical or mental impairment.
- Once the person has been required to receive an examination, the examining physician reports the results to the Division of Drivers Licensing on a form furnished by the Department of Vehicle Registration.
- When the Department receives the form, it is evaluated based on standards set in 601 KAR 13:010. The Department then submits any case that needs medical expertise to the MRB.
- After review, the MRB can make a variety of recommendations to the Department including further medical examination, testing, driving restrictions, or denial of driving privilege. If the recommendation is further testing, then the Department notifies the person of a compliance date. If the board recommends total suspension or restrictions, then the person is notified along with a notification of their right to an informal hearing before the MRB and, if necessary, an appeal to the board for a formal administrative hearing.
- In the event of the need for an informal hearing, the suspect driver is notified no later than 10 days before the hearing. The Commissioner or his/her representative schedules the hearing and at least three physicians from the MRB must be present. The scope of the hearing is for the MRB to present the evidence for its decision.
- The Commissioner ultimately makes a decision if there is an appeal process, and notifies the suspect driver of his/her decision within 10 days after the hearing. If the decision of the MRB is not overruled, the Commissioner informs the suspect driver that his/her appeal was denied but he/she has the right to an Administrative Hearing.

Based on the data provided in the driver record file, there were 4,744 cases reviewed by the MRB during the 1993-1997 period for an annual average of 950 cases. This number represents a very small portion of the driving population (0.002 percent).

Given these low numbers, it was decided to contact the medical community in Kentucky to determine the level of awareness regarding the presence and use of the MRB. A telephone interview was conducted with the President of the Kentucky Medical Association (KMA) who indicated that their group was not aware of the presence of the MRB. An interview with the president-elect revealed that the medical community in Kentucky is not familiar, and in some cases not aware, of the role and existence of the MRB so the KMA recognized the need of a publicity campaign for the medical community on the role of the MRB. To achieve this goal, a brochure was developed (as shown in Appendix C) for distribution among the members of the

medical community throughout the state. A short article describing the physician's responsibilities and role of the MRB was also published in the Association's Newsletter (reprint in Appendix C).

A detailed analysis of the MRB data was completed to determine the types of claims made and investigated, and the driver characteristics involved in these claims. Some expected patterns were noted in the data, shown in Tables 2 and 3, confirming the age groups and types of claims. For example, the number of cases increased both in numbers and in percent of drivers reviewed as the driver's age increased (shown in Table 2).

Table 2. Medical Review Board cases by driver age

Age group	Number of cases	Licensed drivers	
		Number	Percent in MRB cases
16-19	224	186,337	0.0012
20-24	324	265,116	0.0012
25-34	700	593,769	0.0012
35-44	841	629,736	0.0013
45-54	619	499,935	0.0012
55-64	391	320,212	0.0012
65-69	215	125,879	0.0017
70-74	292	108,337	0.0027
75-79	379	78,537	0.0048
80+	759	77,462	0.0098

Age related trends were also noted for the likelihood of suspending the driver's license based on a MRB exam. An increase was noted as the driver aged (Table 3). A similar age related trend was also noted for requests for road tests (an increased percentage with increased driver age). Another age related trend was noted for the periodic medical exams, but it showed a decreased percentage with increased driver age. Since younger age groups have significantly higher percentages in this area, it was hypothesized that this trend may be due to the fact that these persons are becoming of driver age and they attempt to get a driver license for the first time.

The number of hearing cases seems to exhibit a somewhat constant trend with a larger number of cases for young and older drivers. This higher percentage of younger drivers may be due to the fact that genetic hearing problems, not related to aging, are discovered at a younger age while for the older drivers, the increase is due to aging-related problems. Irrespective of driver's age, most of the cases resulted in a periodic medical exam while a significant portion of them lead to license restriction or suspension (22.7 percent).



Table 3. Medical Review Board cases by age and type of case

Age group	Number of cases	Percent cases of					
		License restriction/suspension	Vision exam request	Road test request	Periodic medical exam	Periodic vision exam	Hearing requested
16-19	543	10.1	3.3	0.2	58.0	0.2	28.2
20-24	1,083	13.7	2.3	0.2	54.7	0.2	29.0
25-34	2,006	19.0	2.5	0.8	49.2	0.1	28.5
35-44	2,367	19.7	2.1	1.5	49.7	0.1	27.1
45-54	1,602	20.4	4.4	2.6	49.4	0.0	23.3
55-64	939	24.6	5.0	4.3	38.7	0.0	27.5
65-69	495	27.5	5.3	5.1	33.5	0.2	28.5
70-74	668	28.3	7.6	10.8	21.3	0.3	31.7
75-79	862	32.7	6.4	10.2	16.1	0.0	34.6
80+	1,634	34.2	7.7	11.8	10.4	0.2	35.7
Totals	—	22.7	4.2	4.2	39.7	0.1	29.1

Note: The number of cases is larger than the 4,744 total number of cases due to multiple entries for the same driver

An additional analysis was performed to determine whether more cases were reported in the urban areas compared to other areas in the state. The three major urban areas of the state, consisting of Fayette County and surroundings, Jefferson County and surroundings, and the Northern Kentucky counties, were examined. This analysis showed that almost one-half of the cases (2,168 or 45.7 percent) were from these counties. A possible explanation may be the fact that these are also the most populated areas in the state ( 41 percent of the population). However, an additional reason may be the potential of better advertisement or higher levels of awareness of the process in these areas. Therefore, it may be reasonable to increase publicity in rural areas and inform more persons of the medical review process.

#### 4.0 DRIVER RENEWAL ALTERNATIVES

There is a variety of alternatives for revisions of the driver renewal process and retesting presented and discussed in this section. Possible implications of each alternative for the existing system regarding shifts in duties and responsibilities among current agencies are also discussed. The renewal policies examined include retesting of selected drivers, renewal by mail, inclusion of a vision test, and special considerations for older drivers. However, it must be kept in mind that there may be conflicting issues when changes in the renewal process are considered. On one hand, the licensing agency is concerned about the expeditious service of their customers, but on the other hand, the agency's priority is also to carefully identify and separate the drivers who are most at risk. Therefore, a balance should be sought that will not create an arduous process for the

driver nor will be extremely costly and time consuming to the agency. This section of the report discusses such an approach and makes recommendations to achieve this balance.

#### **4.1 Use of Traffic Convictions and Crashes as Criteria for Retesting**

Alternative methods which could be used to identify a driver for retesting include the accumulation of points from traffic convictions, involvement in a traffic crash, or a combination of convictions and involvement in crashes. A direct relationship has been found between the number of points a driver accumulates as a result of traffic convictions and the number of crashes (2). For example, about 2.1 percent of the drivers (approximately 61,000 drivers) had six or more points in two years. These drivers accounted for about 5.3 percent of all crashes. This shows that these drivers were over-represented in traffic crashes by a factor of 2.5. Drivers with nine or more points were over-represented by a factor of 3.4 with these drivers (about 14,000) accounting for about 0.47 percent of all drivers compared to 1.6 percent of crashes. While reducing the number of crashes for drivers with a large number of points would not have a dramatic effect on the total number of crashes, the direct relationship between points and crashes supports the current procedure using points as a criteria for a hearing, suspension, probation, or attendance of a driver improvement clinic.

The consideration of specific types of convictions could be used to identify the potential for involvement in a traffic crash. The highest number of crashes per driver was found for drivers with an improper start conviction (0.72 convictions per crash in five years) followed by speeding 26 mph or more (0.66 convictions per crash), reckless driving (0.65 convictions per crash), and careless driving (0.63 convictions per crash).

To further investigate the relationship of particular convictions to traffic crashes, a more detailed analysis was undertaken that examined the length of time between specific convictions and crash involvement. These relationships were examined for different combinations among numbers of convictions, crashes, and years. Specifically, the combinations tested included: 1) a conviction and a crash within a year; 2) a conviction and two crashes within a year; 3) a conviction and one crash within two years; 4) a conviction and two crashes within two years; 5) two convictions and a crash within a year; 6) two convictions and two crashes within a year; 7) two convictions and a crash within two years; and 8) two convictions and two crashes within two years. These frequencies allow for determining the relationship between crashes and convictions and could be used in establishing criteria for requiring drivers to undergo additional tests at their driver license renewal. For example, if convictions accounting for six points on the driver's record and one crash involvement within a year indicate that there is a strong relationship in determining risk-prone drivers, then a policy could be established where drivers with six points and one crash within a year should be required to attend driver education or pass a road exam upon driver license renewal.

The number of drivers for the 1993-1997 period with one conviction and different numbers of crashes within one or two years is presented in Table 4. The data show that there

were approximately 14,750 drivers per year with one conviction and a crash within a year, 20,300 drivers with a conviction and a crash within two years, 1,400 with a conviction and two crashes within a year, and 3,100 drivers with a conviction and two crashes within two years. As expected, the longer time period increased the number of drivers who matched the combination of convictions and crashes, and there is a significantly smaller number of drivers with two crashes and a conviction for either time period. The most important aspect of this analysis is that there is a fairly small number of drivers that match these criteria; the highest being 3.7 percent of all drivers having a conviction and a crash within two years.

Table 4. Number of drivers for combinations of convictions, crashes, and time (1993-1997)

Number of Convictions	Number of Crashes	Years	
		1	2
1	1	73,874	101,779
	2	7,158	15,549
2	1	27,227	55,442
	2	2,983	9,135

The number of drivers was reduced significantly when the number of convictions was increased from one to two (Table 4). There are approximately 5,450 drivers per year with two convictions and a crash within a year, 11,100 drivers with two convictions and a crash within two years, 600 with two convictions and two crashes within a year, and 1,800 drivers with two convictions and two crashes within two years. For these drivers as well, the longer time period increased the number of drivers who matched the combination of convictions and crashes. Moreover, within a given year there will only be 2.0 percent of the drivers renewing their license that would match the most populous category--two convictions and a crash within two years.

Based on these estimates, a relatively small number of drivers would be required for additional tests upon renewal. However, to establish a sound process in determining which drivers should be tested, a statistical analysis was undertaken to estimate which of the variables considered (convictions, crashes or time period) are more capable of identifying these drivers. The analysis was performed using logistic regression, where the likelihood of predicting the dependent variable is a function of one or more factors. The logistic regression is considered more appropriate than other statistical model tests because the dependent variable of interest has only two values--one or two convictions/crashes. This approach is also more relevant in this analysis given the fact that what is salient here is the ability to determine which combination of crashes and convictions would allow for an appropriate determination of drivers that are at higher risk. The models used in such an analysis would then be able to predict the probability that a driver would have one or two convictions (or crashes) as a function of other independent variables such as number of points, time between crash and conviction, and number of crashes (or convictions). Given this approach, two analyses were performed: 1) the number of crashes was used as the dependent variable, while the time period, the points of the conviction, and the

number of convictions were used as factors; and 2) the number of convictions was used as the dependent variable and the time period, the points of the conviction, and the number of crashes as factors. A variety of combinations (models) were tested and the results were considered significant at the five percent level.

The effect of each factor on the dependent variable was first examined alone to determine whether only two variables could be used for identifying drivers at risk. The general trend of the analysis indicated that there are relationships among all three basic variables (i.e. number of crashes, number of convictions, and time), and each one has a significant impact on determining the likelihood of the number of crashes or convictions. Even though all models were statistically significant, the analysis indicated that some combinations had a better fit, i.e. stronger relationships were noted (Table 5). The p-values shown are all 0.00 indicating that there is strong relationship. At the same time, the G-values that test whether the slope of the regression is statistically different that zero are high, and the higher they are the better the model fits. Thus, it can be concluded that: a) there are strong relationships between convictions and crashes, b) the number of points of the conviction are not as good a predictor as the other variables, and c) there is a strong relationship with the number of years. These findings conform to prior expectations that there is a relationship between crashes and convictions, and that the longer the time period, the higher the likelihood to commit more than one conviction or crash. Although the models with the points from the convictions were not as strong as the others, a trend was observed where six point-convictions were statistically significant as individual predictors.

Table 5. Statistical analysis results (p/G values)

Dependent variable	Factors			
	Crashes	Convictions	Years	Points
Crashes	--	0.00/132.36	0.00/1,583.7	0.00/42.33
Convictions	0.00/132.35	--	0.00/1,094.0	0.01/11.45

The next step in the analysis involved the combination of these variables and testing of a variety of models. Again, all models tested showed a statistical significance and some had stronger relationships than others. The strongest fit was obtained when all variables were combined, a somewhat expected result, since all variables were significant. The models for both dependent variables showed that drivers with six-point convictions are more likely to be involved in a crash or commit additional convictions. Both models tested also indicated that, the longer the time period considered, the higher the likelihood to commit another conviction or be involved in a crash. Finally, between the two models tested, the model with number of crashes as the dependent variable had a better fit and thus, could be used to establish a policy for retesting.

Since Kentucky allows for the use of traffic school as a means to prevent points from being assigned to one's driver record, the impact of this policy on the analysis was also evaluated.

Since the number of points of a conviction did not affect the possibility for attending traffic school, traffic school attendance could be considered equal to a conviction. Under this assumption, a crash and traffic school attendance could be equivalent to a crash and a conviction, while a crash and a conviction and traffic school attendance could be considered equivalent to a crash and two convictions. Given these scenarios, the number of drivers that had a crash and attended traffic school within two years is approximately 27,400 per year (Table 6). This number is again the largest number of drivers as compared to 19,700 drivers per year with a crash and traffic school attendance within a year, 4,000 drivers per year with two crashes and traffic school attendance within a year, and 6,200 drivers with two crashes and traffic school attendance within two years. Obviously, these estimates are higher than those observed for the same conditions—a crash and a conviction—in the data in Table 4 since another conviction (in the form of traffic school attendance) is added. The number of drivers is increased by 45 percent when considering traffic school attendance with a crash and is almost doubled when two crashes are examined.

Table 6. Number of drivers for combinations of convictions (including traffic school), crashes and time (1993-1997)

Convictions and/or traffic school	Crashes	Years	
		1	2
1	1	98,474	137,121
	2	20,059	30,963
2	1	36,827	76,134
	2	3,898	12,153

The number of drivers with two “general” convictions—a conviction coupled with traffic school attendance or another conviction—was also higher than when only two convictions were considered (Table 6). The data show that there were approximately 7,400 drivers per year with two convictions and a crash within a year, 15,200 drivers per year with two convictions and a crash and attended traffic school within two years, 800 drivers per year with two convictions and two crashes within a year, and 2,400 drivers with two convictions and two crashes within two years. Given this analysis, there is a small increase of drivers that would have two “general” convictions and a crash within two years compared to the 11,100 drivers with two convictions and a crash within two years. Therefore, to account for the effect of eliminating a conviction with traffic school attendance, and since the number of drivers to be retested is not considerably higher, it is considered more appropriate to establish the policy based on counting traffic school attendance as a conviction.

A statistical analysis, similar to that presented previously, was also performed for these data. Since the type of conviction, and thus its points, that was waived with traffic school attendance was not known, it was hypothesized that most of these convictions could carry three points and were considered as such. The analysis indicated that the crash model had a stronger fit. The time period was also a good predictor, as well as the number of convictions. However,

the number of points for the conviction were not statistical predictors of crash involvement, which may be attributed to the assumption of points assigned to traffic school attendance.

The analysis shows that there is a strong relationship between crashes and convictions and a driver who either commits a traffic violation or is involved in a crash has an increased likelihood to be involved in another crash or commit a violation. Therefore, traffic convictions and crashes would be valid criteria for determining the need for retesting. At the same time, a reasonable filter should be implemented that would not overburden the existing structure and become inefficient in evaluating such drivers. Based on the data presented here, the reasonable compromise between all the combinations examined is that of at least one crash and two convictions within a two-year period (where attendance in traffic school would count as one conviction). This two year period will start to count from the time when either a conviction or a crash occurs. Such a policy would require approximately 15,200 drivers to be retested per year, as previously estimated.

#### **4.2 Vision Testing at Renewal**

The literature review indicates that there is universal agreement among researchers that vision plays a significant role in driving performance. At the same time, the literature points out the absence of a common opinion for the determination of vision screening policies and that the utilization of new approaches in screening elderly drivers for vision deficiencies is gaining popularity. Moreover, there is a significant amount of research indicating that visual abilities deteriorate with age, although there is no specific point along the aging continuum that identifies when vision changes occur. However, the use of an age-based vision test is not considered appropriate, due to constitutional issues and since it may create significant problems regarding the mobility of the elderly. A vision screening procedure implemented for all license renewals is likely to be more cost effective and more appropriate to determine drivers with vision acuity problems.

The current driver license renewal practices used in Kentucky consist of a four-year renewal policy with no tests and require all drivers to renew their license in person. Examiners need to travel throughout the state to perform tests and their schedule is limited in order to cover the entire state. Therefore, any additional tests and examinations will increase their workload and burden the existing system if they are not accompanied by counterbalancing actions. Given this status and the fact that at least some vision tests are needed to ensure monitoring of the changes in driving abilities and deficiencies, a balance was sought and is presented.

It is apparent that some type of vision test should be implemented during the renewal process, since it could identify individuals with vision deficiencies. Such tests could be achieved either with a test during license renewal or with an eye exam prior to renewal. The test at renewal would be similar to that currently performed for initial driver license applications and could be performed by the KSP examiners during their visits at the testing site or by the Circuit Court Clerks at the time of renewal. Given the findings from the interviews with the KSP Division of

Driver Testing, it is apparent that this activity cannot be accommodated using the existing personnel. At the same time, the Circuit Court Clerks do not want an added cost or time burden added to the license renewal process. Potential means to reduce the workload would involve allowing a proof of a vision test at renewal or renewal by mail.

#### **4.3 Proof of Vision at Renewal**

An acceptable alternative to the vision screening at renewal would also be the use of an eye exam performed by a licensed optician (ophthalmologist or optometrist). The eye exam should be within a six-month period of the renewal date to be valid and should also include a peripheral vision test in addition to the standard vision test. Opticians recommend an eye exam every two years so it is reasonable to assume that a person can schedule it within six months from his/her license renewal month and thus, not require an additional trip to the optician or pose an added cost or time burden. This process will be similar to that currently in place for license plate renewal and proof of insurance.

#### **4.4 Renewal by Mail**

Another alternative to reduce the burden of a new vision screening would be to initiate a renewal by mail for certain groups of drivers. This process would permit drivers with clean records (with no points and/or crashes since their last renewal) to renew their license by mail every other period, i.e. every eight years. To ensure that there are no vision problems, a proof of vision verification should be mailed with the renewal application. Using this procedure, fewer drivers would require "in person" tests which would decrease the hours necessary to implement vision screening. This process will also reduce the work load of the Circuit Court Clerks. Moreover, the renewal every other period will allow for an update of the photograph on the license. Based on the analysis presented of the 1993 through 1997 data, there was 1,871,000 drivers with clean records since their last renewal which represents approximately 65 percent of all drivers in Kentucky. Therefore, only one-third of drivers would not qualify for this process and thus, allow examiners time for other test procedures.

It should be recognized that this may be an alternative to be considered in the near future, rather than immediately, due to current technological limitations. To implement this alternative, license photographs should be stored in an electronic format and digitally reproduced for the license to be mailed. Such a system would be feasible after 2005 since, starting in 2001, digital imaging is to be used to photograph drivers with digital images used for the driver license.

#### **4.5 Special Concerns for Older Drivers**

Approximately 13 percent of the driving population in Kentucky is over 65 years old; a percentage similar to that of the national average (10). Moreover, there is no apparent reason to expect that the aging trends expected nationwide in the upcoming decades will not also be

observed in Kentucky. Therefore, to better prepare for the future and the increased number of elderly drivers, some additional considerations are required for the driver license renewal process.

A basic assumption has been that the relationship between points on a driver's record and crash risk is the same for all age levels. Recent work indicates that this may not be the case since drivers over 70 showed a higher likelihood to be involved in a crash when they have six or more points in the last three years when compared to other age groups with similar driver records (34). These findings indicate that there may be a need for an earlier intervention for older drivers when they accumulate points in their driving record. Therefore, an age-based point system may serve as a warning strategy and establish a first level intervention, where elderly drivers with six or more points would be mailed an educational brochure or a self-assessment guide designed to reflect upon their driving performance.

Among the three possible tests that a driver can take (vision, knowledge, and road) visual and knowledge tests have shown to be an acceptable means for identifying drivers with age-related deficiencies (35). The addition of contrast sensitivity to the typical vision screening would be a significant improvement in evaluating drivers with potential visual deficiencies related to the driving task (7). Testing for low contrast sensitivity could be easily achieved with the addition of another slide in the vision screening devices. Knowledge tests have also shown strong relationships between their scores and crash prediction (36). Simple knowledge tests, where drivers are shown shapes and colors of signs and are required to identify their meaning, could be implemented to screen drivers who may be in need for further evaluation. Moreover, road tests at every renewal for elderly drivers do not necessarily provide additional information regarding the ability of the driver to safely perform the driving task, and they are better reserved for referrals by the MRB.

“In-person” driver license renewal allows for the licensing agent to visually observe the driver and evaluate his/her general physical and cognitive abilities for driving. While several states provide guidance and/or training to their licensing agents regarding the identification of potentially hazardous signs and symptoms of drivers while they renew their licenses, a simple line of questioning at the time of renewal could allow the agents to perform a basic screening regarding mentally impaired drivers (37). A recent survey conducted of the licensing agencies in the US and Canada indicated that such a practice would be feasible to implement and several states have already designed their manuals and training sessions to educate their agents to ensure accurate identification of potentially problem drivers (38). This approach has also been legally cleared from the Americans with Disabilities Act (ADA) and was recommended as part of a model program for initially screening older drivers (35, 39).

Medical conditions and symptoms have been shown to affect the driving task and elderly drivers are more susceptible to a variety of medical problems related to aging. The inclusion of a questionnaire at the driver license renewal process identifying possible medical problems for the elderly has been examined and suggested in previous research (40), and it is currently used in a few states. This issue has also been legally cleared by ADA, and it has been recommended to



include a standardized form of simple medical questions that could determine whether an applicant may have certain medical problems and symptoms that would affect his/her driving abilities. This questionnaire would be of higher significance for areas where reporting by physicians is not mandatory or is not widely publicized, and it could be completed at the time of renewal by the licensing agent. The following are a sample of questions that could be asked in the questionnaire:

- Have you ever been diagnosed with any of the following within the past 4 years? (Epilepsy; Stroke; Glaucoma; Cataracts; Diabetes; High blood pressure; Parkinson's disease; Alzheimer's disease; Multiple sclerosis; and Heart disease/problems)
- Are you taking any medications that may impair safe driving?
- Do you have any problems hearing an ambulance with your windows rolled up?
- Can you go outside in the bright sunlight and see clearly immediately?
- Can you turn your head and neck far enough to see over your shoulder?
- Can you drive for 30 minutes without your fingers or arms becoming tingly or numb?
- Can you lift your arm high enough to adjust your rear view mirror?
- Can you sit for 15 minutes without your feet or legs becoming tingly or numb?
- Can you always use your right foot to depress the brake pedal?

Finally, a shorter renewal period for drivers over 75 could be considered, where these drivers would be required to renew their driver license every two years in person with the same vision test requirements. There are approximately 140,000 drivers over 75 and such a policy would add approximately 35,000 driver tests annually. This addition would not significantly burden the renewal process when considered in combination with the renewal by mail, since the reduction of the mail renewal drivers outweighs the increase in the elderly drivers renewal.

## **5.0 IMPLEMENTATION CONSIDERATIONS**

An important aspect of a successful implementation of any new policy is the determination of its impact on the existing system and the amount of resources required to accomplish its goals. This section examines the impact of each of the alternatives presented in the previous section and presents the additional resources that may be required for their implementation.

### **5.1 Existing Resources**

The issuing and renewal of a driver license is currently fragmented within three agencies. One agency performs all tests required for a new license (the KSP Division of Driver Testing), while another issues the license (the Circuit Court Clerks), and a third administers and maintains the license file, revokes or suspends driver's licenses, and is responsible for the MRB (the KyTC Division of Driver Licensing). Given the separation between the testing and issuing agencies, it is logical to assume that such a system would continue. Therefore, the impact of each alternative discussed in the previous section was estimated under this assumption.

The KSP Division of Driver Testing currently employs 81 examiners that perform all of the required tests. Several of these examiners are permanently assigned to heavily populated areas while the remaining drive periodically to various counties to conduct the required tests. Based on data provided by the KSP, there were a total of approximately 215,000 written and skills (road) tests performed in 1998. The number of tests per county as well as the frequency of testing are provided in Appendix D.

Using the 1998 data, consisting of 215,000 tests and the testing frequency by county, the number of tests per day for each county was computed (Figure 1). A total of 48 weeks per year were used to account for vacation and holidays in the work schedule. Based on these data, most of the counties perform an average of less than 10 tests per day, while the counties with more than 10 tests have more than one examiner. The estimates provided by the KSP regarding the average number of tests performed on a daily basis range from 20 to 30 for vision screening and written tests and from 15 to 20 for road tests. These estimates show that it is possible to conclude that additional tests can be undertaken within the existing structure and personnel. Moreover, at least 60,000 tests associated with new procedures could be given with the existing number of examiners, since approximately this number of tests has been given to out-of-state transferring drivers in the past and will not be given in the future.

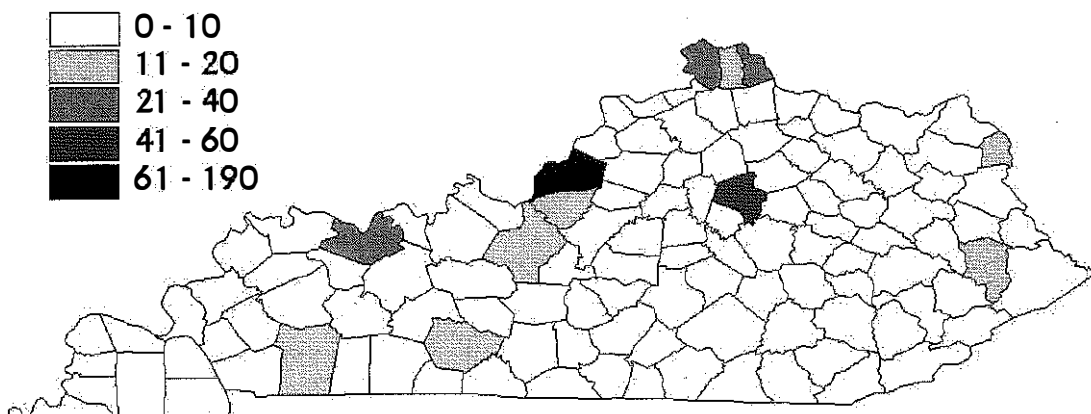


Figure 1. Number of written and road tests per day by county, 1998

License renewals are available on a daily basis and are performed by the Circuit Court Clerks in the driver's home county. The number of license renewals by county for the 1993 through 1997 period are also shown in Appendix D and summarized in Figure 2. These data indicate that there is a large variation among counties with their average daily workload varying from 1.5 to 110 drivers. Only seven of the most populous counties have more than 50 renewals per day. Based on these estimates, it would be feasible that driver license renewals could be offered only on specific days of the week, and it is not necessary to be available on a daily basis.

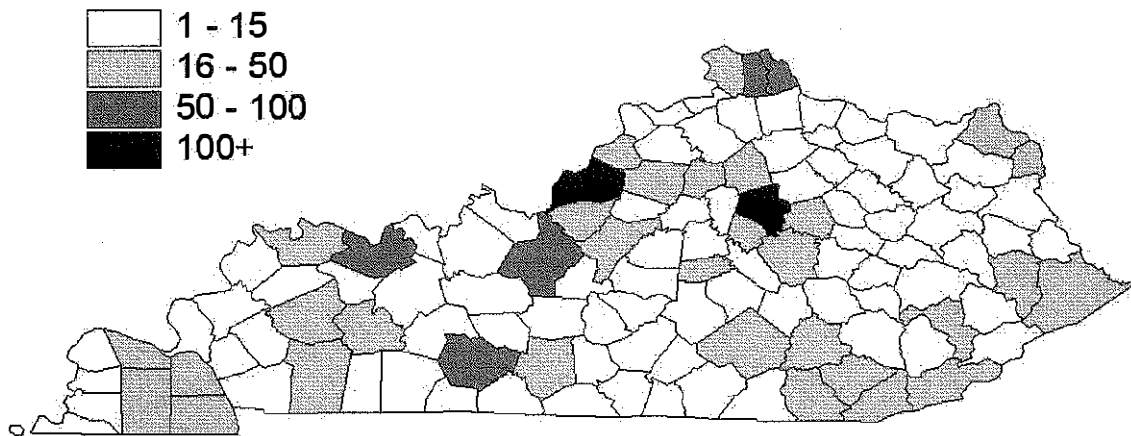


Figure 2. Number of renewals per day by county, 1993-1997

## 5.2 Retesting based on Crashes and Convictions

The estimated number of drivers to be retested using the recommended criteria would be 15,200 drivers per year as indicated in the analysis of crashes and convictions. These are drivers with one crash and two convictions within two years, where traffic school attendance would count as a conviction. These drivers will be referred to a review process through the Transportation Cabinet. The most appropriate action could then be taken. This could be a referral to traffic school or to a hearing with the Medical Review Board.

## 5.3 Vision Testing

The number of drivers renewing their driver license is approximately 550,000 drivers per year. Based on the estimates provided by KSP, a vision screening typically lasts less than five minutes. The assumption is that vision screening would not be available on a daily basis for some counties which have low numbers of renewals. Moreover, additional vision screening equipment will be required to implement vision testing at an estimated price of \$1,500 per unit. The use of an eye exam as a waiver of the vision screening would obviously reduce the number of screenings administered.

## 5.4 Renewal by Mail

This policy would allow the drivers with clean records to renew their driver license by mail which would dramatically reduce the workload of the Circuit Court Clerks. This policy would have a significant impact when considered in conjunction with vision screening. The estimated number of drivers requiring an in-person renewal would be about 198,000 per year.

## **5.5 Older Driver Retesting**

The annual number of drivers over 75 renewing their driver license is estimated to be approximately 35,000. It is suggested that a screening should be given to these drivers when they renew their license. The screening would consist of the types of questions presented previously, a vision screening of the type proposed for all drivers, and a written test. It is estimated that these tests will not last longer than 30 minutes and would provide examiners with the means to screen drivers potentially at risk.

## **6.0 SUMMARY AND CONCLUSIONS**

The current practices regarding driver license issuing and renewal were examined in this study. Several alternatives were identified for consideration relating to renewal and retesting in Kentucky's driver license process. The process of obtaining a driver license in the Commonwealth of Kentucky allows a person to take a vision screening and a written test upon completion of his/her sixteenth birthday. A successful completion of these tasks provides the person with a driver's permit and after six months a road test can be taken. Upon successful completion of the road test, the person is considered a licensed driver. Periodic renewal every four years is required to maintain the license but there are no testing or examination requirements at the time of renewal. All testing is conducted by the KSP Division of Testing while the driver license is issued or renewed by the Circuit Court Clerks. The driver files are maintained by the KyTC Division of Driver Licensing and this agency is also responsible for MRB processes and for suspending or revoking a driver license.

The driver license tests are conducted at a few permanent locations, but most examiners are required to travel throughout the state to perform these tests. Therefore, any additional tests and examinations will increase their workload and burden the existing system if they are not accompanied by any counterbalancing reductions. Given this status and the fact that at least some vision tests are needed to ensure monitoring of the changes of driving abilities and deficiencies, a balance was sought and presented.

There is a universal agreement among researchers that vision serves a significant role in driving performance, that visual abilities deteriorate with age, and that elderly drivers have higher crash rates all but the youngest drivers. However, there is no common opinion for the determination of vision screening policies. The use of an age-based vision test is not considered appropriate given the constitutional issues and since it may create significant problems regarding the mobility of the elderly. A vision screening implemented for all license renewals is likely to be more appropriate to identify all drivers with vision acuity problems. The use of low-contrast charts may also improve the effectiveness of these tests. Age-based road tests are not considered as a practical means to identify drivers with deficiencies, and they would unnecessarily burden the license renewal process. However, using road tests as an additional means of evaluating select individuals, such as those failing vision tests or referred by a physician or family member, could significantly improve the identification of deficient drivers. At the same time, the current

responsibility for referrals for additional examination is not well defined. Also, some physicians are concerned with legal liabilities so they frequently do not refer drivers with potential deficiencies to medical review boards.

It is apparent that some type of vision screening should be implemented during the renewal process since it could identify individuals with potential deficiencies. Such screening could be achieved either with a test during the license renewal or with an eye exam prior to license renewal. The eye exam should be performed by a licensed optician within a six-month period of the renewal date and include a peripheral vision test. An effort should be made to increase public awareness of the need for vision tests as an aid to safer driving. This would include information about the consequences of poor vision on the ability to drive.

To reduce the burden of these tests, renewal by mail for specified drivers could be also initiated in the future when the use of digital photography becomes available in 2005. This process will permit drivers with no points or crashes, since their last license renewal, to renew their license by mail every other period, i.e. every eight years. To ensure that there are no vision problems, a proof of a vision test could be mailed back with the renewal application. This way, fewer drivers will require in-person tests and there will be more available time for a closer inspection of drivers with potential problems. Moreover, the practice of only renewing every other period will allow for updates of driver license photographs. Based on the analysis presented in the previous sections, a large number of drivers will qualify for this process which would allow examiners time for other test procedures. Finally, a shorter renewal period for drivers over 75 could be considered, where these drivers would be required to renew their driver license every two years in person with the same vision test requirements. These changes will not significantly burden the renewal process, since the reduction from the mail-renewal drivers will outweigh the increase of the elderly drivers' renewals.

In addition to the vision testing, a policy that identifies potential at-risk drivers was also examined. The combination of convictions and crashes was considered as an appropriate means to distinguish such drivers. The analysis performed showed that the alternative that would capture a meaningful portion of the driving population without excessively burdening the existing system would be that of a crash and two convictions within a two year period (including traffic school attendance as a conviction). The level of retesting for these drivers would be based on the types of convictions committed and points accumulated.

The existing medical review board process should be maintained. The awareness of physicians and police officers regarding the medical process mandated by the U.S. Department of Transportation and their options and responsibilities for referring drivers with potential problems to the medical review board should also be increased. The brochure shown in Appendix C should be distributed as a method to increase awareness.

Special consideration should be given for older drivers renewing their driver licenses. In addition to the vision screening, a written test could be administered at license renewal along with

the medical questions previously presented. Since age-based point systems have shown relationships between crash rates and driver age, some considerations should be given for a shorter renewal period for older drivers, perhaps over 75. Moreover, the use of a road test for all renewals would not be beneficial and would not assist in identifying at-risk drivers.

Additional research should also be considered to evaluate the use of low-contrast vision tests, such as the Pelli-Robson test, as well as the feasibility of statewide implementation of these vision screening tests. The use of age-based point systems currently in review in other states should be closely followed to determine whether they would provide an earlier means of identifying older drivers at risk. Finally, the evaluation of license renewal policies in other states should be closely observed to determine what the impacts of current changes will be in the future.

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**APPENDIX A**

**State License Renewal Policies**



Table A-1. Fees and Tests for Driver License Renewal by State

State	Renewal Term	Renewal Fee	Fees on Yearly Basis	Vision Test	Who Conducts
Alabama	4	\$ 20.00	\$ 5.00	N	
Alaska	5	\$ 15.00	\$ 3.00	Y	DMV employees
Arizona	44	\$ 25.00	\$ 0.57	Y	DMV employees
Arkansas	4	\$ 14.00	\$ 3.50	Y	Revenue Dept. Employees
California	5	\$ 15.00	\$ 3.00	Y	DMV employees
Colorado	5	\$ 15.00	\$ 3.00	Y	DMV employees
Connecticut	4	\$ 35.50	\$ 8.88	Pending	
Delaware	5	\$ 12.50	\$ 2.50	Y	DMV employees
Florida	6	\$ 15.00	\$ 2.50	Y	DMV employees
Georgia	4	\$ 15.00	\$ 3.75	Y	DMV employees
Hawaii	4	\$ 12.00	\$ 3.00	Y	DMV employees
Idaho	4	\$ 20.50	\$ 5.13	Y	Local sheriff offices
Illinois	5	\$ 10.00	\$ 2.00	Y	Driver license examiners
Indiana	4	\$ 6.00	\$ 1.50	Y	DMV employees
Iowa	4	\$ 16.00	\$ 4.00	Y	DMV employees
Kansas	4	\$ 10.00	\$ 2.50	Y	DMV employees
Louisiana	4	\$ 18.00	\$ 4.50	Y	DMV employees
Maine	6	\$ 30.00	\$ 5.00	Y	DMV employees
Maryland	5	\$ 20.00	\$ 4.00	Y	DMV Service Representatives
Mass	5	\$ 33.75	\$ 6.75	Y	DMV employees
Michigan	4	\$ 13.00	\$ 3.25	Y	DMV employees
Minnesota	4	\$ 18.50	\$ 4.63	Y	Public safety employees / Privately owned stations
Mississippi	4	\$ 20.00	\$ 5.00	N	
Missouri	3	\$ 7.50	\$ 2.50	Y	DMV employees
Montana	8	\$ 32.00	\$ 4.00	Y	DMV employees
North Dakota	4	\$ 10.00	\$ 2.50	Y	Driver license examiners
New Hampshire	4	\$ 32.00	\$ 8.00	Y	Driver license examiners
New Mexico	4	\$ 13.00	\$ 3.25	Y	DMV employees
North Carolina	5	\$ 18.75	\$ 3.75	Y	DMV employees
Nebraska	4	\$ 15.00	\$ 3.75	Y	License stations / Small towns use courthouse
Nevada	4	\$ 20.50	\$ 5.13	Y	DMV employees
New Jersey	4	\$ 16.00	\$ 4.00	N	
New York	5	\$ 27.25	\$ 5.45	N	
Ohio	4	\$ 10.75	\$ 2.69	Y	DMV employees
Oklahoma	4	\$ 15.00	\$ 3.75	N	
Oregon	4	\$ 16.25	\$ 4.06	N	
Pennsylvania	4	\$ 24.00	\$ 6.00	N	
Rhode Island	5	\$ 35.00	\$ 7.00	Y	DMV employees
South Dakota	5	\$ 8.00	\$ 1.60	Y	Driver license examiners
SC	5	\$ 12.50	\$ 2.50	Y	DMV employees

State	Renewal Term	Renewal Fee	Fees on Yearly Basis	Vision Test	Who Conducts
Tennessee	5	\$ 17.50	\$ 3.50	N	
Texas	4	\$ 16.00	\$ 4.00	Y	Driver license examiners
Utah	5	\$ 15.00	\$ 3.00	Y	Driver license examiners
Vermont	4	\$ 20.00	\$ 5.00	N	
Virginia	5	\$ 12.00	\$ 2.40	Y	
Washington	4	\$ 14.00	\$ 3.50	Y	Driver license examiners
West Virginia	5	\$ 13.00	\$ 2.60	N	
Wisconsin	4	\$ 10.00	\$ 2.50	Y	DMV employees
Wyoming	4	\$ 15.00	\$ 3.75	Y	Driver license examiners

Table A-2. Vision Requirements at Renewal by State

State	Vision Machine	Static/Dynamic	Eyes	Glasses	Exemption w Slip
Alabama					
Alaska	Y	S	E+B	Y	Y
Arizona	Machine and Chart	S	E+B	Y	Y (Authorized Form)
Arkansas	Y	S	E+B	Y	N
California	Y(Chart first, then machine if fails chart)	S	E+B	Y	N
Colorado	Y	S	E+B	Y	N
Connecticut					
Delaware	Y	S	E+B	Y	N (If test failed, sent to doctor)
Florida	Y	S	E+B	Y	N
Georgia	Y	S	E+B	Y	N
Hawaii	Y	S	E	Y	Y (From certified physician)
Idaho	Y	S	E+B	Y	Y(Authorized Form)
Illinois	Y	S	E+B	Y	Y
Indiana	Y	S	E+B	Y	N
Iowa	Y(Optech 1000)	S	E+B	Y	N(If test failed, sent to doctor)
Kansas	Y	S	E+B	Y	Y (From certified physician within 90 days)
Louisiana	Y	S	E+B	Y	Y(Authorized Form)
Maine	Y(Titmus stereo optical)	S	E+B	Y	Y
Maryland	Y(Snellin Chart also)	S	E+B	Y	Y(Authorized Form, No Photocopies)
Mass	Y	S	E+B	Y	Y(Authorized Form)
Michigan	Y	S	E+B	Y	Y
Minnesota	Y	S	E+B	Y(opt)	N(If test failed, sent to doctor)
Mississippi					
Missouri	Y	S	E+B	Y	Y
Montana	Y(Optech 1000)	S	E+B	Y(opt)	Y
North Dakota	Y	S	E+B	Y	Y
New Hampshire	Y	S	E+B	Y	Y
New Mexico	Y	S	E+B	Y	N(If test failed, sent to doctor)
North Carolina	Y	S	E+B	Y	N(If test failed, sent to doctor)
Nebraska	Y	S	E+B	Y	N
Nevada	Y	S	E+B	Y	Y
New Jersey					
New York					
Ohio	Y	S	E+B	Y	N
Oklahoma					
Oregon					
Pennsylvania					
Rhode Island	Y(Optech 1000)	S	E+B	Y	Y(Authorized Form)
South Dakota	Y	S	E+B	Y	N
South Carolina	Y	S	E+B	Y	N(If test failed, sent to doctor)
Tennessee					

State	Vision Machine	Static/Dynamic	Eyes	Glasses	Exemption w Slip
Texas	Y	S	E	N	Y
Utah	Y	S	E+B	Y	Y (From certified physician)
Vermont					
Virginia					
Washington	Y	S	E+B	Y(opt)	N(If test failed, sent to doctor)
West Virginia					
Wisconsin	Y	S	E	Y	Y(Authorized Form)
Wyoming	Y	S(Traffic signs & letters)	E+B	Y	Y(Authorized Form)

Table A-3. Medical Review Board Process by State

State	Process Established	Mandatory Reporting	Comments
Alabama	Y	N	License is suspended upon notification by doctor
Alaska	N		Some do report
Arizona	N		
Arkansas	N		If doctor reports something, then the state must call the person in and act on it
California	Y	Y	Doctors required to report any person with unsafe condition for driving
Colorado	N		DMV conducts physical if person appears questionable to drive, DMV makes final decision
Connecticut	Y	N	
Delaware	Y	Y	Doctors are required to report any condition that could affect driving. Then DMV calls the person in and makes the final decision
Florida	Y	Y	Doctors have forms that they are required to submit to state
Georgia	N		If a doctor does report, that is enough to revoke the license
Hawaii	Y	Y	Doctor required to notify the state, Driver Application also asks questions to detect problems
Idaho	N		If doctor does report then license is revoked
Illinois	Y	Y	Doctor required to contact medical review board
Indiana	N		
Iowa	N		
Kansas	N		Have a medical review board with 3 doctors that reviews questionable cases received by letters
Louisiana	N		DMV employees determine whether or not the person should be sent to a doctor for exam
Maine	N		Some do report to an Adverse Reporting System for Review
Maryland	N		
Mass	N		If a doctor reports then state follows up, screen thru disabled parking applications with several questions
Michigan	Y	Y	Doctors have forms that they are required to submit to state
Minnesota	Y	Y	Doctors required to notify states of conditions that will impair driving ability
Mississippi	Y	N	DMV acts on letters from doctors to call people in and retest
Missouri	N		
Montana	N		Some do report
North Dakota	N		
New Hampshire	N		No requirement but if doctor indicates unsafe condition then license is suspended
New Mexico	N		Doctors are encouraged to report
North Carolina	Y	Y	If a doctor notices anything that could be a danger to driving then they are required to request a medical report form for that person or send a letter to state
Nebraska	N		Doctors may recommend 6 month / 1 year recalls
Nevada	N		

State	Process Established	Mandatory Reporting	Comments
New Jersey	Y	Y	
New York	Y	N	Doctors or next of kin report to medical review board
Ohio	N		
Oklahoma	Y	N	DMV acts after notification from doctors to call people in and retest
Oregon	Y	Y	
Pennsylvania	Y	Y	
Rhode Island	N		
South Dakota	N		
South Carolina	N		Doctors and law enforcement may report but they are not required
Tennessee	Y	Y	
Texas	Y	Y	Doctors required to notify states of conditions that will impair driving ability
Utah	Y	Y	Doctors required by law to notify states of conditions that will impair driving ability
Vermont	Y	N	Doctors or next of kin report to medical review board
Virginia	Y	N	Doctors protected if they report
Washington	N		If problem is reported from reliable source, then the person could be required to take an exam
West Virginia	Y	N	Law enforcement, family members, and doctors may report
Wisconsin	N		Protected by law if they do report. License may be revoked upon recommendation from doctor
Wyoming	Y	Y	Doctors required to notify states of conditions that will impair driving ability



## **APPENDIX B**

### **Vision Quotes**



"The evolution of driver visual performance standards, testing procedures, and periodic evaluation has been guided by a clearly perceived need to specify adequate visual capacity to assure public safety in a task (i.e. driving) obviously dependent on vision. However, this process has been able to draw little from an empirical base. A reading of the historical record in this area leads to the conclusion that driver licensing vision screening programs (at original license application and/or license renewal) are based on expert opinion from those in the medically oriented fields of ophthalmology and optometry, research scientists concerned with problems of human visual psycho-physics, and traffic safety and engineering professionals concerned with standards and the regulatory process."

Decina, L. E. and Staplin, L. (1993) Retrospective Evaluation Of Alternative Vision Screening Criteria For Older and Younger Drivers, *Accident Analysis & Prevention*, Vol 25, No. 3, pp. 267-275.

"It is estimated that vision accounts for 90% of the input drivers use when operating a vehicle. To date, however, there is a lack of empirical evidence identifying a significant predictive relationship between changes in vision function and automobile crashes. Driving is a visually complex task. Efforts to determine the role of vision in driving, while suggestive, have not been useful in identifying at-risk older drivers."

Penchansky, R. and Shipp, M. D. (1995) Vision Testing and the Elderly Driver: Is There a Problem Meriting Policy Change?, *Journal Of The American Optometric Association*, Vol 66, No. 6.

"Driving is a highly visual task, and thus it might be expected that higher incidence of visual problems and eye disease in the elderly is a primary cause of their driving difficulty. This expectation is reflected by the practice of assessing visual acuity, and sometimes peripheral vision, at driver licensing sites in each state. Despite the intuition that vision and driving ability should be related, earlier studies have found only weak correlations between visual deficits (e.g. static and dynamic acuity, disability glare) and vehicle crashes. These weak correlations were often statistically significant due to very large sample sizes, but accounted for less than 5% of the crash variance, and thus are insignificant from the practical standpoint of identifying what older drivers are at risk for crash involvement."

Ball, K., Owsley, C., Sloane, M. E., Roenker, D. L., and Bruni, J. R. (1993) Visual Attention Problems as a Predictor of Vehicle Crashes in Older Drivers. *Investigative Ophthalmology & Visual Science*, Vol. 34, No. 11, 1993.



**APPENDIX C**

**Medical Review Board Flyer**



## **ARTICLE IN KENTUCKY MEDICAL ASSOCIATION NEWSLETTER**

### **Medical Review Process**

The Commonwealth of Kentucky enacted a Medical Review Process that went into effect October 1, 1996 under authority of statutes KRS 186.444 and KRS 186.570. These statutes required the Transportation Cabinet to establish a Medical Review Board in order to withhold driving privileges from individuals deemed mentally or physically unsafe to drive. The Medical Review Board consists of three licensed physicians that review cases on a case by case basis.

### **You Can Help**

The Transportation Cabinet needs help identifying unsafe drivers. If you know someone that could be dangerous behind the wheel because of a medical condition, you may report this to the Kentucky Transportation Cabinet Medical Review Section. It is not easy to decide to report a relative, friend, or long time patient. However, the safety of the individual and the rest of society should be the deciding factor. The following is a list of individuals or groups that may report an unsafe driver and start the Medical Review Process:

- Physicians
- Two Concerned Citizens in a signed affidavit
- Law Enforcement Officers
- Commonwealth Attorney, County Attorney, County Clerk, Circuit Clerk, Sheriff, or Judge
- Driver License Examiner
- Driver him/herself

### **The Process**

Once the Medical Review Division receives notice of a potentially medically impaired driver, the person in question will be required to submit an examination by a qualified physician within 45 days or else their license will be suspended. The Department shall receive examination results on a form provided by the Transportation Cabinet and shall review each case on a case by case basis. The Department shall submit any case that require medical expertise to the Medical Review Board, which consists of at least three licensed physicians. After review, the Medical Review Board can make a vast range of recommendation from total suspension to mild restrictions. The person in question has the right to an informal and possibly an Administrative hearing to dispute any recommendations of the Medical Review Board. The Commissioner of Motor Vehicles, or his appointed assistant, ultimately make a decision if a hearing takes place.

### **Contact Information**

If you come in contact with a driver that you feel is unsafe due to a physical or mental condition, you may contact the Medical Review Division at the Kentucky Transportation Cabinet:

Kentucky Transportation Cabinet  
Division of Driver Licensing  
Medical Review Board  
501 High Street  
Frankfort, KY 40622  
(502) 564-6800 ext. 2550

***Kentucky  
Transportation  
Cabinet***

***Division of Driver  
Licensing***

***Medical Review  
Process***

***For Additional Information  
Contact:  
Kentucky Transportation Cabinet  
Drivers Licensing Division  
Medical Review Division  
8888 Road  
Frankfort, KY 40622***

***Or Call  
502-555-5555***

***The purpose of the State of***

***Kentucky's Medical Review***

***Process is to identify and***

***possibly remove high risk***

***drivers from Kentucky's***

***highways in order to***

***improve safety for everyone.***

**BROCHURE**



## ***If You Are Concerned About***

### ***An Impaired Driver***

*If you know someone that could be dangerous behind the wheel because of a medical condition, you may report this to the Kentucky Transportation Cabinet Medical Review Section. See contact information on back of brochure.*

### ***A Safety Consideration***

*It is not easy to decide to report a relative, friend, or long time patient. However, the safety of the individual and the rest of society should be the deciding factor.*

### ***Who Can Report Someone?***

- Physicians
- Two Concerned Citizens in a signed affidavit
- Law Enforcement Officers
- Commonwealth Attorney, County Attorney, County Clerk, Circuit Clerk, Sheriff, or Judge
- Driver License Examiner
- Driver him/herself

## ***The Process***

*Once the Medical Review Division receives notice of a potentially medically impaired driver, the person in question will be required to submit an examination by a qualified physician within 45 days or else their license will be suspended. The Department will receive examination results on a form provided by the Transportation Cabinet and will review each case on a case by case basis. The Department will submit any case that require medical expertise to the Medical Review Board, which consists of at least three licensed physicians. After review, the Medical Review Board can make a vast range of recommendations from total suspension to mild restrictions. The person in question has the right to an informal and possibly an Administrative hearing to dispute any recommendations of the Medical Review Board. The Commissioner of Motor Vehicles, or his appointed assistant, ultimately make a decision if a hearing takes place.*

## ***Typical Conditions That Need Consideration***

- Heart Conditions
- Declining Motor Skills and Decision Making
- Endocrine Function Disorders
- Musculoskeletal(Muscular) Disorders
- Neurological Disorders
- Mental and Emotional Disorders
- Respiratory Disorders
- Vision and Sensory Function Disorders

*The above conditions are all conditions that can impair a person's ability to operate a motor vehicle. Any condition that may be harmful is subject to review. The Commonwealth of Kentucky needs help identifying these types of problems. Please do your part to make Kentucky highways safer for everyone.*



**APPENDIX D**

**Number of Tests by County**



COUNTY	DRIVER TESTS(1998)	TESTS PER DAY	RENEWALS (1993-1997)	RENEWALS PER DAY
Adair	1,093	4.3	11,605	9.1
Allen	1,002	3.9	11,672	9.2
Anderson	958	3.8	13,561	10.6
Ballard	444	1.7	6,580	5.2
Barren	2,205	8.6	26,921	21.1
Bath	634	2.5	7,672	6.0
Bell	2,006	7.9	19,504	15.3
Boone	5,412	21.2	56,092	44.0
Bourbon	1,136	4.5	14,611	11.5
Boyd	3,398	13.3	38,477	30.2
Boyle	1,374	5.4	20,123	15.8
Bracken	541	2.1	5,969	4.7
Breathitt	1,066	4.2	10,358	8.1
Breckinridge	1,211	4.7	13,140	10.3
Bullitt	3,577	14.0	43,887	34.4
Butler	769	3.0	8,859	6.9
Caldwell	741	2.9	10,156	8.0
Calloway	1,488	5.8	24,839	19.5
Campbell	5,333	20.9	63,495	49.8
Carlisle	321	1.3	4,221	3.3
Carroll	750	2.9	7,398	5.8
Carter	1,617	6.3	18,793	14.7
Casey	885	3.5	10,582	8.3
Christian	3,900	15.3	37,752	29.6
Clark	1,805	7.1	24,138	18.9
Clay	1,845	7.2	14,516	11.4
Clinton	597	2.3	6,952	5.5
Crittenden	526	2.1	6,995	5.5
Cumberland	394	1.5	5,072	4.0
Daviess	6,329	24.8	68,348	53.6
Edmonson	903	3.5	8,438	6.6
Elliott	432	1.7	4,630	3.6
Estill	962	3.8	10,954	8.6
Fayette	13,637	53.5	189,484	148.6
Fleming	826	3.2	9,704	7.6
Floyd	3,040	11.9	30,848	24.2
Franklin	2,443	9.6	35,464	27.8
Fulton	462	1.8	5,737	4.5
Gallatin	385	1.5	5,096	4.0
Garrard	753	3.0	9,834	7.7
Grant	1,167	4.6	15,087	11.8
Graves	1,238	4.9	27,238	21.4
Grayson	1,326	5.2	17,295	13.6
Green	660	2.6	8,077	6.3
Greenup	1,383	5.4	28,572	22.4
Hancock	519	2.0	6,334	5.0

COUNTY	DRIVER TESTS(1998)	TESTS PER DAY	RENEWALS (1993-1997)	RENEWALS PER DAY
Hardin	2,905	11.4	66,119	51.9
Harlan	1,216	4.8	24,322	19.0
Harrison	1,129	4.4	13,258	10.4
Hart	1,039	4.1	11,885	9.3
Henderson	1,370	5.4	34,193	26.8
Henry	859	3.4	11,011	8.6
Hickman	331	1.3	4,136	3.2
Hopkins	1,173	4.6	35,084	27.5
Jackson	929	3.6	9,015	7.1
Jefferson	48,140	188.8	512,920	402.3
Jessamine	1,360	5.3	26,581	20.8
Johnson	1,101	4.3	17,397	13.6
Kenton	3,521	13.8	107,011	83.9
Knott	1,235	4.8	11,521	9.0
Knox	1,547	6.1	20,739	16.3
Larue	715	2.8	9,895	7.8
Laurel	1,437	5.6	35,837	28.1
Lawrence	1,170	4.6	10,799	8.5
Lee	455	1.8	5,316	4.2
Leslie	951	3.7	9,012	7.1
Letcher	1,221	4.8	18,809	14.8
Lewis	880	3.5	9,896	7.8
Lincoln	1,360	5.3	15,553	12.2
Livingston	508	2.0	7,617	6.0
Logan	1,020	4.0	19,323	15.2
Lyon	314	1.2	5,614	4.4
Madison	1,608	6.3	51,908	40.7
Magoffin	915	3.6	11,570	9.1
Marion	1,128	4.4	7,555	5.9
Marshall	1,572	6.2	46,182	36.2
Martin	774	3.0	9,244	7.3
Mason	1,077	4.2	12,330	9.7
McCracken	1,638	6.4	23,897	18.7
McCreary	1,319	5.2	9,244	7.3
McLean	625	2.5	12,663	9.9
Meade	1,536	6.0	16,399	12.9
Menifee	400	1.6	4,395	3.4
Mercer	1,176	4.6	15,802	12.4
Metcalfe	585	2.3	7,061	5.5
Monroe	713	2.8	8,566	6.7
Montgomery	1,218	4.8	15,808	12.4
Morgan	779	3.1	8,368	6.6
Muhlenberg	1,301	5.1	24,187	19.0
Nelson	1,441	5.7	26,290	20.6
Nicholas	345	1.4	5,419	4.3
Ohio	1,575	6.2	16,500	12.9

COUNTY	DRIVER TESTS(1998)	TESTS PER DAY	RENEWALS (1993-1997)	RENEWALS PER DAY
Oldham	1,215	4.8	30,462	23.9
Owen	605	2.4	7,134	5.6
Owsley	367	1.4	3,694	2.9
Pendleton	910	3.6	9,942	7.8
Perry	1,066	4.2	22,533	17.7
Pike	1,992	7.8	51,409	40.3
Powell	792	3.1	9,476	7.4
Pulaski	1,874	7.3	41,090	32.2
Robertson	119	0.5	1,548	1.2
Rockcastle	1,045	4.1	11,333	8.9
Rowan	1,100	4.3	14,054	11.0
Russell	959	3.8	12,299	9.6
Scott	1,080	4.2	21,722	17.0
Shelby	1,613	6.3	22,078	17.3
Simpson	1,090	4.3	12,161	9.5
Spencer	583	2.3	7,387	5.8
Taylor	1,380	5.4	16,897	13.3
Todd	726	2.8	8,134	6.4
Trigg	605	2.4	9,251	7.3
Trimble	316	1.2	5,599	4.4
Union	1,561	6.1	13,678	10.7
Warren	2,861	11.2	63,777	50.0
Washington	621	2.4	7,919	6.2
Wayne	1,118	4.4	13,212	10.4
Webster	962	3.8	10,581	8.3
Whitley	1,387	5.4	23,807	18.7
Wolfe	638	2.5	5,105	4.0
Woodford	1,380	5.4	17,473	13.7

