A Physician Guidebook

Medical Perspectives on Impaired Driving

Third Edition ~ January 2004

Updates to this Guidebook will be made available on our website at **www.massmed.org**

Produced by:
Massachusetts Medical Society

This publication is intended to serve as an informational resource for physicians in Massachusetts and includes general guidelines drawn from the Canadian Medical Association,[1] British Columbia Medical Association,[2] Massachusetts Registry of Motor Vehicles' policy, and other clinical literature.

Medical care and treatment decisions must be determined on the basis of all the facts and circumstances involved in each individual case. Information and suggestions in this publication are not intended to serve as standards of medical care but rather as a starting point for clinicians. Approaches to issues of medical impairment as they affect the ability to operate a motor vehicle safely will continue to evolve as scientific and medical knowledge and experience advance. Physicians are urged to consult the voluminous and ever-increasing literature when faced with a particular clinical situation.

References to Massachusetts law and regulation are general and reflect the state of the law for drivers with a Class D or M license (i.e., private, non-commercial car, SUV, or motorcycle operators) at the time of this brochure's publication. The legal authorities referenced, however, are subject to change by legislative and regulatory action at any time. Nothing contained herein should be construed as legal advice or legal opinion. Legal counsel knowledgeable about health care should be consulted for the application of current law and regulation to specific situations.

The information contained in the appendices to this guidebook reflects resources available at the time of publication and are not intended to be an exhaustive list. Inclusion of driver rehabilitation facilities and consumer resource information in this guidebook does not represent an endorsement by the Massachusetts Medical Society, the Working Group on Impaired Drivers, or Massachusetts state agencies. Information on these resources was collected through individual contacts by members of the Working Group on Impaired Drivers and by Massachusetts Medical Society staff.

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[1] Canadian Medical Association. Determining Medical Fitness to Drive: A Guide for Physicians, *6th ed. Ottawa, ON: Canadian Medical Association, 2000. (reprinted with permission of the publisher)*

[2] British Columbia Medical Association. Guide for Physicians in Determining Fitness to Drive a Motor Vehicle, *7th ed. Vancouver, BC: British Columbia Medical Association, 1997. (reprinted with permission of the publisher)*

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Section 1

Introduction

Owing to medical advances and a growing population of older persons in the United States, physicians will increasingly care for patients who might be unable to operate a motor vehicle safely. This puts patients and physicians in the difficult position of weighing health and public safety concerns while maintaining regard for individual independence. Although there is comparatively limited scientific evidence available to assess the degree of driving impairment that results from specific medical conditions, the body of knowledge continues to expand. As the pressure to ensure that impaired drivers do not put themselves and others at risk increases, reliable, evidence-based resources for the practicing physician will become invaluable.

The Massachusetts Medical Society's Working Group on Impaired Drivers has prepared this guidebook to help physicians practicing in the Commonwealth identify medical conditions that can lead to impaired driving, access resources for patients who might be at risk of impaired driving, and determine their legal responsibilities when treating a patient who may be medically impaired to drive. This resource includes detailed descriptions of medical conditions that can affect a person's ability to drive. In addition, the appendices contain contact information for driving evaluation centers, as well as resources that patients and family members can access for help with alternative transportation.

Section 2

Medical/Legal Issues

Massachusetts Statutory and Regulatory Framework for Physical Fitness to Drive

In Massachusetts, the Registry of Motor Vehicles (RMV) is the state agency authorized to issue and revoke driving privileges. The RMV typically issues the following classes of driver's licenses:[3]

- **Class A** ~ Any combination of vehicles with a gross combination vehicle weight rating GCWR of 26,001 lbs. or more provided the GVWR of the vehicle(s) being towed is in excess of 10,000 lbs., except a School Bus. With a Class A license and the appropriate endorsements, you may operate any vehicle covered within Classes B and C.
- **Class B** ~ Any single vehicle with a gross vehicle weight rating GVWR of 26,001 lbs. or more, or any such vehicle towing another vehicle not in excess of 10,000 lbs. GVWR, except a School Bus. With a Class B license and appropriate endorsements, you may operate any vehicle covered within Class C.
- **Class C** ~ Any vehicle that is either less than 26,001 lbs. GVWR or any such vehicle towing a vehicle not in excess of 10,000 lbs. GVWR or a vehicle placarded for hazardous materials or designed to transport 16 or more persons, including the operator, except a School Bus.
- **Class D** ~ Any single vehicle or combination except a semitrailer unit, truck trailer combination, tractor, or truck having a registered gross weight in excess of 26,000 lbs., a bus or a school bus.
- **Class M** ~ A motorcycle or any other motor vehicle having a seat or saddle for the rider and designed to travel with no more than three wheels in contact with the ground.

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[3] *Licensing Information page. Massachusetts Registry of Motor Vehicles website available at: www.state.ma.us/rmv/license/2diflic.htm. (Accessed January 2004)*

The information in this guidebook is focused on Massachusetts drivers with a Class D or M license (i.e., private car, SUV, or motorcycle operators). Commercial driving and operation of vehicles in other RMV classes introduces different legal, regulatory, and clinical considerations. Specialized resources should be consulted when questions arise about caring for these patients.

RMV Medical Affairs Branch and Medical Advisory Board

The RMV's Medical Affairs Branch is a division of the Driver Licensing Department and serves two main functions: (1) issuance of disabled plates and placards and (2) establishing policies and procedures regarding minimum physical qualifications to operate motor vehicles. The Branch sets minimum medical standards for vehicle operation based on the recommendations of the RMV's Medical Advisory Board.

At present, for drivers in Class D and M, the Medical Affairs Branch has established policy statements regarding minimum standards for vision qualifications, loss of consciousness and seizure conditions, cardiovascular and respiratory conditions, and arthritis.[4] These minimum medical standards, previously published only as policy statements, recently have been codified into Massachusetts regulations. These standards apply to those individuals currently possessing a driver's license as well as new applicants. Other standards may apply to drivers in different license classes. In specific instances, the Medical Affairs Branch will conduct assessments of an individual's ability to operate a motor vehicle or ask the individual to provide additional information from his or her physician.

Throughout this guidebook, whenever there is a specific minimum standard imposed for a particular condition by the RMV, the state standard will be referenced and identified as such. Readers are urged to consult the applicable regulations or policy statements for complete details.

Physician Reporting and Patient Consent Issues

Licensees whose medical condition makes them ineligible to drive have the responsibility to report their medical condition to the RMV's Medical Affairs Branch. Currently, there is no Massachusetts law authorizing physicians or other clinicians to report a patient's medical impairments to the RMV.[5] Accordingly, physicians must have patient authorization prior to sharing information about their medical condition with the RMV. Physicians who choose to provide information to the RMV without their patient's authorization may expose themselves to liability for breach of their duty to honor patient confidentiality. Patients whose driving ability or medical condition is being evaluated by

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[4] *Medical Affairs page. Massachusetts Registry of Motor Vehicles website available at: www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

[5] *For more information on a physician's duty to report the occurrence of specific patient conditions, please refer to the Massachusetts Medical Society's informational guide, "Reporting of Patient Diseases, Conditions, and Occurrences," available at www.massmed.org/pages/reporting_cover.asp. (accessed January 2004)*

the RMV will ask their physician to provide medical information through a certification form or other documantation. Whenever a physician provides information to the RMV, patient authorization should be carefully documented.

Physicians practicing in states other than Massachusetts should be aware of all relevant local statutes. Eight states — Vermont, Georgia, Oregon, New Jersey, California, Delaware, Pennsylvania, and Nevada — require physicians to report specific disorders to the appropriate state agency. Several other states have laws permitting, but not requiring, physicians to report impaired drivers. These statutes contain different provisions and standards for a physician's legal liability if they choose to report or not to report a patient who might be at risk for impaired driving.[6] In the absence of such a law, physicians who choose to provide information to the RMV without their patients' consent may incur liability.

Risk Management

Absent a reporting statute, the physician's primary role in this area is to be alert to medical conditions or treatments that may impair the ability to drive and to counsel their patients appropriately. If complete cessation of driving is warranted, the physician should advise the patient of this conclusion and document the conversation in the medical record.

In the rare case where a physician concludes that a patient's continued driving poses a serious threat to the patient or other parties, and the patient refuses to stop driving, the physician should assess his or her ethical obligations and potential legal liability for reporting or failing to report the individual to the RMV. While reporting without patient consent may expose a physician to potential legal liability, disclosure in certain situations may be justified if it would avert a serious danger to the patient or others. The privacy provisions of the Health Insurance Portability and Accountability Act of 1997 (HIPAA), due to take effect in 2003, may clarify the physician's obligations in this regard. Physicians confronted with such a situation are advised to consult legal counsel.

Medical Society Ethical Policies Regarding Medically Impaired Drivers

At present, very few organized medical societies have issued policy statements regarding a physician's responsibility to report medically impaired drivers. However, the topic has engendered considerable debate within the American Medical Association (AMA). In December 1999, the AMA's House of Delegates adopted the recommendations of Report 102 from their Council on Ethical and Judicial Affairs (CEJA). These recommendations were subsequently embodied in CEJA opinion 2.24.[7] Report 102 concludes, "physicians have an ethical responsibility to assess patients' physical or mental impair-

[6] *For a summary of state laws regarding physician reporting of medically impaired drivers, please see Appendix F.*

[7] *The full text of this report is available through the AMA website at www.ama-assn.org/ama/pub/category/5494.html#I99. (accessed January 2004)*

ments that might adversely affect driving abilities." With respect to the reporting issue, AMA CEJA opinion 2.24 states "[i]n situations where clear evidence of substantial driving impairment implies a strong threat to patient and public safety, and where the physicians' advice to discontinue driving privileges is ignored, it is desirable and ethical to notify the Department of Motor Vehicles."

In the past, the MMS has supported legislative proposals authorizing physicians to make voluntary reports to the RMV when they feel that a patient is unable to operate a motor vehicle safely, but the Society has emphasized in testimony that such a law must clearly define the scope of the reporting obligation and provide physicians with good faith immunity for their reporting decisions. The MMS House of Delegates (HOD) has directed the Committee on Ethics and Discipline to consider whether the MMS should support legislative or regulatory initiatives that seek to require or authorize physicians to report medical impairments to the RMV without patient consent. The MMS has adopted a general policy on patient confidentiality which states, "conflict between a patient's right to privacy and a third party's need to know should be resolved in favor of the patient's privacy and confidentiality except where that may result in serious harm to the patient or others."[8] The MMS also looks to the AMA CEJA opinion for ethical guidance.

[8] *Massachusetts Medical Society, Policy on Patient Privacy and Confidentiality, General Principle #4 (1996).*

Section 3

Alcohol

The Effect of Alcohol on Driving

Alcohol abuse is the greatest risk factor for motor vehicle-related collisions and injury. Almost 40% of motor vehicle collisions (MVCs) resulting in a fatality are alcohol related.[9] At the same time, 1.4 million drivers were arrested in 1998 for driving under the influence (1 arrest per 132 licensed drivers). Physicians can contribute to the health of their patients and to the safety of their communities by assuming a role in the evaluation for excess use of alcohol. Physician intervention in the identification and treatment of excess alcohol use can be successful. For example, even brief, family practice-based interventions have been shown to reduce the quantity and frequency of patient drinking.[10]

The legal definition of operating a motor vehicle under the influence of alcohol is set forth in Chapter 90, Section 24 of the Massachusetts General Laws. Drivers taking a breath test and registering a Blood Alcohol Content (BAC) of 0.08 or higher are operating above the legal limit. For drivers under age 21, Massachusetts has a "zero-tolerance" law. This means a BAC of 0.02 is above the legal limit for a person under the age of 21. Driving while intoxicated can subject an individual to severe civil and criminal penalties, as well as loss of license.

[9] *National Center for Statistics and Analysis. Traffic Safety Facts 1999: Alcohol. Washington, D.C.: National Highway Traffic Safety Administration, 1999.*

[10] *Fleming MF, Mundt MP, French MT, Manwell LB, Stauffacher EA, Barry KL. Brief physician advice for problem drinkers: long-term efficacy and benefit-cost analysis.* Alcoholism: Clinical & Experimental Research. *26(1):36–43, 2002 Jan.*

Identifying and Assessing Alcohol Dependence and Abuse

The major medical criteria for a diagnosis of alcohol dependence are loss of control, compulsive behavior related to alcohol ingestion, and continued use of alcohol despite the presence of clinical consequences. These consequences include liver disorders, pancreatitis, chronic gastritis, and, in extreme cases, evidence of impaired brain function. Blood disorders and vitamin deficiency are frequently found as well. Dependence may lead to withdrawal symptoms, gross tremors, hallucinations, delirium tremens, and withdrawal seizures. Where available, information from family members and other health care providers about a patient's drinking behavior and associated health outcomes should be sought as part of an assessment.

When discussing with patients the health risks presented by alcohol use, physicians should include appropriate information about the dangers of drinking and driving. In addition, patients with patterns of drinking defined as alcohol abuse or dependence should be offered treatment for this disorder. When there is an opportunity to have a patient enrolled in a rehabilitation program and to monitor alcohol use behavior by an addiction medicine specialist, physicians should discuss and evaluate this option with their patient.

Cognitive Impacts

According to the Massachusetts RMV Driver's Manual, "The facts are simple: You cannot drive safely after drinking alcohol or taking other drugs. Alcohol is a drug. It is a depressant that affects your vision, reaction time, coordination, and judgment. Even small amounts of alcohol or other drugs—including some over-the-counter medicines—can decrease the mental and physical abilities you need to operate a motor vehicle safely. You do not have to be drunk or completely intoxicated to be a dangerous driver."[11] Mild intoxication may cause impaired judgment with limited insight, belligerence, impaired attention, and labile moods. It can also produce amnesia with memory deficits.

Visual Impacts ~ *see* Cognitive Impacts

Musculoskeletal Impacts ~ *not applicable*

Loss of Consciousness ~ *see* Cognitive Impacts

[11] *Driver's Manual. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/dmanual/index.htm. (accessed January 2004)*

Section 4

Drugs

The Effect of Drugs on Driving

Many drugs can impair a person's ability to operate a motor vehicle safely. Because the degree of impairment varies so widely from person to person, it is difficult to predict whether a disabling reaction will occur with any specific intensity. Physicians who prescribe drugs known to have an effect on sensory, mental, or physical functions should counsel their patients that these drugs may affect their ability to drive a motor vehicle safely. Since many people take drugs and alcohol in combination, it also may be appropriate to counsel a patient that alcohol increases the side effects of certain drugs. In addition, physicians should be alert to patients who supplement their prescribed medication with over-the-counter drugs. Many agents bought over the counter may produce drowsiness or other forms of impairment if taken in sufficient quantity.

In addition, it should be noted that Section 24, Chapter 90 of the Massachusetts General Laws criminalizes driving while under the influence of narcotic drugs, depressants or stimulant substances, and marijuana (as these are defined in the Massachusetts controlled substances statute, Chapter 94C, section 1), as well as the vapors of glue. If a drug falls into one of the first three categories, the fact that it is being taken pursuant to a valid prescription is not a defense.

Cognitive Impacts

Patients taking **sedatives** and **anxiolytics** should be cautioned about driving. The use of **benzodiazepines** constitutes an important risk, particularly for older drivers. Patients more heavily sedated for therapeutic reasons should not drive any type of motor vehicle.

Patients taking **antipsychotics** or **antidepressants** should be carefully observed during the initial phase of dosage adjustment and advised not to drive if they show any evidence of drowsiness or hypotension. Patients who are stable on maintenance doses can usually drive motor vehicles if they are symptom free.

Euphoria, depression, or the inability to concentrate can often follow the use of **opiates**, such as **codeine**, **heroin**, **morphine**, and some **synthetic narcotics** like **meperidine (Demerol)**. After assessment for frequency and habituation, patients who use these opiates may warrant further clinical evaluation of their ability to operate a motor vehicle. Physicians also should monitor patients who are on long-term prescribed **analgesic therapy**.

The abuse of **Central Nervous System stimulants**, such as **amphetamines** or **cocaine**, can cause detrimental effects that are notoriously unpredictable. Major changes in mood and behavior can occur. A highly dangerous period of depression and fatigue can also follow prolonged use. Abuse of these drugs is a contraindication to driving. Patients who take these stimulants should be informed about the hazards of initial and prolonged use.

Recommended treatment of attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) may include **amphetamines (Dexedrine)** and **methylphenidate (Ritalin)**. Use of these drugs by patients as prescribed does not usually impair driving. *(see also:* **Section 12: Psychiatric Disorders***)*.

Some of the **anticonvulsant drugs** used for behavioral management, pain control, or seizure disorders can cause drowsiness, particularly when first prescribed. Patients should be monitored and cautioned not to drive while this side effect persists *(see* **Section 5: Diseases of the Nervous System***)*.

Patients undergoing outpatient procedures, including day surgery with **general anesthesia**, **spinal or epidural anesthesia**, **conscious sedation**, or **regional blocking** should not drive for at least 24 to 48 hours following the procedure. Pain, analgesic use, and impaired mobility following day surgery may require a further extension of driving restriction. Non-drug impacts on driving ability following surgery should be assessed on an individual basis.

Heavy doses of some **anti-infective agents** may cause drowsiness or imbalance. Patients should be told of these possible reactions and counseled about the danger of driving if they occur. Drowsiness and dizziness are frequent side effects of **antihistamines** and **motion sickness medication**. However, it is impossible to predict whether these preparations will produce a reaction. Patients using these drugs for the first time should be advised not to drive until they learn from experience whether they are prone to adverse reactions.

Visual Impacts

Drugs such as **cannabis** and its derivatives, **lysergic acid diethylamide (LSD)**, and **methylene dioxy-methamphetamine (MDMA)** can impair driving ability by drastically altering perception.

Musculoskeletal Impacts ~ *not applicable*

Loss of Consciousness ~ *see* Cognitive Impacts

Section 5

Diseases of the Nervous System

The Nervous System in Driving

To operate a motor vehicle safely, especially in heavy traffic or under extreme weather conditions, every driver should be able to carry out a series of complex motions without hesitation and with great precision. Driving requires a reasonable level of intelligence, complete control over all muscle movements, and freedom from the distracting influence of severe pain. In addition, a safe driver should always be alert, fully conscious, and capable of quickly evaluating and responding to changing traffic patterns and road conditions.

Cognitive Impacts

Dementia

Although no consensus exists on a mandated course of action for drivers with progressive dementia, several key principles can be identified. While caring for patients with cognitive impairment, physicians should consider the risk associated with driving. Focused medical assessments, including specific details in the medical history, physician examination, and neuropsychological testing, are recommended in addition to the general medical evaluation. Physicians also should be aware that cognitive or functional problems due to dementia may cause driving difficulties that need to be addressed, such as visuospatial functioning, impaired judgment, and problems with divided attention. Finally, physicians should encourage patients with Alzheimer's disease and their caregivers to discuss options for driving privileges and continuing support for those who lose their capacity to drive during the early stages of the disease process.

Severe Pain

Severe pain from such causes as migraine headache, trigeminal neuralgia, or lesions of the cervical or lumbar spine can decrease concentration or limit freedom of movement to a degree that can make driving extremely hazardous. In addition, prescription and over-the-counter painkillers may interfere with a person's ability to drive safely *(see* **Section 4: Drugs***)*. Patients who experience frequent, chronic, and incapacitating pain should be advised to avoid driving while incapacitated.

Head Injuries

Drivers who have had a recent head injury should be examined with particular care to determine if there is any evidence of confusion or other symptoms that would make them temporarily unfit to drive. A head injury that results in even minimal cognitive impairment or concussion (even without loss of consciousness) should be fully evaluated before driving is resumed. The major factors that may prohibit driving for an extended period are severe, incapacitating headaches; loss of judgment and insight; decreased intellectual capacity, including distractibility, poor attention, and extreme irritability; post-traumatic seizures *(also see* **Loss of Consciousness***)*; visual deficiencies *(see* **Section 10: Vision and Driving***)*; and loss of motor power. A person with persistent post-traumatic amnesia following a blow to the head should not drive any type of motor vehicle without undergoing a thorough medical examination.

Intracranial Tumors

A patient who wishes to resume driving after removal of an intracranial tumor should be evaluated with great care. If a patient's judgment, coordination, visual fields, sense of balance, motor power, and reflexes are all found to be normal after the removal of a benign intracranial tumor, there is usually no reason to recommend any permanent driving restrictions. If a seizure occurred either before or after the removal of the tumor, the patient should be seizure free for at least six months with or without medication before resuming driving *(also see* **Loss of Consciousness***)*. No general recommendation can be made about driving after the removal of a malignant or metastatic brain tumor. Cases should be evaluated individually.

Visual Impacts

Many neurological conditions may impact vision, the most common being stroke, multiple sclerosis, and brain tumors. Primary visual acuity, peripheral vision, visual fields, as well as various disorders of visual processing may be affected. In addition, certain medications (e.g., anticonvulsants) if in a toxic range, may produce diplopia and blurred vision.

Musculoskeletal Impacts

Disorders Affecting Coordination and Muscle Strength and Control

Loss of muscle strength or coordination occurs in a wide variety of disorders, each of which poses a special problem. This group includes such conditions as poliomyelitis,

Parkinson's disease, multiple sclerosis, cerebral palsy, the muscular dystrophies, myasthenia gravis, tumor of the brain and spinal cord, spina bifida, brain damage following a head injury or stroke, Tourette's syndrome, Huntington's chorea, and ataxias. In the early stages of some of these conditions, no driving restrictions may be necessary. Drivers who have mild loss of muscle strength or control may have special controls added to their cars. Patients with more severe impairments may be unable to drive and should be evaluated individually.

If the disorder is not progressive, one medical examination and road test will usually suffice. However, if the condition is progressive, the patient should be followed closely and driving discontinued when the disability reaches a point that makes driving unsafe. If the condition also is accompanied by cognitive impairment or impairment of memory, judgment, or behavior, or is liable to lead to a loss of consciousness, then the patient should be counseled to stop driving.

Loss of Consciousness

Seizures and Driving

The Massachusetts RMV has developed very specific standards for individuals who have experienced one or more seizures that may affect driving ability. According to the RMV Seizure and Loss of Consciousness standard, "any licensee or applicant for a learner's permit or license who has experienced a seizure, syncope, or any other episode of altered consciousness which will or may affect the safe operation of a motor vehicle must voluntarily surrender his or her license, or be subject to suspension or revocation, until such time as that individual has remained episode free for a period of at least six (6) months."[12] After six months, individuals can have their driving privileges reinstated provided that they submit a written statement certifying that they have been seizure free for at least six months. This statement must be filled out by the individual's physician and contain all of the following information:

- Cause of the episode
- Means by which the condition is controlled
- Degree of impairment or disability suffered during an episode
- Probability of recurrence of the episode
- Date of the most recent episode
- Certification, to a reasonable degree of medical certainty, that the individual's medical condition and medications will not interfere with the safe operation of a motor vehicle.

The RMV may waive or extend the six-month seizure-free period depending on the specific clinical information presented.

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[12] *Seizure and Loss of Consciousness Policy Statement. Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

Febrile or Toxic Convulsions

Where convulsions are directly related to a toxic illness, either in childhood or adulthood, and the patient has fully recovered from the illness, these prior convulsions are of no relevance in evaluating his or her current medical fitness to drive.

Syncope

Syncopal episodes that affect driving ability fall under the general provisions of the RMV's Seizure and Loss of Consciousness standard *(see* **Seizures and Driving***)*.

Single, Unprovoked Seizure Before a Diagnosis

Patients should be advised to stop driving vehicles of any kind at once. Under the RMV standards, individuals may not drive for at least six months after a single, unprovoked seizure and until a complete neurological examination, including EEG and computed tomography (CT), has been carried out to determine the cause. If this examination does not suggest a diagnosis of epilepsy or some other condition that precludes driving, a physician may recommend a return to driving after the patient has been seizure free for six months *(see* **Seizures and Driving***)*.

After Surgery to Prevent Epileptic Seizures

Consistent with RMV standards, these patients should be seizure free for six months after surgery before being permitted to drive any type of motor vehicle.

Seizures Only While Asleep or on Wakening

Patients with epilepsy whose seizures have occurred, for at least five years, while they were asleep or immediately after awakening can be recommended for a license *(see* **Seizures and Driving***)*. On the recommendation of a neurologist and approval from the RMV, this period may be reduced for patients who remain under close observation.

Withdrawal of Seizure Medication or Medication Change

Some patients with fully controlled seizures whose antiepileptic medication is withdrawn or changed have a recurrence of their seizures. Because the relapse rate is 25% to 30%, patients should not drive for three months from the time their medication is discontinued or changed. Such patients should always be cautioned that they could have future seizures.

When seizures recur after a physician has ordered a discontinuation or a change in antiepileptic medication, patients can resume driving upon RMV approval provided they take the medication according to the physician's instructions and have been seizure free for six months *(see* **Seizures and Driving***)*. This period may be reduced on the recommendation of a neurologist and approval from the RMV.

Auras (Simple Partial Seizures)

Patients with auras with somatasensory or special sensory symptoms, or nondisabling focal motor seizures in a single limb may be eligible for a license and to continue driving, provided there is no impairment in their level of consciousness and cognition.

Section 6

Sleep Disorders

Sleep Disorders in Driving

Increasing evidence links MVCs with sleep disturbances. Sleepiness and the resulting reduction in vigilance are associated with both driver error and an increased risk for MVC. Physicians may often overlook sleep disturbances unless they are in the habit of inquiring about each patient's sleeping pattern. A minor MVC may be the first sign of an underlying sleep disturbance and, if there is any such indication, should trigger a medical workup.

Sleep disorders may be divided into three general classes: intrinsic sleep disorders (e.g., obstructive sleep apnea, narcolepsy); extrinsic sleep disorders (e.g., alcohol use, hypnotics, sleep deprivation); and disturbances in circadian rhythm (e.g., Parkinson's disease, Alzheimer's disease).

Assessing Patients with Sleep Disorders

When a physician becomes aware that a patient has been involved in an at-fault MVC within the past 12 months, it is worthwhile to question the patient about excessive somnolence, sleep habits, and the following risk factors for an intrinsic sleep disorder: chronic heavy snoring (often reported by bed partner); witnessed apnea; poorly controlled hypertension; significant cardiovascular disease; morning headaches; craniofacial abnormalities; obesity; male, over 40 years of age. Patients with excessive somnolence and one or more of these risk factors should be assessed in a sleep laboratory.

Cognitive Impacts

Sleep disorders generally affect arousal and attention, but also may manifest as problems with confusion, visuospatial orientation, and judgment.

Visual Impacts

Hypnagogic and hypnopompic hallucinations associated with narcolepsy may occur in patients with sleep disorders.

Musculoskeletal Impacts ~ *not applicable*

Loss of Consciousness

Obstructive Sleep Apnea

The prevalence of obstructive sleep apnea (OBS) in the general population is 2% and 4% for middle-aged women and men, respectively.[13] Although studies disagree on the exact prevalence, a significant percentage of patients with OBS have experienced a MVC, with an average of two per patient.[14]

Treatment of OBS with continuous positive airway pressure (CPAP) or uvulopalatopharyngoplasty (UPPP) surgery has been successful in reducing crash risk to control levels as measured by driving simulator testing. Reassessment for compliance with CPAP (using a compliance metering device on the CPAP unit) should be done one to two months after diagnosis. The effectiveness of UPPP is less clear, and patients treated in this way may require re-evaluation by sleep study.

Patients with OBS documented by a sleep study who are compliant with CPAP or have had successful UPPP treatments should be fit to drive. Patients with moderate to severe OBS documented by sleep study who are not compliant with treatment and are considered at increased risk for MVCs by the treating physician should be advised not to drive a motor vehicle. Patients with a high apnea-hypopnea index, especially if associated with right heart failure or excessive daytime somnolence, should be considered at high risk for MVCs. These recommendations should only be made by physicians familiar with the interpretation of sleep studies.

Narcolepsy

The prevalence of narcolepsy in the general population is 0.02% to 0.18%.[15] Narcolepsy is characterized by sudden, recurrent, irresistible lapses into sleep that typically last 10 to 15 minutes. Narcolepsy may be accompanied by cataplexy (sudden bilateral loss of muscle tone), sleep paralysis (generalized inability to move or speak during the sleep-

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[13] *National Heart, Lung, and Blood Institute: Facts About Sleep Apnea. Washington, D.C.: National Institute of Health, 1995.*

[14] *Aldrich MS. "Automobile accidents in patients with sleep disorders."* Sleep*; 1989. 12(6):487–494.*

[15] *Mignot E. "Genetic and familial aspects of narcolepsy."* Neurology*; 1998. 50(Suppl 1):S16.*

wake transition), and vivid hallucinations at sleep onset. About 50% of people with narcolepsy report having sleep-related MVCs.[16] Patients with cataplexy and sleep paralysis are believed to be at the greatest risk for MVCs. There is little information on the effect of treatment for patients at risk for MVCs. Patients with sleep study-confirmed narcolepsy and with uncontrolled episodes of cataplexy, uncontrolled daytime attacks, or sleep paralysis during the past 12 months (with or without treatment) should be advised not to drive any type of motor vehicle.

Extrinsic Sleep Disorders

Sleep disorders due to external causes are more common than intrinsic sleep disorders. Physicians may take an active role in preventing sleep-related MVCs by counseling patients on certain key issues:

- **Alcohol and Driving.** Alcohol-associated MVCs are well documented and result from both the poor judgment and impaired coordination associated with intoxication, as well as from sedation, with drivers falling asleep at the wheel. Physicians should remind patients to avoid driving after drinking, and encourage the concept of a designated awake and sober driver *(see* **Section 3: Alcohol***)*.
- **Prescription Medication and Driving.** All medications that may cause sedation should be reviewed with patients to assure their understanding of the risk of driving while taking the medication. It is also helpful to question patients about their use of over-the-counter medications that could have sedating effects *(see* **Section 4: Drugs***)*.
- **Sleep Deprivation and Driving.** Literature is accumulating regarding the association of sleep deprivation with MVCs. Attention has focused on long-haul trucking drivers, students, and shift workers, but all patients can be advised to avoid driving when fatigued and to take frequent breaks on longer trips.

Disturbances of Circadian Rhythm

Circadian sleep disorders related to an underlying medical condition may result in daytime sleepiness that could impair driving. Sleep disturbances, especially nighttime agitation, are common in patients with Alzheimer's disease. Whether these disturbances are due to an intrinsic sleep disorder or a disruption of normal circadian rhythm is unclear. Management of patients with Alzheimer's disease and other dementias is discussed in Section 12. Patients with Parkinson's disease also have sleep disturbances that may be related to altered circadian rhythm or an intrinsic sleep disorder. Patients with Alzheimer's disease or Parkinson's disease may have cognitive or motor deficits, not related to circadian rhythm patterns, that interfere with their ability to drive. Due to the characteristic fluctuating symptomatology of Parkinson's disease from both the disease and its treatment, further history and repeated evaluations may be necessary to adequately evaluate driving competence.

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[16] *Aldrich MS. Automobile accidents in patients with sleep disorders."* Sleep*; 1989. 12(6):487–494.*

Section 7

Diabetes Mellitus

Cognitive Impacts

Drugs used to treat diabetes mellitus may induce hypoglycemia and its sequelae of cognitive impairment. Drivers with Type 1 diabetes mellitus who are attempting tight control of their blood glucose with frequent doses of insulin may be at particular risk for hypoglycemia. The ability to detect symptoms of hypoglycemia is impaired in many diabetics and predisposes them to severe symptoms, including seizures.

Since driving requires considerable attention, and glucose levels may fluctuate based on the brain's use of blood glucose during prolonged driving, persons with diabetes mellitus should be counseled to refrain from driving whenever there is an increased risk of hypoglycemia (i.e., change in dose or type of medication or eating habits) and should receive educational reinforcement regarding safe driving habits. Diabetics undertaking long drives should monitor their blood sugar before driving and should be sensitive to symptoms of hypoglycemia. It would be useful for diabetics to keep test equipment in their car as well as a high-glucose source above the visor or close at hand. Autonomic neuropathy associated with diabetes mellitus may result in recurrent syncope. The standard set forth by the Massachusetts RMV is that a patient with severe hypoglycemia resulting in seizures should not drive until his or her diabetes mellitus has been under adequate control

for a period of six months.[17] The RMV may waive the six-month restriction based on the advice of a physician that the patient's condition and medication will not interfere with the safe operation of a motor vehicle.

Visual Impacts

Hypo- or hyperglycemia may result in transient visual changes that may temporarily preclude safe driving. In addition, diabetic retinopathy is a complication of diabetes that results in one of the most common causes of blindness in the United States. Visual impairment from diabetes is subject to the general recommendations covered in Section 10.

Musculoskeletal Impacts

Diabetes mellitus may result in peripheral neuropathy, which generally causes sensory rather than motor deficits. Sensory deficits of the lower extremities may impair the ability to use floor pedals safely. Focal motor weakness seen with diabetes may make driving unsafe.

Loss of Consciousness ~ *see* Cognitive Impacts

[17] *Medical Affairs. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

Section 8

Cardiovascular Disease

Cognitive Impacts

Cerebral hypoperfusion states associated with cardiovascular disease may lead to subtle cognitive impairments that may impact driving.

Visual Impacts ~ *not applicable*

Musculoskeletal Impacts

Some patients with congestive heart failure (CHF) and angina may have weakness or other musculoskeletal impairments associated with their condition that may be exacerbated by driving. These patients may benefit from a low-energy conservation technique applied to driving.

Loss of Consciousness

Cardiac Arrhythmias

A driver who has suffered syncope or a lapse in consciousness due to a cardiac arrhythmia should refrain from driving until the underlying condition provoking the episode has been diagnosed and treated. The RMV's Seizure and Loss of Consciousness standard states that licensees or applicants for licenses who have experienced syncope must surrender their license for at least six (6) months.[18] Some drivers will develop arrhythmias secondary to an adverse drug effect or a transient electrolyte imbalance. If, after careful medical evaluation, the physician determines that the transient condition

[18] *Medical Affairs page. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

has resolved and is unlikely to recur, the patient may be able to resume driving. However, most arrhythmias are secondary to an underlying cardiac condition. As with patients with seizures, these patients should not drive until they have been syncope free for six months.

The RMV's Cardiovascular and Respiratory Disease standard regarding implantable cardiac defibrillators (ICDs) states that a patient who has an ICD shall not drive for the first six months after implantation. If the device does not trigger during the six-month waiting period, the patient is eligible to regain the license privilege subject to certification by his or her physician. If at any time the ICD triggers, the individual is required to voluntarily surrender his or her license, and the six-month waiting period would again apply.[19]

Congestive Heart Failure and Angina

According to the RMV's Cardiovascular and Respiratory Disease standard, individuals who are medically determined to be a Class IV heart patient according to the American Heart Association's standards are not eligible to operate a motor vehicle.[16] Drivers with Class I, II, or III heart failure or angina may retain driving privileges if they do not have symptoms at rest. After a myocardial infarction or coronary artery bypass graft surgery, a medical evaluation is desirable prior to resuming driving.

[19] *Medical Affairs. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

Section 9

Cerebrovascular Disease

Cerebrovascular Disease in Driving

Cerebrovascular disease can cause disabling symptoms that are difficult to detect. If there is a reason to suspect a problem, a careful history and evaluation of the degree of disability present is probably the best method for determining fitness to drive. An assessment by a trained occupational therapist is desirable; a road test also may be helpful.

Cognitive Impacts

Transient Ischemic Attacks

The abrupt onset of a partial loss of neurological function during a transient ischemic attack (TIA) that persists for less than 24 hours and clears without residual signs should not be ignored in anyone who drives a motor vehicle because it raises the possibility of a later stroke.

Strokes

Symptomatic cerebral aneurysms that have not been surgically repaired are an absolute barrier to driving any class of motor vehicle. Following successful treatment, patients should be evaluated individually. Patients who have had a stroke may resume driving if functionally able, if a neurological assessment discloses no obvious risk of sudden recurrence, and if any underlying cause has been addressed with appropriate treatment. Where there is a residual impairment of motor function, sensation, visual field loss, coordination, or neglect, a road test may be indicated.

In addition, the physician should take particular care to note any changes in personality, alertness, or decision-making ability in stroke patients, however subtle and inconsistent, that could significantly impair driving ability. Patients who have had a stroke and subsequently resume driving should remain under regular medical supervision, as the episode may be the forerunner of a gradual decline in their thought processes.

Visual Impacts

Visual field defects are common after a stroke and should be evaluated.

Musculoskeletal Impacts

Spasticity, paralysis, coordination, contractures, and sensory deficits all may affect the ability to drive safely. Further driving assessment may be necessary.

Loss of Consciousness

Seizures may be associated with strokes *(see also* **Section 5: Diseases of the Nervous System***)*.

Section 10

Vision and Driving

Good visual functioning is essential for safe driving. Any significant loss of visual function, such as visual acuity or visual field, will diminish a person's ability to operate a motor vehicle safely. A driver with a marked visual defect may fail to perceive a potentially dangerous situation altogether or see it too late to react appropriately.

Physicians are required to report any person whose vision falls within the definition of legal blindness to the Massachusetts Commission for the Blind.[20] Pursuant to recent changes in state law, the Commission for the Blind will notify the RMV of any person on their roster of licensed drivers who has been certified as legally blind.

Cognitive Impacts ~ *not applicable*

Visual Impacts

Visual Acuity

A driver's visual acuity must be such that he or she has time to detect and to react to obstacles, pedestrians, other vehicles, and signs while moving at the maximum posted speed in daylight and in darkness. Greater levels of visual acuity are required for some classes of license to ensure public safety. Similar

[20] *For more information on a physician's duty to report the occurence of specific patient conditions, please refer to the Massachusetts Medical Society's informational guide, "Reporting of Patient Diseases, Conditions, and Occurrences," available at www.massmed.org/pages/reporting_cover.asp. (accessed January 2004)*

individuals with a cataract or cataracts who elect to have cataract surgery and intraoccular lens implant surgery are far less likely to be involved in crashes.[21]

Visual Field Standards

An adequate continuous field of vision is important to safe driving. Any significant scotoma or restriction in the binocular visual field can make driving dangerous. If a visual field defect is suspected (based on medical conditions, subjective reports, or confrontation field assessments), the patient should be referred for further testing.

The RMV has adopted the following standards for licensees and applicants for licenses to operate a motor vehicle:[22]

- Visual acuity and horizontal peripheral field of vision standards (excluding individuals who use bioptic telescopic lenses)
  1. Individuals with at least 20/40 distant visual acuity (Snellen) in either eye, with or without corrective lenses, and not less than 120 degrees combined horizontal peripheral field of vision are eligible for a license.

     OR

  2. Individuals with between 20/50 to 20/70 distant visual acuity (Snellen) in either eye, with or without corrective lenses, and not less than 120 degrees combined horizontal peripheral field of vision are eligible for a "daylight only" license.

- Visual acuity and horizontal peripheral field of vision standard for applicants and licensees who use bioptic telescopic lenses

  Individuals who use bioptic telescopic lenses are eligible to receive "daylight only" learner's permits and licenses only, provided the following standards are met:

  1. At least 20/40 distant visual acuity (Snellen) through the telescope, and at least 20/100 distant visual acuity (Snellen) through the carrier lens, and at least 20/100 distant visual acuity (Snellen) through the other lens; and not less than 120 degrees combined horizontal peripheral field of vision;

[21] *Owsley C, McGwin G, Sloane M, Wells J, Stalvey BT, Gaythreaux S. Impact of Cataract Surgery on Motor Vehicle Crash Involvement by Older Adults.* JAMA *2002; 288(7):841-849*

[22] *Medical Affairs page. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed July 22, 2003)*

2. The bioptic telescope used by the applicant or licensee must be:

Monocular	The telescope must be on one eye only; telescopes over both eyes are not acceptable for licensing purposes.
Fixed focus	Telescopes that need to be rotated to focus are not acceptable.
No greater than 3x	Magnification must not exceed three times.
Spectacle-mounted and an integral part of the lens	No clip-on or hand-held telescopes are acceptable for licensing purposes.
Located so as not to occlude the wearer's line of sight and not to occlude the visual field in the other eye	The telescope must be affixed to the upper quadrant of the lens so that the wearer's vision while looking through the carrier lens or other lens is not blocked or impeded in any way.

- Color vision standard

  Applicants must be able to distinguish the colors red, green, and amber.

- Vision impairment standard

  Applicants must not have unresolvable diplopia (double vision which cannot be resolved by wearing an eye patch or other suppressive device).

Musculoskeletal Impacts ~ *not applicable*

Loss of Consciousness ~ *not applicable*

Section 11

The Aging Driver

The Effects of Aging on Driving Ability

Federal Highway Administration data indicates that, per mile driven, drivers 75 years and older have higher rates of fatal motor vehicle crashes than drivers in any other age group except teenagers.[23] Motor vehicle collisions and traffic violations in the elderly population seem to reflect errors of inattention, failure to yield, difficulty maneuvering, and driving too slowly. Although the rate of physical and mental decline varies greatly from person to person, the physiologic changes that accompany aging eventually affect everyone's ability to drive. The borderline often is hazy between a hazardous deterioration and a decline that can be compensated for by long experience and voluntary limitations to driving (e.g., avoiding driving at night).

Examining the Older Driver

Factors to consider in examining the older driver include failing vision, hearing loss, slowing of perception, episodes of confusion, and declining memory, as well as such signs or symptoms as loss of strength, arthritic joints, chronic obstructive pulmonary disease, and the potential for sudden changes in heart rhythm. The possible side effects of prescribed and over-the-counter drugs also should be explored and discussed with the patient. The daily or frequent consumption of alcohol should be questioned, as even small amounts, coupled with some medications and the metabolic changes of aging, can markedly influence the ability of older people to drive safely. During regular evaluation of their older patients, physicians should be alert to the signs and

[23] *U.S. Department of Transportation Federal Highway Administration. "Older Driver Facts." Available at www.fhwa.dot.gov/safety/fourthlevel/pro_res_olderdriver_facts.htm. (accessed January 2004)*

symptoms of cognitive dysfunction and physical disability that may affect medical fitness to drive, keeping in mind that the effect of minor impairments may be cumulative.

The RMV sets its licensing policies based upon physical qualifications for driving and has no policy specifically addressing the older driver. Unless an injury or acute illness makes action necessary, there may be no need to advise an older person to give up driving. Limiting driving to daylight hours, avoiding peak traveling time, and selecting certain types of roads may be suggested by the physician. If there is any doubt about a patient's ability to drive, referral for a road test is appropriate.

Cognitive Impacts

Safe driving demands (1) a critical level of attention, (2) adequate visual-spatial skills, (3) efficient information processing, and (4) rapid decision-making. With increasing age, attention becomes impaired, visual processing time slows, and reaction time decreases. Judgment and insight also may become impaired and contribute to decreased self-awareness that driving is becoming more hazardous. Elderly drivers with more severe cognitive impairment may in fact have early to middle stages of dementia. A variety of medications may cause confusion in elderly individuals and adversely impact their ability to drive. *(see* **Section 5: Diseases of the Nervous System***)*.

Visual Impacts

Visual functions critical for safe driving depend on the ability to see (1) moving objects (dynamic visual acuity), (2) objects in dim light (scotopic visual acuity), (3) objects that do not stand out sharply from their background (contrast sensitivity), (4) objects that appear in the outer edges of the visual field (peripheral vision), and (5) objects clearly at a distance (primary visual acuity). Virtually all visual functions decline with age either because of the normal aging process or as a consequence of diseases common to aging. Visual processing impairment includes disturbances related to both eye disease and cognitive function *(see* **Section 10: Vision & Driving***)*.

Musculoskeletal Impacts

An older person often has several minor physical defects that individually may not affect driving ability much, but taken together may be dangerous. The hazards increase if these physical defects are accompanied by some slowing of the ability to convert perception and judgment into timely action. *(see also* **Section 16: Musculoskeletal Conditions and Disabilities for the RMV's Arthritis Disease Standard***)*.

Loss of Consciousness

The clinical standards that older licensees with neurological impairments, cardiovascular or respiratory disease, or seizure disorders must meet in order to maintain their eligibility to drive are covered under the relevant RMV standards.[24]

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[24] *Medical Affairs page. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

Section 12

Psychiatric Disorders

Psychiatric Disorders in Driving

It is often extremely difficult to assess the driving hazards associated with a psychiatric disability. Although many disorders of the mind are not severe enough to warrant concerns over driving ability, such symptoms as suicidal thoughts, extreme agitation, impulsive violent actions, delusions, or hallucinations may be very dangerous in a person in charge of an automobile.

The advent of ambulatory long-term drug therapy has created a new challenge because most drugs used have some effect on driving ability. In therapeutic doses, these drugs can seriously impair driving ability, particularly if they are combined with alcohol. A physician should advise the patient of the possible side effects of any prescribed medication on driving ability. Patients who are receiving electroconvulsive therapy should not drive until their cognitive sensory and motor abilities have fully recovered after each treatment. In addition, a patient's ability to drive safely is often completely dependent on his or her responsible use of the prescribed medication.

Cognitive Impacts

Temporary Stress/Dysfunction

Many emotionally stable people become disturbed during periods of severe stress. Beyond that, there are individuals who may exhibit irresponsible and dangerous behavior, characterized as "road rage."

If the disturbance is severe enough to produce such symptoms as uncontrollable crying, severe depression, slowed psychomotor activity, preoccupation, or the loss of a sense of caution and good judgment, patients should be counseled not to drive until the problem has been addressed and they have made a sufficient recovery. The possible side effects of drug therapy also should be kept in mind *(see* **Section 4: Drugs***)*.

People who have a history of erratic, violent, aggressive, or irresponsible behavior have been identified by crash investigators as a potentially high-risk group. The examining physician should evaluate patients with these characteristics carefully.

Psychosis

Initially, most people with an active psychotic illness will be admitted to a hospital and should not drive any class of motor vehicle. At the time of discharge, the attending physician will evaluate whether, in his or her opinion, the patient has recovered sufficiently to safely drive again; however, the physician often faces difficulty in assessing the degree of patient insight — a critical factor in relapse prevention and self-awareness of driving abilities. In some cases, a period of observation at home may be required before a physician can form an opinion. Particular attention should be paid to a recent history of suicidal tendencies, paranoid delusions, or violent and aggressive behavior because safe driving calls for a high degree of emotional stability, good judgment, and social responsibility.

Patients who have had more than one acute psychotic episode present an especially difficult problem. Individuals who have experienced recurrent psychotic episodes should be monitored carefully for any potential impacts on their driving ability. As stated above, the advent of ambulatory long-term drug therapy has created a new problem for both the attending physician and the motor vehicle licensing authorities because a patient's ability to drive safely often depends on his or her conscientious use of antipsychotic medication, in the dose prescribed, over long periods and sometimes for life. For a variety of reasons, some patients on long-term drug therapy stop taking their prescribed medication without their physician's knowledge.

Behavioral/Learning Disorders

In evaluating a person suspected of or proven to have a behavioral or learning problem (including ADD, ADHD, and Tourette's syndrome), physicians should endeavor to determine whether the patient is able to understand and respond appropriately to traffic signs and signals, and whether he or she has the capacity to react quickly to the demands of normal traffic situations. For those with learning disabilities, other potential sources of difficulty might include visual and auditory overload and difficulty in being able to distinguish between left and right. Evaluation of driving ability in patients with behavioral and learning disabilities is best carried out in a road test.

Visual Impacts

Visual and auditory hallucinations may occur with psychosis or its treatment.

Musculoskeletal Impacts

Tremors, akathisia, and parkinsonism may occur with medical management of psychiatric disorders.

Loss of Consciousness ~ *not applicable*

Section 13

Hearing

Hearing in Driving

Hearing loss in itself should not constitute a barrier to driving. However, loss of one's sense of balance can seriously affect driving ability. Patients who are subject to recurrent attacks of vertigo that occur without warning should not drive any type of vehicle until it is certain that their spells of dizziness have been controlled or have abated.

Cognitive Impacts ~ *not applicable*

Visual Impacts ~ *not applicable*

Musculoskeletal Impacts ~ *not applicable*

Loss of Consciousness ~ *not applicable*

Section 14

Respiratory Disease

Respiratory Diseases in Driving

Some respiratory diseases, if severe enough, may interfere with the safe operation of a motor vehicle. Any marked decrease in the lungs' ability to provide sufficient oxygen to the brain can lead to impaired judgment, reduced concentration, slow response time, and physical weakness.

The RMV standard on Cardiovascular and Respiratory Disease states that any licensee or applicant whose oxygen saturation level at rest or with minimal exertion is less than 88% is not eligible to operate a motor vehicle. Licensees or applicants for a license are presumed to be physically able to operate a motor vehicle if their oxygen saturation level meets these minimum criteria. Usually, the RMV won't intervene unless additional evidence is presented by a third party that would preclude a licensee from operating a motor vehicle. In addition, individuals whose forced expiratory volume in one second (FEV-1) is less than 1.2 liters will be required to submit an oxygen saturation test result to the RMV in order to operate a motor vehicle.[25] Driving could be dangerous for a patient with chronic hypoxia at a level requiring supplemental oxygen. A road test may be recommended if the physician has any doubt.

[25] *Medical Affairs page. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

Permanent Tracheostomy

A person with a permanent tracheostomy who has no difficulty keeping the opening clear of mucus should be able to drive any class of motor vehicle provided that the medical condition which made the tracheostomy necessary does not preclude driving.

Cognitive Impacts

Because of the progressive nature of respiratory disease, patients who need supplemental oxygen should remain under close and regular supervision.

Visual Impacts ~ *not applicable*

Musculoskeletal Impacts ~ *not applicable*

Loss of Consciousness ~ *see* Cognitive Impacts

Section 15

Renal Disease

Cognitive Impacts

Patients with chronic renal failure may drive while under treatment for dialysis, depending on their clinical presentation. On certain days before or following dialysis, they may feel poorly and less inclined to drive owing to feelings of weakness from hyperkalemia or fatigue, or if they have had hypotension associated with a dialysis treatment. Severe renal disease may be associated with significant fluctuations in cognitive status and may warrant closer surveillance.

Visual Impacts

Patients with renal disease may have visual impairments depending on the cause of the renal impairment. Visual impairment from renal disease is subject to the general recommendations covered in **Section 10: Vision and Driving**.

Musculoskeletal Impacts

Patients with renal disease also may have other underlying musculoskeletal impairments depending on the cause of their renal disease. *(See* **Section 16: Musculoskeletal Conditions and Disabilities** *for further input.)*

Loss of Consciousness ~ *not applicable*

Section 16

Musculoskeletal Conditions and Disabilities

Musculoskeletal Conditions and Disabilities in Driving

Every driver must be able to carry out a series of complex, coordinated movements to operate a motor vehicle safely. If there is any question of a physical disability, a driver's ability to perform the required movements swiftly, accurately, and repeatedly without undue pain should be carefully assessed. The Massachusetts RMV standard states that any licensee or applicant for a license or learner's permit who is unable to perform basic self-care activities due to a medically determined arthritis condition will be required to submit supplemental information from his or her physician. According to the RMV's standard, "self-care" is defined as "the ability to perform the functions of daily living and of survival, such as feeding oneself, toilet functions, bathing, dressing, and so on."[26]

The Physician's Role

It is often impossible for a physician to give a fully informed opinion about a physically handicapped patient's ability to drive safely, as some people with an arm or leg disability can compensate much more effectively than others. In many instances, after an extended road test, an experienced driver examiner can best decide whether to grant or withhold a license.

[26] *Medical Affairs page. Massachusetts Registry of Motor Vehicles website available at www.state.ma.us/rmv/medical/index.htm. (accessed January 2004)*

The physician's primary role with respect to a physically handicapped patient is to report the etiology, nature, and extent of the disability — when asked to do so by the appropriate licensing agency and authorized by the patient — and to give an opinion on whether the disability is temporary, permanent, stable, or progressive. If the physical disability is secondary to brain damage, it is important for the physician to examine and report on other potentially affected systems. Possible visual-field defects and reduced mental capacity also should receive particular attention.

Vehicle Modification

People with an arm or leg disability may be evaluated to have their vehicles modified or fitted with special controls. In Massachusetts, the decision to undergo an evaluation is left up to the individual's judgment. Following a road test, the driver examiner is in the best position to determine the need for these modifications. If special controls are needed, the driver will be restricted to driving vehicles equipped with such controls.

Cognitive Impacts ~ *not applicable*

Visual Impacts ~ *not applicable*

Musculoskeletal Impacts

Disabilities of the Limbs and Prosthetic Limbs

People with an impairment of limb function may drive any vehicle provided they demonstrate the ability to drive to the satisfaction of the driver examiner. Many people with an amputation of one extremity are able to drive a vehicle. Patients with amputation of the right lower extremity may need to undergo a formal driving evaluation and may need to drive a vehicle with an automatic transmission. Patients with an impairment of limb function may consider handset modification of their vehicle if they wish to continue driving.

Cervical and Thoracic Vertebrae

Licensees and applicants for a license to drive should be free of pain that limits movement, attention, or judgment. Some degree of loss of movement of the head and neck may be permitted, but the driver should then be restricted to driving vehicles equipped with both right and left outside mirrors and have the ability to carry out shoulder checks. People wearing a neck brace or cast should be advised not to drive until pain and restriction of movement are minimal and external support is no longer required.

People with a marked deformity or painfully restricted motion in the thoracic vertebrae are potentially able to drive vehicles safely. Their ability to drive can best be determined by a driver examiner. Patients wearing braces or body casts are evaluated on the basis of their ability to move free of pain, operate the controls, and observe approaching vehicles.

Paraplegia and Quadraplegia

Following a spinal cord injury, there may be a loss of motor function in terms of weakness, loss of coordination, or involuntary movements — including spasticity of muscles in the trunk or affected limbs. Even without the loss of motor function, there may be a sensory impairment that may impact touch sensation or proprioception, or give painful parasthesia.

For this reason, those who have had a spinal cord injury may need to undergo driver retraining, possibly with modifications to their vehicle to allow hand controls and other safety features.

Loss of Consciousness ~ *not applicable*

Section 17

Medical Issues in Motorcycle Operation

Operating a motorcycle demands a higher level of physical fitness and driving skill than driving a private passenger vehicle. Motorcycle operators (Class M) are expected to meet the medical standards for private vehicle (Class D) drivers in every respect. In doubtful cases, there is less room for compromise. Medical disabilities that might be insignificant in an automobile driver may be incompatible with the safe operation of a motorcycle.

Medical Conditions

The following specific medical conditions can make driving a motorcycle hazardous and should be looked for and evaluated with care, particularly in older patients.

Depth Perception and Stereopsis

Absence of depth perception may increase the hazards of motorcycle driving.

Angina

Exposure to cold and cold winds can trigger an anginal attack in susceptible patients. Motorcycle operators who are known to be subject to angina should be evaluated with particular care and advised to avoid riding their motorcycle in cold weather.

Carotid Sinus Sensitivity

Carotid sinus sensitivity is a very dangerous condition in a motorcycle operator because of the tight restraining straps on most protective headgear.

Permanent Tracheostomy

Motorcyclists with a permanent tracheostomy should have some form of protection from the effects of the airstream.

Loss of Balance

Difficulty with balance or position sense (proprioception) may make motorcycle driving more hazardous.