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16. Abstract

On September 13 and 14.1990. the Office of Motor Carriers (OMC). Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT). sponsored a conference to develop medical standards for commercial motor vehicle driven with disorders of the lung and respiratory system. The conference convened an expert panel of 25 participants representing the following fields: physicians experienced in the diagnosis, treatment, and long-term care of individuals with pulmonary diseases: representatives of the motor carrier industry; medical reprisentatives affiliated with the trucking industry; and a medical representative from Canada.

The current regulations for the medical cerification of commercial vehicle drivers were written in 1971. and the guidelines for evaluating pulmonary/respiratory disorders have not been revised. While many suspect that the regulations are incomplete and inadequate to ensure safety on the highways. others believe that the rules for medical evaluation are too stringent and are outdated in light of current diagnostic techniques and new treatment methods Therefore, OMC's goal in assembling the expert panel was to provide FHWA with reasonable. clear guidelines based upon their expertise in the field of pulmonary/resiratory disorders to aid examinin g physicians in the medical certificationof commercialvehicle drivers.

The participants were divided into four task forces: Infectious Conditions, Noninfectious Conditions, Allergies. and Secondary Pulmonary Conditions. The recommendations reflect the task force members' agreement on manifestations of diseases that would render the commercial driver to be "not medically qualified" to drive and on medical conditions that equire a detailed medical evaluation including consulution by a pulmonologist or other specialist, before a decision on the driver's medical qualification can be reached.

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EXECUTIVE SUMMARY

On September 13 and 14, 1990, the Office of Motor Carriers (OMC), Federal Highway Administration (FHWA), U.S. Department of Transponation (DOT), sponsored a conference to develop medical standards for commercial motor vehicle drivers with disorders of the lung and respiratory system. The conference convened an expert panel of 25 participants representing the following fields: physicians experienced in the diagnosis, treatment, and long-term care of individuals with pulmonary diseases; representatives of the motor carrier industry; medical representatives affiliated with the trucking industry; and a medical representative from Canada.

The current regulations for the medical certification of commercial vehicle drivers were written in 1971, and the guidelines for evaluating pulmonary/respiratory disorders have not been revised. While many suspect that the regulations are incomplete and inadequate to ensure safety on the highways, others believe that the rules for medical evaluation are too stringent and are outdated in light of current diagnostic techniques and new treatment methods. Therefore, OMC's goal in assembling the expert panel was to provide FHWA with reasonable, clear guidelines based upon their expertise in the field of pulmonary/respiratory disorders to aid examining physicians in the medical certification of commercial vehicle drivers.

The participants were divided into four task forces to review separate sets of pulmonary diseases grouped according to etiology. The task forces considered the following pulmonary conditions:

- Task Force I-Infectious Diseases. Included in the Task Force I Report are recommendations regarding the common cold, influenza, acute bronchitis, bronchiectasis, pneumonia, pleurisy, pulmonary tuberculosis, and atypical tuberculosis.

- Task Force II-Noninfectious Diseases. This report contains recommendations on chest wall deformities, diffuse interstitial pulmonary fibrosis (idiopathic and associated with other conditions), chronic obstructive pulmonary disease (COPD) (chronic bronchitis and emphysema), cystic fibrosis, and pneumothorax (traumatic and spontaneous).

- Task Force III-Allergies. This task force considered diseases caused by allergic reactions of the lungs: asthma, allergic rhinitis (hay fever), hypersensitivity pneumonitis, idiopathic anaphylaxis, and angioedema.

- Task Force IV-Secondary Pulmonary Conditions. These diseases or conditions affect the lungs, not as a primary disease, but as a part of another disease category. The task force considered lung resection, aacheostomy, obstructive sleep apnea, deep vein thrombosis and pulmonary thromboembolism, pulmonary hypertension and cor pulmonale, primary and secondary lung cancer, pulmonary disease associated with AIDS, and lung or heart-lung transplantation.

Each task force report is organized according to the diseases as listed above. In addition, in the consideration of each disease, the following topics guided the panel members' discussions: (1) the definition, description, and diagnosis of the disease; (2) the risk that the disease presents to commercial driving safety: (3) the risk to driving safety introduced by therapy to cure or control the disease: and (4) recommendations to DOT. These recommendations reflect the task force members' agreement on manifestations of diseases that would render the commercial driver to be "not medically qualified" to drive and on medical conditions that require a detailed medical evaluation, including consultation by a pulmonologist or other specialist, before a decision on the driver's medical qualification can be reached.

TASK FORCE I-INFECTIOUS DISEASES

General Recommendations

Although the conditions in this category have varying etiology and severity, most of them have no long-term implications for a commercial driver's ability to operate a vehicle, if they are properly treated. These conditions include the common cold, influenza, acute bronchitis, pneumonia, and even tuberculosis. However, during the acute infection, the symptoms are debilitating and can interfere with the driver's ability to remain attentive to driving conditions and to perform heavy exertion. In addition, medications used to treat respiratory tract congestion, **such** as antihistamines or narcotic amitussives, can cause drowsiness and loss of attention: drivers should not operate a vehicle for at least 12 hours after taking such medications. Therefore, the task force members recommend that corporations, agencies, or individuals responsible for commercial drivers' work schedules relieve affected drivers fmm duty until proper treatment for the illness has been completed.

Bronchiectasis

With respect to bronchiectasis, individuals who have life-threatening and uncontrolled bouts of severe infection or life-threatening hemoptysis (i.e., volumes of 250 ml or mom) should be considered temporarily medically unqualified to operate a commercial vehicle. This group of drivers should use preventive measures such as influenza and pneumonococcal vaccines to decrease episodes of acute illness. To determine if an affected person is medically qualified for driving, the examining physician should perform pulmonary function studies.

Pulmonary Tuberculosis

Although modem therapy for pulmonary tuberculosis has been extremely successful in controlling this disease, it persists in some patients either despite therapy or because they take no therapy. Individuals with chronic pulmonary tuberculosis should be considered medically unqualified for commercial driving.

Atypical Tuberculosis

The task force members agreed that drivers with atypical tuberculosis should be allowed to continue driving as long as the disease remains relatively stable. However, if the disease becomes progressive, causing the driver to experience symptoms of extensive pulmonary dysfunction, weakness, and fatigue, the examining physician should perform pulmonary function studies. (See the pulmonary function criteria outlined in the introduction on page 11.) The driver should be considered medically unqualified for commercial driving until the disease is in remission.

TASK FORCE II-NONINFECTIOUS DISEASES

General Recommendations

This category includes a number of conditions that cause significant long-term structural changes in the lungs and/or thorax and, therefore, interfere with the lungs' functioning. These conditions include thoracic cage abnormalities resulting from kyphoscoliosis, muscular diseases, massive obesity, etc.; interstitial lung disease (ILD); and COPD. The presence of such a disease indicates that the driver should undergo pulmonary function testing; the criteria outlined in the introduction should be followed to determine if the driver is medically qualified.

Interstitial Lung Diseases

Although ILDs have many common clinical, x-ray, physiologic, and pathologic features, the diagnosis alone is frequently not sufficient to deem a driver medically unqualified. Each individual case must be evaluated and the degree of impairment documented before. a decision can be made regarding the driver's qualification. Pulmonary function studies should be performed, and a more extensive evaluation may be warranted based on the extent of x-ray abnormality and/or dyspnea.

Chronic Obstructive Pulmonary Disease

The task force members recommend that, during their medical qualification examination, all drivers over the age of 35 who smoke undergo a spirometric examination, which is a simple, inexpensive, and specific screening test for COPD. Drivers with an FEV below 65 percent of the predicted normal should have arterial blood gas measurements performed. The spirometry should be repeated at each biennial physical examination so that accelerated decline can be detected. Individuals with a history of continuing paroxysms of cough leading to cough syncope should be considered medically unqualified for commercial driving.

Pneumothorax

An examining physician should use x rays to ensure that a driver who has suffered pneumothorax is recovered completely before the driver returns to work. A patient should

regain a vital capacity of greater than 65 percent of the predicted value within 3 months. If not, the patient should be referred to a pulmonary specialist. If the pneumothorax was spontaneous, the specialist should determine if surgery is necessary to prevent a recurrence.

TASK FORCE III-ALLERGIES

This task. force considered several allergies that are common in the general population and, therefore, in commercial drivers. Normally, the symptoms of these allergic reactions are not severe enough to cause driving impairment. However, in certain circumstances, the symptoms or the prescribed treatment regimen may hinder driving safety significantly.

Asthma

Asthmatic individuals generally exhibit reversible airway obstruction that can be treated effectively with pharmaceutical agents such as bronchodilators and corticosteroids. Complications of asthma that could hinder driving safety include severe dyspnea that is unresponsive to conventional therapy, hypoxemia resulting in a deterioration of mental function, and prolonged spells of coughing that are possibly accompanied by cough syncope. Individuals who require frequent hospitalization for continual and uncontrolled symptomatic asthma or whose pulmonary functioning does not meet the criteria outlined in the introduction should be considered medically unqualified for commercial driving. If the symptoms are treated properly, the driver can be reconsidered for medical qualification. The treatment must be conuolled by a physician because the pharmaceutical agents used may cause nausea, vomiting, or tremors; in rare cases, seiz

Allergic Rhinitis

Allergic rhinitis, which involves a temporary inflammation or me respiratory tract, should rarely render an individual medically unqualified for commercial driving. Because of recent advances, the symptoms of this disorder can now be treated with nonsedating antihistamines or with local steroid sprays.

Hypersensitivity Pneumonitis

Like asthma and allergic rhinitis, hypersensitivity pneumonitis does not necessitate that a commercial driver be considered medically unqualified. However, individuals with this disorder do require medical care to alleviate symptoms of dyspnea, cough, and fever. Also, the driver should avoid exposure to the causative agent (e.g., in transporting the agent) because severe respiratory impairment could occur with repeated exposure.

Life-Threatening Conditions

Certain related conditions exist that are life-threatening, such as severe anaphylactic reactions and upper airway obstruction resulting from exposure to an allergen, a genetic deficiency, or an unknown mechanism. Individuals with a past history of these conditions

should be considered medically unquaiified to drive a commercial vehicle unless they have accurate documentation of preventive measures or treatment with no adverse side effects.

TASK FORCE IV-SECONDARY PULMONARY CONDITIONS AND UNDERLYING PULMONARY DISORDERS

Lung Resection

In persons who have undergone lung resection, two major factors may cause risk to driving safety: the underlying disease process and the resulting functional state of the lungs. Therefore, before such persons can be certified for commercial driving, the examining physician should consider both factors. The underlying disease process should be evaluated according to recommendations in the relevant sections of this report, and pulmonary function studies should be performed with 'the criteria outlined in the Task Force I summary observed. Individuals with significant hypoxemia following lung resection should not be certified for commercial driving.

Tracheostomy

The decision to certify an individual with tracheostomy for commercial driving should be based on the severity of the underlying symptoms or lung dysfunction. Recommendations for this determination are found under the specific conditions.

Obstructive Sleep Apnea

Individuals with suspected or untreated sleep apnea (symptoms of snoring and hypersomnolence) should be considered medically unqualified to operate a commercial vehicle until the diagnosis has been dispelled or the condition has been treated successfully. In addition, as a condition of continuing qualification, commercial drivers who are being treated for sleep apnea should agree to continue uninterrupted therapy as long as they maintain their commercial driver's license. They should also undergo yearly multiple sleep latency testing (MSLT).

Deep Vein Thrombosis and Pulmonary Thromboembolism

Pulmonary embolism (blood clots to the lungs) usually originates from thrombi in deep veins of the leg. Individuals with this disorder should be considered medically unqualified for commercial driving unless they have received anticoagulation therapy, have had a lower extremity venous examination with normal results, or have met the acceptable criteria for pulmonary function. Current regulations do not permit certification for drivers on anticoagulation therapy. However, because lower doses of anticoagulants have recently proved to be effective in treatment, the task force members recommend that drivers on carefully monitored and controlled therapy be allowed to return to work. The members stress that biweekly monitoring of the therapy is essential and that drivers who cannot participate in this monitoring should be considered medically unqualified for commercial driving.

Pulmonary Hypertensionl/Cor Pulmonale

Individuals with pulmonary hypertension, with or without cor pulmonale, should be considered medically unqualified for commercial driving if they exhibit symptoms of dyspnea, dizziness, or hypotension or if measurements of their blood gas composition do not meet the criteria outlined in the introduction.

Lung Cancer

Patients with lung cancer, either newly diagnosed or previously treated, may have symptoms that render them medically unqualified for commercial driving. These symptoms include severe cough, dyspnea, wasting, metastatic brain disease, hypoxemia, and significant physiologic dysfunction. A patient who is considered cured after lung resection should meet the established criteria for pulmonary function and arterial blood gas composition measurements before reruming to work. A patient who is undergoing radiation treatment or chemotherapy may continue to drive if he/she meets the pulmonary function criteria and has no symptoms of severe. cough, dyspnea, vomiting, or weakness. A pulmonologist should monitor these patients at 3-month intervals for 2 years and then yearly for 5 years to check for recurrence. Cancer that spreads to the lungs from other organs exhibits similar symptoms and risks as primary lung cancer, and the same recommendations apply.

Pulmonary Disease and AIDS

Most individuals with HIV infection will experience some pulmonary disorder during the course of their illness. These disorders fall into five categories. (1) Disorders that are curable but recurrent (e.g., pneumocystis carinii pneumonia and acute bacterial pneumonia) do not preclude commercial driving provided the disorder has been treated fully and the patient's pulmonary functioning meets the established criteria. A patient with tuberculosis must also be considered noncontagious before returning to work. (2) Incurable suppressible disorders (e.g., histoplasmosis, coccidiomycosis, and cryptococcoses) render a driver medically unqualified unless the infection is controlled, pulmonary function meets the accepted criteria, and symptoms such as cough, fever, or dyspnea are absent. (3) Incurable infections such as mycobacterial disease usually occur with end-stage HIV disease and are debilitating. HIV-infected individuals with these infections should be considered medically unqualified for commercial driving. (4) Noninfectious curable disorders should not preclude commercial driving provided the symptoms have subsided and pulmonary function test results are acceptable. Patients with this type of disorder should be monitored at 3-month intervals by a physician who is knowledgeable in pulmonary diseases associated with HIV-l infection. (5) Incurable noninfectious disorders (e.g., Kaposi's sarcoma, lymphoma, and lymphoid interstitial pneumonitis) are symptomatic and have a downhill course. These disorders preclude a driver from obtaining medical certification.

Pulmonary Transplantation

To be certified for commercial driving, a lung or heart-lung transplant recipient must meet the accepted pulmonary function criteria. Also, because these individuals may need

rapid access to a transplant center for treatment of complications and control of drug therapy, they should limit the geographic range in which they drive.

GENERAL RECOMMENDATIONS

To facilitate the implementation of the specific recommendations made by the task forces, the Expert Panel as a whole agreed that some general recommendations were necessary. The panel members also suggested guidelines for examining physicians to follow when screening for pulmonary disease in commercial drivers. These general recommendations and the screening guidelines are found in the introduction to this report.

INTRODUCTION

The Office of Motor Carriers (OMC) is the arm of the Federal Highway Administration (FHWA), Department of Transportation (DOT), that regulates the use of motor vehicles in interstate commerce. One aspect of OMC's regulatory activities is the medical certification of commercial motor vehicle drivers. A driver in interstate commerce operates a vehicle that weighs over 10,000 lb and carries various types of cargo, from passengers to hazardous materials. The driver's working conditions often involve extended work periods and long distances under tight delivery schedules and other adverse physiological, psychological, and environmental conditions. Therefore, the driver's health has a significant effect on the ability to operate a commercial vehicle safely and effectively, to remain alert to roadway conditions, and to react quickly.

The main goal of highway regulatory medicine is the reduction of death, injury, and property loss on public highways. To meet this goal, the medical standards must be applied uniformly. However, under the present system, drivers may be examined in various settings: by their family physicians, in an industrial clinic, or by a physician appointed by the motor carrier. Furthermore, drivers often "shop around" for a physician who will certify them because their livelihood depends on their medical certification. Given the economic consequences to the driver who is denied certification the diagnosis must be accurate and the medical standards must be fair.

The current medical regulations, which were established in 1971, should be reevaluated in light of recent advances in medical technology. The control of pulmonary/respiratory disorders may have improved over the last two decades to a point where the risk to driving safety has been minimized for some disorders that previously precluded commercial driving.

The expert panel's task was to address these concerns and lay a foundation for uniform standards and their application by providing clear guidance to **FHWA** for revision of the current standards or the promulgation of new ones. This report was prepared to present the panel's recommendations and to assist examining physicians in evaluating pulmonary/respiratory disorders during the certification process.

GUIDELINES FOR EXAMINING PHYSICIANS

Screening for Pulmonary Disease

The patient's history and physical examination can yield information that indicates the presence of significant disease of the respiratory system. In determining the patient's history, the examining physician should routinely ask the following questions:

- Do you smoke? If so, how much? How long have you been smoking?
- Do you feel short of breath while driving?

- Do you cough frequently? Is your cough productive of sputum?
- Do you experience tightness of the chest while resting or exercising?
- Do you snore and frequently fall asleep during the day?
- Do you wheeze during the day and night?

Smoking. Because of the strong correlation between smoking and chronic obstructive pulmonary disease (COPD) or its components, chronic bronchitis and emphysema, the panel recommends that drivers aged 35 or more who have a history of heavy smoking undergo spirometry as a further screening procedure. If spirometry reveals an FEV, of less than 65 percent of predicted normal, arterial blood gas measurements should be performed to ensure that the driver would not be medically unqualified because of hypoxemia and hypercapnia.

Shortness of Breath. Many drivers may experience shortness of breath while performing the nondriving aspects of their work (i.e., loading and unloading, etc.). In these instances, this symptom would be difficult to evaluate as a sign of pulmonary/respiratory disease. However, most commercial vehicle drivers are not short of breath while driving their vehicles. If a driver has this symptom under those conditions, the examining physician should conduct a more detailed evaluation of the patient, possibly consulting with an appropriate medical specialist.

Cough. Frequent and persistent cough, whether productive of sputum or not, is often an indication of significant pulmonary disease. If the patient reveals this symptom and the examining physician finds no evident reversible clinical explanation, a more detailed evaluation of the pulmonary system is required.

Tightness of the Chest. This symptom, occurring when the driver is either resting or exercising, can be a manifestation of respiratory or cardiac diseases including asthma, diffuse interstitial pulmonary fibrosis, or coronary ischemia. If the symptom is persistent and repetitive, a thorough examination of the patient's pulmonary and/or cardiovascular system should be performed:

Snoring and daytime somnolence. These symptoms may be the only readily detectable indicators of clinically significant sleep apnea.

Wheezing. Episodic wheezing during the day or night strongly suggests hyperactive airway disease.

Like the patient's history, the physical examination may reveal manifestations that should be investigated by a more detailed pulmonary function evaluation or consultation with a pulmonologist. These manifestations include (1) clubbing of the fingers, (2) cyanosis, (3) slowing of expiration, (4) tachypnea at rest, (5) diffuse pulmonary wheezes and rhonchi, pulmonary *rales,* (6) total loss or marked diminution of breath sounds in any part of the

thorax, (7) pleural friction rubs, (8) unequal inflation-deflation contours of the right and left thorax, (9) significant kyphosis or scoiiosis of the thoracic spine, and (10) use of accessory muscles of ventilation at rest.

Pulmonary Function Testing

Physiological impairment is potentially present in many lung disorders. Therefore, simple pulmonary function testing (forced expiratory volume in 1 second (FEV), forced vital capacity (FVC), and FEV,/FVC ratio) should be performed for applicants who have any of the following indicators: a history of any specific lung disease; symptoms of shortness of breath, cough, chest tightness, or wheezing; and cigarette smoking in applicants aged 35 or older. No further testing is necessary if the lung function is normal and no other abnormality is suspected. However, if lung function is abnormal, the following guidelines are recommended.

For an applicant with a disease that causes airway obstruction (e.g.. emphysema, bronchitis, COPD, or asthma), additional testing is required if the FEV, is less than 65 percent of the predicted value and if the FEV/FVC ratio is less than 6.5 percent. These individuals should be referred for arterial blood gas analysis or screening pulse oximetry **A** pulse oximetry saturation of less than 92 percent also requires that'blood gas composition levels be measured. If the measurements reveal a partial pressure of arterial oxygen (PaO2) of less than 65 mm Hg at altitudes of less than 5,000 ft or 60 mm Hg above 5,000 ft and/or a partial pressure of arterial carbon dioxide (PaCO,) greater than 45 mm Hg (at any altitude), the applicant should be considered medically unqualified.

For an applicant with a restrictive impairment (e.g., interstitial lung disease, chest wall deformity, etc.), additional testing is required if the FVC is less than 60 percent of the predicted value. Blood gas analysis and screening pulse oximetry should be performed. If the arterial blood gas measurements do not meet the criteria recommended in the previous paragraph, the applicant should be considered medically unqualified.

GENERAL RECOMMENDATIONS

The Expert Panel members believe that the task force recommendations, while placing priority on highway safety, also form a basis for the equitable consideration of commercial driver applicants who have pulmonary/respiratory disorders. However, they recognize that not all of the specific recommendations can be easily implemented within the existing regulatory framework. Furthermore, in some cases, implementation of a particular recommendation may not be practical. On the other hand, the current limitations of controls on the medical certification of commercial vehicle drivers may hinder the implementation of a recommendation that is both practical and valuable to ensuring highway safety. Therefore, the panel participants offer the following recommendations to address some general concerns that may also apply to other areas of medical certification.

First, FHWA should form an ongoing multidisciplinary medical advisory committee composed of experts in the various fields. The committee members would serve as advisors on matters related to driver certification and driver health.

Second, because any licensed physician can perform the examination for a commercial vehicle driver's medical certification, FHWA should develop a mechanism to facilitate education of the certifying physicians. A concise, simplified education pamphlet that includes a set of guidelines (aigotithm) for evaluating various categories of illness is one possible solution. At the same time, physicians should be required to report their examination results and qualifications decisions to the FHWA. This requirement would help motivate physicians to take advantage of the educational opportunity provided by the pamphlet.

Consideration should also be given to providing a medical manual/guidebook that would serve as a reference to the industry for conditions that affect daily driving.

Finally, although the primary goal of this panel was to formulate medical recommendations regarding the certification of drivers, the panel members were also concerned about the overall health of the driver. Consideration of the driver's work environment revealed that the driver is exposed to various agents that may aggravate underlying medical conditions. These exposures may even cause the disorders that can potentially render the driver medically ineligible. The panel members believe that, to balance the process of regulating the activity of drivers, they should also address the issue of environmentally induced diseases and disorders of drivers. Therefore, the panel recommends that regulatory activities in the area of commercial motor vehicles be extended to include the safety of the driver's work environment and to reduce the risks of developing diseases and disorders stemming from this environment.

TASK FORCE I REPORT-INFECTIOUS DISEASES

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Infectious conditions, as a group, are usually easily identified because of the patient's symptoms. They are frequently so debilitating that the patient will not work or will not apply for a job. By their nature, infectious conditions have major systemic symptoms, including chills, fever, night sweats, weakness, tiredness, and weight loss. If the condition involves the lungs, it will also usually create a cough, chest pain, shortness of breath, wheezing, and occasionally secondary cardiac disease. Some of the conditions, however, may develop gradually, and the patient may not be aware of the fact that a problem exists until complications occur. An ordinary medical history and physical examination will usually detect signs of the common infectious conditions. Until the conditions themselves have either been treated or regress spontaneously, the patient should not be considered qualified to drive commercial motor vehicles.

COMMON COLD

Definition, Description, and Diagnosis

This disease is an acute infectious respiratory disorder caused by a variety of viruses. Usually self-limited, the common cold produces temporary and relatively mild morbidity in otherwise healthy individuals. Symptoms include fever, malaise, fatigue, nasal congestion, and soar throat. The occurrence of a cough varies, but it is usually mild and not productive of sputum. Treatment is directed toward symptoms of fever and nasal congestion and consists of antipyretic analgesics, antihistaminics, and sympathomimetic agents. Antibiotics are not required unless evidence of 'a bacterial superinfection of the upper (paranasal sinuses) or lower airway exists.

Risks of the Disease for Commercial Driving Safety

Given its relatively short duration, the common cold has no long-term implications for the ability of operators to drive a truck. During the infection, however, the acute symptoms have the potential to interfere with the driver's ability to maintain attention to driving conditions and to perform sustained heavy exertion.

Risks of Therapy for Commercial Driving Safety

The medications used to treat nasal congestion that contain antihistaminics may cause drowsiness and temporary loss of attention. Sympathomimetic agents may synergize with other stimulants to aggravate hypertension and contribute to hyperactive behavior.

Recommendations

Regulating the operation of commercial vehicles by drivers with the common cold will be difficult because of the cold's temporary nature and relatively high frequency, particularly in the winter months. A more practical approach for operators with this condition who wish to drive is to recommend that they not take sedating forms of antihistaminics or any over-the-counter cold preparation containing sedative medications during the 12 hours prior to driving. They may take preparations that do not contain sedatives and any of the nonsedating forms of antihistamines. Although acute sinusitis is not specifically covered in this document, a similar recommendation should apply since therapy of this condition usually requires continuous treatment with antihistamines and/or antibiotics.

INFLUENZA

Definition, Description, and Diagnosis

This disease is an acute infectious disorder affecting primarily the upper and lower respiratory tract that is caused by a number of specific viruses. that belong most commonly to the Group A or Group B Influenza family. Although people tend to call many viral infections of the respiratory tract influenza, this disorder is aimost invariably associated with a very disturbing cough that is usually nonproductive and spasmodic in character and causes pain or discomfort in the substemal region. Although usually self-limited, unmodified influenza has a longer duration than the common cold and causes much more morbidity and mortality. In addition to the cough, other symptoms include fever, malaise, myalgias that are often severe; headache, and sore throat. Gastrointestinal symptoms are uncommon, but nausea, vomiting, and diarrhea may occur. Symptoms typically persist for 5 to 7 days, and complete recovery may require several weeks. Death may occur in otherwise healthy individuals as a consequence of overwhelming viral pneumonitis or from superimposed bacterial pneumonia.

Infections from Group A Influenza may be treated with amantadine, but this agent is not effective against Group B Influenza. This drug shortens the duration and severity of illness, but only if it is administered early in the course of the infection. Treatment is usually directed at symptoms. Antipyretic analgesics are the mainstay. Antihistaminics and sympathomimetic agents may also be used for nasal congestion. Often of high priority, cough suppression usually requires narcotic-based antitussives. Antibiotics may be needed for superimposed bacterial bronchitis or pneumonia. Healthy individuals usually do not require hospitalization unless they contract pneumonia. Individuals with pre-existing cardiopulmonary disease are at much higher risk for developing an exacerbation of their underlying condition and for superimposed respiratory infection.

Potential Risks of the Disease

Most individuals with fully developed influenza will likely be physically unable to operate a vehicle and do related tasks during the peak of symptoms. Individuals with underlying asthmatic conditions may experience an exacerbation of cough or wheezing or

develop these symptoms for the first time. The effect of asthma on the operator is covered in the Task Force III Report.

Risks of Therapy

Treatment with antihistaminics and narcotic antitussives may cause drowsiness. Amantadine has been associated with confusion, although primarily in the elderly.

Recommendations

. Because of its relatively short duration, regulating the operation of a vehicle by a driver with influenza will not be practical. As with the common cold, however, recommendations regarding driving while the operator is using specific and symptomatic therapy seem indicated. Drivers should abstain from using any form of antihistaminics with known sedative side effects and narcotic-based antitussives for the 12 hours prior to driving. Operators created with amantadine should be informed that the drug may cause confusion in individuals over the age of 60. Vaccination for influenza and pneumonia to prevent or modify the severity of infections should be promoted by employers. Modem vaccines are highly effective and rarely produce significant side effects.

ACUTE BRONCHITIS

Definition, Description, and Diagnosis

Acute Bronchitis is an acute infectious disorder usually caused by bacterial or viral agents that represents either a primary infection of the lower respiratory tract or a secondary infection superimposed on a viral or bacterial infection of the upper respiratory tract The most prominent symptom is a cough productive of purulent sputum. Fever and systemic symptoms vary greatly and depend on the severity of the infection and of underlying disease of the affected individual, such as asthma or chronic obstructive pulmonary disease (COPD). In susceptible individuals, asthmatic symptoms may appear for the first time or worsen from their baseline levels. Broad spectrum oral antibiotics are the therapy of choice in chronic bronchitis and emphysema. Expectorants and antitussives may also help selected patients. Treatment of underlying disorders such as asthma and COPD may need to be intensified.

Potential Risks of the Disease

The main risk emanates from the treatment of uncomplicated forms of the illness Narcotic antitussives and antihistaminics may cause drowsiness. This condition may exacerbate or bring on underlying COPD and asthma. (Recommendations regarding the impact of these diseases on the ability to operate a commercial vehicle are detailed in the Task Force 11 and III Reports.)

Risks of Therapy

Treatment with sedating antihistaminics and narcotic antitussives may cause drowsiness.

Recommendations

Again, because acute bronchitis is usually a temporary ailment, regulating the operation of vehicles by drivers with acute bronchitis is not practical. Instead, recommendations regarding the use of certain medications while driving should be made. The major concern is narcotic-based antitussives. Drivers should abstain from these medications for 12 hours prior to operating a vehicle.

BRONCHIECTASIS

Definition, Description, and Diagnosis

Bronchiectasis is a condition characterized by chronic, irreversible dilation and distortion of the bronchi, which is caused by inflammatory destruction of the muscular and elastic components of the bronchial walls. A wide variety of conditions may predispose a person to bronchiectasis, including foreign body obstruction, strictures or benign tumors of proximal airways, inhalation of noxious substances, or infections. Bronchiectasis may be localized to a lobe or segment, or may be widespread, involving both lungs. The localized form often is associated with obsauction to the bronchus leading to the area. Diffuse bronchiectasis is associated with widespread bronchial infections, inhalation of toxic substances, or host abnormalities such as cystic fibrosis (CF).

Treatment of the localized disease includes surgical removal-of the involved lung and is indicated primarily for relief of chronic sputum production or significant hemoptysis. The diffuse disease rarely allows resection, and is treated with antibiotic therapy, annual **influenza** vaccination, bronchial hygiene with postural drainage, and possibly bronchodilators. The condition is irreversible, and treatment is directed primarily toward control of exacerbations.

Potential Risks of the Disease

Severe hemoptysis is rare but may be fatal. Clubbing, cyanosis, and weight loss are late findings in severe disease. Death is usually related to respiratory failure during an acute infection or cor pulmonale.

Risks of Therapy

No specific risks are recognized.

Recomtnendations

Mild bronchiectasis (sputum production less than 10 ml per day) should not prohibit licensing for commercial driving; however, employers should advise drivers to have annual

flu vaccinations and early access to oral antibiotics if signs of acute infection appear. Subjects with recurrent exacerbations of bronchiectasis, or who have reported one or more recent episodes of significant hemoptysis (250 ml or more), should be temporarily disqualified from operating a commercial vehicle. Pulmonary function studies should be performed in all individuals with bronchiectasis. The criteria for not medically qualifying a driver, based on results of lung function as outlined in the Task Force II Repott, should apply to individuals with bronchiectasis.

PNEUMONIA

Definition, Description, and Diagnosis

Pneumonia is an infection of the lung parenchyma, involving the invasion of alveolar spaces by microorganisms and the filling of the alveolar spaces with exudative fluid. On chest x ray, pneumonias are eirher localized (lobar pneumonia) or'diffuse, with bilateral patchy areas of consolidation (bronchopneumonia). They may be classified clinically as acute (bacterial, viral, mycoplasmal) or chronic (fungal, mycobacterial, parasitic). Acute pneumonias may be either "typical" (bacterial) or "atypical" (nonbacterial).

Acute lobar pneumonia is usually a bacterial' infection, often a superinfection following a viral respiratory illness.. It is characterized by the abrupt onset of fever, chills, **cough** productive of mucopurulent or blood tinged sputum, and pleuritic chest pain. Nonbacterial ("atypical") pneumonias usually are bmnchopneumonias. Symptoms resemble those of bacterial pneumonias, except that they are milder and, typically, more systemic. Symptoms. include myalgia, joint pains, headache, and malaise, A mucoid sputum producing cough is often found.

Chronic pneumonias may **be** caused by mycobacteria, fungi, or parasites. Fungal pneumonias resemble those caused by mycobacteria except that the symptoms may not be as severe as indicated on the chest x ray. Primary infections with pathogenic fungi usually resolve without specific therapy and *may* not produce chronic symptoms. In a small percentage of patients, due to a defect in resistance of known or unknown type, the disease may become chronic, thus causing granulomatous infiltrates to develop in the lungs with necrosis and cavity formation. Predisposing factors for the chronic form include increasing age, COPD and other systemic illnesses, and a history of cigarette smoking. Symptoms include a cough with chronic production of mucoid sputum, anorexia and weight loss, and general malaise, often associated with a chronic, low-grade fever. Some of the pathogenic fungi that cause chronic pneumonia in susceptible hosts in the U.S. are *Histoplasma capsulatum* (histoplasmosis), *Blastomyces dermatitides* (blastomycosis), *Coccidioides immiris* (coccidioidomycosis), and *Sporothrix schenkii* (sporotrichosis).

Acute bacterial pneumonias are treated with antimicrobial agents, based upon the clinical picture and laboratory findings. Supplemental therapy includes hydration, antipyretics analgesics, and oxygen and respiratory support, if needed. Cough suppressants may be required in some patients. Nonbacterial pneumonias are treated with general supportive therapy in addition to a broad spectrum antibiotic, such as erythromycin. Chronic

mycobacterial and fungal pneumonias are ueated with long-term antimicrobial therapy, most often with oral agents.

Potential Risks of the Disease

Acute bacterial pneumonia is a potentially fatal illness, with mortality in the U.S. averaging about 10 percent. Death that most often results from acute respiratory failure occurs most commonly in older persons and those with associated systemic diseases. Complications of acute pneumonia include pleurisy and pleural infections, pneumothorax, hemorrhage, respiratory failure, sepsis, and death. Severe pneumonias may produce multiple organ failure with hypoxemia, shock, and death. The most common cause of disability in chronic fungal pneumonias is progressive destruction of lung tissue leading to chronic respiratory failure.

Risks of Therapy

There are no risks of therapy relevant to the recommendations for regulating operators of commercial vehicles.

Recommendations

A history of pneumonia should not prohibit licensing; However, because acute pneumonia, which can occur in otherwise normal humans, is a debilitating illness, subjects should not be considered medically qualified until their symptoms have resolved. Patients with pneumonia need immediate medical therapy. Although patients with fungal pneumonias are not contagious and need not be isolated, they should not be considered medically qualified until a response to therapy has been documented.

PLEURISY

Definition, Description, and Diagnosis

Pleurisy (pleuritis) is inflammation of the pleural lining of the lungs that may be acute or chronic. Pleuritic pain is characteristic, well localized, and increased by breathing, coughing, or positional change. Tenderness over the chest wall is also common. Pleurisy may be due to infection, malignancy, or trauma and is most important as a sign of underlying disease. The most common cause of painful pleurisy is infection, which typically spreads from the adjacent lung. Any type of malignancy that involves. the pleura, either primary or metastatic, causes pleurisy. Often accompanied by a pleural effusion, pleurisy associated with pneumonia usually resolves with treatment of the pneumonia. Subjects with a chronic effusion and a positive tuberculin skin test are considered to have active tuberculosis (TB) until proven otherwise and should be treated for TB. Narcotic analgesics may be required for control of pain.

Potential Risks of the Disease

Acute pleurisy is often a debilitating disorder that prevents the individual from performing his usual duties. Patients with chronic pleural effusions should not work and require further evaluation to determine etiology.

Risks of Therapy

Narcotic analgesics may interfere with alertness.

Recommendations

Individuals with acute pleurisy should not be evaluated as medically qualified until they respond to treatment. Individuals with chronic effusions also should not be medically qualified until the cause is determined and a response to treatment has been documented.

PULMONARY TUBERCULOSIS

Definition, Description, and Diagnosis

TB is a disease of protean manifestations. These may range from a simple.sign of an infection, as shown by a positive tuberculin skin test (which would be asymptomatic), to far advanced active TB and/or miliary TB with complete debilitation of the patient.

A positive intermediate tuberculin' skin test (5 T.U.) indicates a previous infection with TB. The incident could be recent or many years ago. If the positivity is old and known and is not accompanied by an x-ray abnormality, no action is required. If x-ray changes occur, there is a need for further evaluation. If the conversion occurred within the last year, active disease may develop and prophylactic therapy should take place. This circumstance would not require limiting the driver's activities.

In advanced disease, the debility of the patient precludes working. The cases with intermediate types of disease are not as straightforward The presence of TB may be indicated by the classic symptoms of. **cough,** hemoptysis, and weight loss. On physical examination under these circumstances, evidences of abnormalities may well be found. However, a large percentage of intermediate cases are asymptomatic, that is, the patient has no history of cough, chest pain, hemoptysis, shortness of breath, or wheezing. These cases require a chest x ray as part of diagnosis and staging. The presence of symptoms or x-ray abnormalities requires a formal evaluation by a pulmonary physician. If the disease has been adequately treated, the individual is not contagious, and lung function is not below the criteria for medical qualification, the driver may be permitted to work.

Risk of recurrence, after adequate therapy of TB, is low. However, some city and State clinics believe that, with adequate therapy, repeat x rays are not warranted for followup. The American Thoracic Society supports this position.

Potential Risks of the Disease

Advanced TB may cause respiratory insufficiency.

Risk of Therapy

The drugs commonly used for TB, namely Isoniazid, Rifampin, ethambutol, pyrizanimide, and streptomycin, have significant toxicity. Their toxicity is usually to the vital organs of the body except for streptomycin, which affects the eighth cranial nerve. In the case of streptomycin, damage to balance and to hearing could constitute a risk to a driver.

Recommendations

The need to take streptomycin usually indicates a patient has a more serious form of the disease. This fact plus the possible neurological complications of hearing and balance would make the driver not medically qualified until therapy with this drug is completed.

Although modem therapy has been extremely successful in conuolling this disease, TB persists in some. patients, either while on therapy or in recalcitrant individuals who refuse therapy. These individuals with chronic TB should not be allowed to drive.

In some individuals the tuberculous disease has been resected with lobectomy or pneumonectomy, either as part of a diagnostic study or in therapy of a refractory case. These individuals require an evaluation of their pulmonary function to be sure that they meet the requirements for certification as outlined in the physiological guidelines in the introduction.

ATYPICAL TUBERCULOSIS

Definition, Description, and Diagnosis

Atypical TB covers the same broad spectrum of symptoms and disability as with TB. Many individuals are colonized, but not infected with atypical organisms, usually ***Mycobacterium*** avium and ***Mycobacterium intracellulare.*** The broad group of atypical Mycobacteria are considered noninfectious and do not pose the problem of contagion. The major problem would be the amount of disease the patients have had and the extent of their symptoms. Many cases of Mycobacteria cause very little in the way of symptoms. The x-ray findings are often migratory and are associated with cough, mild hemoptysis, and sputum production.

Potential Risks of the Disease

If the disease is progressive, respiratory insufficiency may develop.

Risks of Therapy

As these patients usually do not receive drug therapy, there are no risks. If they do undergo therapy, the drugs and associated risks are the same as those noted in the section on pulmonary TB.

Recommendations

If the disease is relatively stable these individuals should be allowed to drive. The. major concern would be if the disease becomes progressive and causes extensive pulmonary symptoms, weakness, and fatigue. Pulmonary function studies should be performed. Drivers with these symptoms should not be medically qualified unless their disease remits.

TASK FORCE II REPORT-NONINFECTIOUS DISEASES

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CHEST WALL DEFORMITIES

Definition, Description, and Diagnosis

Disorders of the musculoskeletal system may affect the mechanics of breathing. These disorders fall into two general categories: neurologic diseases and thoracic wall disorders. Neurologic diseases may affect neural transmission from brain, spinal cord, or peripheral nerves. This may impair diaphragm and/or intercostal respiratory muscle function. Thoracic wall disorders. which include primary muscle disease or deformities of the thoracic cage, may affect the ability of the chest to expand in a fashion appropriate to the development of adequate ventilation. Examples of these disorders include kyphosis, kyphoscoliosis, pectus excavatum, ankylosing spondylitis, massive obesity, and recent thoracic/upper abdominal surgery or injury.

Clinical presentation and symptomatology of these disorders include weakness (as a manifestation of a more general process) and/or exertional dyspnea (as a manifestation of limited pulmonary reserve on exercise). Resting dyspnea is unusual in this group but, if present, would indicate a severe disorder.

Physical examination will reveal the presence of a chest wall deformity; however, chest x rays define the severity of the structural abnormality of the chest cage (PA and lateral x rays may be necessary for this). Small apparent lung volume or abnormally high diaphragm(s) on maximal inspiration films would suggest limited neuromuscttlar capacity or diaphragm impairment if there is no other obvious pathology. Insspiratory and expiratory films for evaluation of diaphragm motion may help,in this setting.

Pulmonary function testing assists in establishing potential limitations of pulmonary reserve. An abnormal vital capacity is the predominant abnormality. Airway function should be near normal.

Potential Risks

The only limitation to employment that would influence driving capabilities in this group would be hypoxemia or hypercapnia at rest. Consequences of these abnormalities might be arrhythmias and hypersomnolence. Exercise abnormalities of blood gas in this group of disorders would appear in those with limited exercise capability. This abnormality would not influence driving capabilities but would affect other aspects of the occupation, such as loading or, during an emergency, truck disability or repair.

Risks of Treatment

No specific medication exisrs for treatment of this group. However, these patients are particularly sensitive to the side effects of alcohol, anti-depressants, and sleeping medications. Blood gas abnormality and/or excessive sleepiness may result from these substances even in small doses.

Recommendations

T'he identification of an abnormality on clinical examination is an indication for spiromeuy. Arterial blood gas at rest and/or during exercise should be evaluated in any patient with subnormal lung volumes or airflow. An individual with hypoxemia at rest and/or during exercise should be medically disqualified to drive. Carbon dioxide retention at rest or on exercise should preclude employment. For specific indices, refer to the physiological guidelines in the introduction.

INTERSTITIAL LUNG DISEASES

Definition, Description, and Diagnosis

The interstitial lung diseases (ILDs) are a heterogeneous group of diseases characterized by alterations in the lung manifested clinically by breathlessness with exertion and/or cough, abnormal shadowing on chest x ray, and a restrictive ventilatory defect Of the more than 150 disorders with which ILDs are associated, approximately two-thirds have no known cause and are, therefore, classified by their clinical and/or pathological features. The inost prevalent causes of the ILDs relate to occupational and environmental exposures, especially to inorganic or organic dust. Othei causes include drugs and poisons, chronic infection, connective tissue diseases, and many other systemic diseases (such as vasculitides, renal failure, and chronic heart failure). Sarcoidosis and idiopathic pulmonary fibrosis (with or without an associated connective tissue disease) are the most common ILDs of unknown etiology. This heterogeneous group of disorden can be classified together because. of common clinical x-ray, physiologic, and pathologic features. Identification of possible ILDs should prompt further evaluation, often including referral to an appropriate specialist to determine cause and extent of impairment.

Occupational Lung Disease

Coal worker's pneumoconiosis, silicosis, and asbestosis are the most common inhalation exposures that result in fibrosis and restrictive lung disease. These processes usually occur in individuals with a long history of exposure to the offending agent, usually greater than 10 years.

Coal, worker's pneumoconiosis usually occurs in association with silicosis. Two forms of disease predominate: simple pneumoconiosis represented by small opacities (less than 1 cm in diameter) found predominantly in the upper lung zones, and complicated pneumoconiosis or progressive massive fibrosis (with opacities 1 cm or more in diameter).

Approximately 10 percent of coal miners contract the disease, of which 0.4 percent develop progressive massive fibrosis. Pulmonary function abnormalities usually occur in simple coal worker's pneumoconiosis only with a history of cigarette smoking despite the presence of x-ray changes.

Silicosis is found in workers, such as miners, sandblasters, and glass workers, who have been exposed to silica dust. Radiographically, silicosis appears as multinodular rounded densities predominantly found in both upper lung zones. The radiographic changes usually occur before the clinical and functional abnormalities. Progression from simple to progressive massive fibrosis occurs in a minority of patients. Patients with silicosis are highly susceptible to infection by *Mycobacterium tuberculosis* and other atypical mycobacteria. These patients also often have sclemderma and rheumatoid arthritis.

Exposure to asbestos is widespread because of its extensive use as an insulation material, fire retardant, and noise reduction agent in many public facilities. Workers employed in the shipyard, automotive, insulation, cement, textile, and asbestos mining indusaies are at greatest risk. There is a long latent period between exposure and the development of lung diseases. Smoking appears to facilitate the damaging effects of asbestos inhalation. Bilateral pleural thickening along the lower or midthoracic walls, calcified pleural plaques, and hazy infiltrates composed of irregular or linear small opacities, especially in the lower lung zones. are the most common x-ray changes. Asbestos is also carcinogenic. Pleural and peritoneal mesotheliomas and bronchogenic carcinoma are complications of asbestos exposure.

Clinical Presentation

Common presenting symptoms include the insidious onset of dyspnea with exercise, easy fatigue, and a nonproductive cough. Other clinical manifestations are. dependent on the underlying process and include constitutional symptoms such as fever, weight loss, myalgias, and arthralgias.

The most important step in the evaluation of a patient with a suspected ILD is a carefully taken clinical history. Particular emphasis should be placed on possible occupational and environmental exposure. For commercial drivers, the clinical history should investigate the most commonly hauled materials and the type of exposure to these materials. A strict chronological listing of the driver's employment (driving and nondriving), including specific duties and known exposures to dusts, gases, and chemicals, is important. The degree of exposure, duration, latency of exposure, and the use of protective devices should be elicited. Review of the environment (home, work, truck), especially as it relates to pets, air conditioners, humidifiers, etc., is valuable.

Physical examination commonly reveals tachypnea and bibasilar end-inspiraiory dry rales ("velcro rales"). Clubbing of the fingers is common in some patients (idiopathic pulmonary fibrosis) and rare in others (sarcoidosis). Signs of pulmonary hypertension and cor pulmonale are seen only in advanced disease.

The chest x ray is useful in suggesting the presence but not the stage of the lLD. It may be normal in as many as 10 percent of individuals. The most common x-ray abnormalities are a reticular or a reticulonodular pattern. A coarse reticular pattern or multiple cystic areas (honeycombing) are late x-ray findings and indicates a poor prognosis.

Pulmonary function abnormalities are common. The classic findings are consistent with a restrictive impairment (that is, vital capacity and total lung capacity are reduced). Unless a complicating airway disease (that is, bronchiolitis obliterans, endobronchial sarcoidosis, or COPD) exists, flow rates are well maintained. Spirometry is less sensitive in the detection of ILDs compared to its role in detecting obstructive lung disease. More importantly, patients with ILDs may have dyspnea that appears out of proportion to the spiromeuy abnormalities.

The diffusing capacity is reduced. The resting arterial blood gas may be normal or reveal hypoxemia and respiratory alkalosis. Commonly, blood gas abnormalities may only be elicited or accentuated by exercise.

Following the initial evaluation, physicians should confirm the diagnosis and determine the stage of disease. Once the diagnosis is confirmed and the state determined, final prognosis and therapy require referral to a qualified specialist. A lung biopsy may also be required to determine the diagnosis.

Potential Risks for Driving Safety

The major issue concerning commercial drivers is the evaluation of pulmonary fitness with symptoms of dyspnea and fatigue and risk of progression of symptoms in a worker with a known ILD (for example, sarcoidosis, preexisting pneumonoconiosis). Also of major concern are situations where direct workplace exposure will lead to ILDs or exacerbation of a respiratory problem (for example, gram haulers or contaminated air conditioner systems causing hypersensitivity pneumonitis or exacerbation of reactive airway disease).

Risk of Therapy

Although the course of ILDs is variable, progression of the disease is common and often insidious. Treatment side effects pose a significant potential problem because of the use of conicosteroids and cytotoxic agents and should be taken into account when assessing commercial drivers.

Significant side effects from corticosteroid therapy include (1) increased appetite and weight gain; (2) salt and water retention with exacerbation of cardiovascular disease; (3) hyperglycemia and/or overt diabetes mellitus; (4) depression, hyperexcitability, or frank psychosis; (5) osteoporosis and joint destruction; (6) peptic ulcer disease; (7) immunosuppression leading to opportunistic infections; and (8) other side effects, that is, hypokalemia, hypertension, renal lithiasis, poor healing, cataracts, eccbymosis, phlebitis, and hirsutism. In addition, withdrawal from steroid drugs may result in its own serious symptoms and morbidity, that is, fatigue, weakness, arthralgia, anorexia, nausea, desquamation of skin, orthostatic dizziness and hypotension, fainting, and hypoglycemia.

Cyclophosphamide, also commonly used to treat LLDs, has side effects that include (1) leukopenia (therapy should be aimed at a total white count greater than 3,000/mm (2) hemorrhagic cystitis ("forced" fluids and frequent bladder emptying are recommended to prevent this problem); (3) gastrointestinal symptoms, that is, anorexia, nausea, and/or vomiting; (4) bone marrow suppression; (5) azoospermia or amenorrhea; (6) infection: and (7) development of hematologic malignancies. Therapy should be altered in the face of renal insufficiency.

Recommendations

The LLDs have many common clinical, x-ray, physiologic, and pathologic features. Thus, criteria that determine whether or not an individual is medically unqualified are discussed in general terms for the entire group of conditions. Further, given the broad range of manifestations and the large number of causes it is not possible to make a simple rule regarding disposition. Importantly, a diagnosis alone frequently provides insufftcient information to deem a driver medically unqualified. Each individual case must be evaluated and the degree of impairment documented.

The parameters that follow should be used by the examiner to determine whether or not the individual is medically qualified to drive. Although dyspnea cannot be used as a single criterion for determination of the extent of impairment, it should initiate a careful evaluation. Dyspnea is estimated by obtaining a history of breathlessness while driving, walking short distances, climbing stairs, handling cargo or equipment, and entering or exiting the cab or cargo space.

Secondary conditions such as visual disturbance, pulmonary hypertension,' cor pulmonale, recurrent pneumothorax, chronic respiratory failure, pulmonary embolism, and cough syncope may be grounds for determining that the individual is not medically qualified.

General physiologic parameters that make the individual medically unqualified are defined in the physiological guidelines detailed in the introduction In addition, in this group more extensive physiologic evaluation may be warranted based on the extent of x-ray abnormality and/or dyspnea. If the total lung capacity (TLC) is less than 60 percent of that predicted or the diffusing lung capacity (DLCO) is less than 60 percent of that predicted, then blood gas testing should be performed. An individual with a significant fall in PO_2 or oxygen saturation with exercise, or inability to exercise beyond a VO_2 max 15 ml/kg/min [4.3.mets] should be considered not medically qualified.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Definition, Description, and Diagnosis

COPD is not a single disease, but a group of medical conditions characterized by chronic reduction of maximal expiratory flow. COPD is very common and one of the leading causes of physical disability in the U.S. Two prototypical diseases, chronic bronchitis and emphysema, cause most COPD.

Chronic airway inflammation and hypertrophy of mucous glands characterize chronic bronchitis. Airway obstruction stems from edema and tenacious mucous. Emphysema is a pathologic diagnosis characterized by desuuction of the alveolar walls and enlargement of terminal airspaces. Most patients with COPD have a combination of chronic bronchitis and emphysema. In the vast majority of cases, cigarette smoking is a primary etiologic factor.

COPD has an insidious onset and patients may have substantial reduction in lung function prior to developing dyspnea on exertion. The cardinal symptoms are chronic cough, sputum production, and dyspnea on exertion, which, as the disease progresses, can become incapacitating. Many patients have an asthma-like component to their disease. Symptoms of increased cough, wheezing, and dyspnea can be provoked by cold air and certain odors or other nonspecific causes. In some patients, the asthmatic component is quite pronounced and COPD blends with chronic asthma (discussed in the Task Force III Report).

Some patients are subject to paroxysms of cough that may interfere with performance of other activities. Patients with very severe airways obstruction, in whom coughs are associated with very little airflow and sustained high intrathoracic pressures that impede. cardiac output, may experience cough syncope. However, this symptom occurs only in patients with very severe incapacitating disease. Patients with prolonged hypoxemia might develop secondary pulmonary hypertension and, ultimately, cor pulmonale or right heart failure.

Physical examination' is a remarkably insensitive means of detecting COPD. Patients may have significant disease with severe impairment of function but with physical signs that a routine physical examination will not detect. Patients with very advanced COPD, particularly of the emphysematous type, will have barrel chest and will use the strap muscles in the neck to assist inspiration. There is diminished excursion of the diaphragm .estimated by percussion of posterior chest between normal end expiratory position and maxima1 inspiration. Patients with severe hypoxia will be cyanotic and may have clubbing of the nails. On auscultation of the chest, patients may experience inspiratory and/or expiratory wheezes and rales or, alternatively, their bronchovesicular breath sounds may be diminished or inaudible.

Chest x rays help little in the diagnosis of COPD. With advanced disease and marked increase of total lung capacity, the heart may appear small relative to the thorax (a reduced cardio thoracic ratio), and the diaphragms may be lower than normal and appear flat. Emphysema is manifested by reduced vascular markings in the periphery of the lung. Absence of these x-ray signs does not exclude the diagnosis of COPD.

Spirometty is a specific screening test for the detection of COPD. The traditional best documented parameter for the diagnosis of COPD is a reduction in the forced expiratory volume in one second (FEV,). Reductionof the FEV, can occur in a variety of conditions that reduce a patient's ability to expand the respiratory system either because of neuromuscular abnormalities, chest-wall abnormalities, or ILDs. These conditions are all characterized by a reduced vital capacity. Patients with COPD also have a reduced vital capacity because of the inability to completely empty their lungs due to airway obstruction. However, in COPD the FEV, is always reduced more than the vital capacity, and the FEV,

forced vital capacity (FVC) ratio is less than that considered normal in contrast to restrictive lung disease in which the FEV, / FVC ratio is characteristically normal or increased.

Potential Risks

Airway obstruction producing significant exertional dyspnea could greatly impair ancillary duties of drivers such as loading, unloading, securing and/or covering loads. Impairment may particularly affect patients with COPD who may experience exacerbations of dyspnea when performing tasks with their arms elevated. Severity of airways obstructions as measured by FEV, (or any other physiologic test, singly or in combination) often affects exercise capacity, but the relationship varies considerably. It is probable that anyone with an FEV, greater than 65 percent of that predicted should be able to perform the duties required of a commercial truck driver.

Risks of Therapy

Medications commonly used for the treatment of COPD include bronchodilators, anti-inflammatory drugs, and antibiotics for intercurrent infections. Bronchodilators may be inhaled or systemically administered. Sympathomimetic drugs, primarily beta adnmergic agents or anticholinergic agents, are used systemically or as inhaled preparations. Beta agonists used systemically may cause tremor but should not impair an ability to operate a motor vehicle. Systemic and inhaled steroids are more commonly used in asthma treatment and are addressed in the Task Force III Report.

Recommendations

Smokers have a high incidence of COPD, yet individuals may have a significant reduction in lung function without symptoms. Consequently, spirometry should be performed in all smokers over the age of 35.

Patients with COPD with an FEV, of less than 65 percent of that predicted should have tests of arterial blood gases taken. Blood gas tensions from uncomplicated COPD, severe enough to make the applicant medically unqualified, are. unlikely to occur in patients with an FEV, of more than 65 percent of that predicted. The physiological guidelines in the introduction on page 11 should be followed. Chronic respiratory failure from COPD, defined as an arterial PCO greater. than 45 mm Hg, predisposes a patient to acute respiratory failure during exacerbations of illness. Acute respiratory failure produces an impaired level of consciousness extending to coma.

Paroxysms of cough represent a hazard that is difficult to quantify. A history of continuing cough with cough syncope would also render the individual not medically qualified.

CYSTIC FIBROSIS

Definition, Description, and Diagnosis

CF is an inheritable disease caused by a recessive autosomal gene. Although researchers have identified the gene, which affects abnormal cell membrane ion transport, physicians still diagnose the condition by abnormally high concenaations of chloride in sweat. Carriers of the gene have elevated sweat chloride levels but are otherwise clinically normal. In affected individuals, abnormal pancreatic and bronchial secretions characterize the disease. Abnormal pancreatic secretions result in impaired digestion of fat, resulting in steatorrhea and malnutrition. This condition is treated by taking pancreatic enzymes. The pulmonary aspect of the disease is characterized by copious viscous bronchial secretions leading to recurrent bronchial infections, ultimately with antibiotic resistant gram negative organisms and COPD.

Until recently, few patients with CF lived into adulthood. With modern therapy many patients survive until their late teens or early twenties, but most patients have severe. COPD. Some patients have a mild form of the disease that may not be diagnosed until early adulthood.

Risk for Drivers

Patients with CF requite almost continuous antibiotic therapy and dally respiratory therapy to help them mobilize their abnormal secretions. Each individual must be evaluated as to the extent of their disease and symptoms and ability to obtain therapy while working. In addition, most patients with CF are of a small stature and of limited physical strength because of their chronic debilitating illness.

Recommendations

Patients with CF should be considered similar to other patients with COPD, and the same recommendations apply as outlined in the COPD section.

PNEUMOTHORAX

Definition, Description, and Diagnosis

Pneumothorax (air in the pleural space) may follow trauma to the chest or may occur spontaneously. When spontaneous, it may complicate lung disease that is already present or may occur in an otherwise healthy individual.

Traumatic Pneumothorax

This may occur following penetrating trauma. to the chest, blunt trauma with rib fractures lacerating the lung, or just following uauma and chest compression. It can also occur following invasive medical procedures. A medical history and physical examination of the applicant will provide the details of the event but may not help to ascertain recovery.

Chest x rays (especially views in deep inspiration and full expiration) will confirm the resolution of air from the pleural space. The chance of recurrence is minimal.

Spontaneous Pneumothorax

If this complicates lung disease already present (for example, emphysema) then the underlying lung disease will determine the individual's ability to return to work and the chance of a recurrent pneumothorax.

If the individual has a history of spontaneous pneumothorax without underlying lung disease, they should be asymptomatic without chest pain or shortness of breath at the time of the examination. Physical examination should be unremarkable with no signs of respiratory distress or illness. There may be a scar from a surgical procedure to remove the air (chest tube) or prevent recurrence (thoracotomp scar). Chest x rays (especially views in deep inspiration and full expiration) will confirm the resolution of air from the pleural space but may show some residual pleural scarring or apical blebs or bullae.

Potential Risks

A recurrent pneumothorax would temporarily interfere with driving a commercial vehicle because of pain, shortness of breath, and possible hypoxemia.

Risks of Therapy

None.

Recommendations

The examining physician needs to ensure complete recovery using chest x rays. If the patient still has air in the pleura1 space and/or air in the mediastinum (pneumomediastinum), then further time away from work is indicated.

Full recovery should take place in 3 months but approximately 25 percent of patients with a spontaneous pneumothorax will have a recurrent episode within 2 years (75 percent on the same side). The recurrence rates are the same if the initial event was treated with observation or tube thoracostomy. After two spontaneous pneumothoraces, the recurrence rates are higher (approximately 50 percent) and after three even higher (up to 85 percent likelihood of recurrence). Activity does not appear to be related to the chance of recurrence. Any individual with a history of two or more spontaneous pneumothoraces on one side should be considered medically unqualified if no surgical procedure has been done to prevent recurrence. Usually, no significant chance of recurrence on the same side exists with pleurodesis.

Pulmonary function screening, as described in the physiological guidelines in the introduction, should also take place to ascertain any residual damage.

TASK FORCE III REPORT-ALLERGIES

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Allergies arc common in the general population. In most cases the severity of symptoms of mild asthma, allergic rhinitis, and urticaria is minor and does not impair commercial driver function. Occasionally, however, symptoms resulting from allergic conditions and their treatment may be sufficiently severe to affect function to such an extent as to be potentially hazardous to the commercial driver and others for whom the driver is responsible.

Litde or no information exists on medical causes of motor vehicle accidents including the risk to the commercial driver of having allergic disease. It is unlikely that allergic diseases per se increase the risk of having a motor vehicle accident, but complications such as impaired vision, severe dyspnea, hypoxemia, thinking abnormalities, panic, or diminished levels of consciousness must presumably be avoided to assure safety in driving. These considerations are further detailed under the specific disease categories.

ASTHMA

Definition, Description, and Diagnosis

Asthma is variable airways obstruction that changes spontaneously or as a result of treatment. Symptoms include chest tighmess, .wheezing, dyspnea, and cough with or without sputum. Blood and sputum eosinophilia are hallmarks of the disease. Airways inflammation, incurred by allergic and nonallergic inhalants, is a recognized pathogenetic component. Hyperresponsiveness to methacholine or histamine occurs. Asthma is a common disease affecting 5 percent of the population. Severity ranges from essentially asymptomatic to potentially fatal. Treatment may not be required, may involve simple bronchodilators for acute episodes, or may require a full spectrum of medications including systemic corticosteroids for adequate, continuing control. Asthma, whether allergic in etiology or not, is by definition *reversible* airways obstruction and, in most affected individuals, is mild or adequately controlled with simple therapeutic measures.

The diagnosis may not be readily apparent because of difficulties in distinguishing asthma from irreversible chronic obsmtctive airways disease in some patients, especially in smokers and individuals over 40 years of age with a smoking history. Pulmonary function studies are a usual part of the examination and, if the results are abnormal, the extent of reversibility should be documented.

Potential Risks of Asthma

Exposure to nonspecific irritant inhalants, irregular hours, fatigue, heavy exertion required for on and off loading, and prolonged exposure to cold temperatures may aggravate chronic asthma and medical help may not be readily available to a long-distance driver. Complications of asthma that could increase risk of driving include severe dyspnea unresponsive to usual bronchodilator therapy ("status asthmaticus"), hypoxemia leading to impaired mental function, and severe coughing spells with or without cough syncope. A history of frequent hospitalizations, need for high-dose corticosteroids, and current findings of significant symptomatic airway obstruction or hypoxemia indicate increased risk and may reasonably lead to refed to a specialist for further evaluation.

In individuals with asthma, or with hyperresponsive airways accompanying other lung diseases, exposure to noxious fumes or gases generated by fuels and lubricants from gasoline or diesel vehicles, to refrigerants (freon, sulfur dioxide), to dusts or chemicals during transportation of specific substances, or to tobacco **smoke** during day-to-day routines may cause irritation. If sufficient to cause progressive symptoms, such encounters should be avoided or pharmacologic therapy used to reverse symptoms. This problem alone should rarely lead to denial of commercial driver cerification, but should be considered in evaluating an individual with moderate to severe airway disease. In special situations, the quantitation of nonspecific airway responsiveness to methacholine of histamine may be useful.

Potential Risks of Therapy

Risks of treatment involve potential side effects of pharmaceutical agents including theophylline and systemic corticosteroids.

Theophylline therapy, used for chronic bronchodilator effect in asthma, may. occasionally result in toxic blood levels causing nausea, vomiting, tremors, excitement and, rarely, seizures. Physician control of dosing is essential.

Systemic adrenal corticosteroids, used in the treatment of resistant asthma and, less commonly, in other allergies unresponsive to simpler measures, may occasionally result in euphoria or depression and, rarely, in acute psychosis in susceptible subjects. A potential need for repeated high-dose steroids in patients with a history of adverse behavioral responses to such therapy would be a reason to delay commercial driver certification until referral to a specialist for further evaluation.

Recommendations

Drivers with asthma who exhibit either of the following medical conditions should not be considered medically qualified.

Continual, uncontrolled, symptomatic asthma.

Significant impairment of pulmonary function (FEVi less than 65 percent) and significant hypoxemia (PaO, of less than 65 mm Hg), in the absence of the first condition.

These medically unqualifying criteria could be reversed by appropriate treatment, and the driver may then be recommended for certification.

ALLERGIC RHINITIS

Definition, Description, and Diagnosis

Allergic rhinitis is a seasonal or perennial inflammatory process of the upper respiratory tract secondary to interactions of allergens (pollen, molds, dust, danders) with specific IgE class antibodies and release of mediators from mast cells in relevant tissues.

Symptoms include sneezing, itching, rhinorrhea, and nasal congestion. Often allergic conjunctivitis also occurs with itching, lacrimation and photophobia; and the throat and larynx may be involved with itching, swelling, and hoarseness.

Potential Risks of Allergic Rhinitis

A history of hay fever (allergic rhinitis) should rarely lead to even temporarily not medically qualifying an individual for commercial driving. Complications that may conceivably impair function and increase the risks of driving include severe conjunctivitis causing impaired vision, inability to keep eyes open, or photophobia; uncontrollable sneezing fits; and sinusitis with severe headaches.

Potential Risks of Therapy

Depending on potency and dosage, some antihistamines may sedate patients, but recent developments make it possible to instead use nonsedating antihistamines such as terfenadine (Seldane) or astemizole (Hismanal) or use local steroid sprays for allergic rhinitis. These treatments avoid unwanted sedation. Commercial drivers can and should avoid potentially sedating antihistamines.

Recommendations

Allergic rhinitis is, not a respiratory disorder that would lead to an evaluation of not being medically qualified. However, for treatment, only nonsedating antihistamines or innanasal steroid sprays should be used to prevent sedation that occurs with conventional therapy.

HYPERSENSITIVITY PNEUMONITIS

Definition, Description, and Diagnosis

Hypersensitivity pneumonitis is an immune-mediated granulomatous interstitial pneumonitis that may present as an acute-recurrent, subacute, or chronic illness variously

manifested by dyspnea, cough, and fever. Chest x ray usually reveals interstitial disease, and the serum contains precipitating antibodies to the causative antigen.

Potential Risks

Once the diagnosis is made and the etiology determined, the patient must avoid the environmental source of the causative agent. No recognized environmental source is associated with commercial driving per se, but transporting of the etiologic agent (for example, moldy hay, mushroom compost, bagasse, birds) may be part of a specific job. Chronic respiratory impairment may occur with continued exposure and may rarely lead to respiratory failure, but without any specific features unique to hypersensitivity pneumonitis.

Recommendations

Patients with symptomatic hypersensitivity pneumonitis need medical care, with the expectation that the disease will be self-limited and not prevent the patient from qualifying for commercial driving.

LIFE-THREATENING CONDITIONS

Definition and Description

These conditions encompass systemic anaphylaxis and acute upper airway obstruction induced by allergens, genetic deficiencies, or unknown mechanisms.

Stinging insect allergy may result in acute anaphylaxis following a sting. The sight of a flying insect inside a vehicle may panic an allergic driver even without a sting. Preventive measures, including an epinephrine injection device available in the truck cab and evaluation for immunotherapy, are recommended.

Hereditary or acquired angioedema (due to deficiency of a serum protein controlling complement function) may result in **acute,** life-threatening airway obstruction or severe abdominal pain requiring urgent medical attention. Control can and should be established with appropriate prophylactic medication.

Acute recurrent episodes of idiopathic amaphylaxis or angioedema may occur unpredictably in some individuals and lead to sudden onset of severe dyspnea,, difficulty seeing, loss of consciousness, or collapse. Similar episodes occur due to known allergens, including medications, which ordinarily can be avoided.

Risks of Therapy

Antihistamines are discussed under the section on Allergic Rhinitis.

Recommendations

The sudden onset of symptoms leading to impaired function can be a driving hazard. Individuals with a history of the above conditions must have successful preventive measures and/or treatment undertaken without adverse effects before the driver can be considered medically qualified. If this has not been documented, the driver is medically disqualified.

TASK FORCE IV REPORT-SECONDARY PULMONARY CONDITIONS AND UNDERLYING PULMONARY DISORDERS

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POST PNEUMONECTOMY/LUNG RESECTION

Definition, Description, and Diagnosis

Lung resection or the surgical removal of any portion of the lung, can consist of removing pan of a lobe, an entire lobe (lobectomy), or an entire lung (pneumonectomy). Although **most** commonly performed to remove cancer, usually primary lung cancer, lung resection may also be performed for other indications, including the removal of lung tissue that is essentially nonfunctional **but** a source of continuing infection or inflammation caused by a destructive process.

Lobectomy, and even pneumonectomy, in individuals with otherwise normal lungs might leave the individual wirh adequate function to carry out both usual daily activities and exertional activities without symptoms. On the other hand pneumonectomy, both wirh and without lung disease, or lobectomy in the presence of lung disease (usually chronic obstructive pulmonary disease-COPD) can result in significant functional abnormalities and symptoms.

Potential Risks for Driving

People who have had pulmonary resection have two major causes of risk to driving safety: a) the underlying disease process (for example, primary lung cancer), and b) the resulting functional state of the **lungs.** Risks from pulmonary functional abnormalities may relate to the presence of severe symptoms, especially dyspnea and fatigue, and to hypoxemia and its attendant risks.

Recommendations

The recommendations for evaluation of the underlying disease process are covered **under** the relevant sections of this report, including primary and secondary lung cancer and bronchiectasis.

Following lung resection, patients should have those physiological studies performed as recommended in the Task Force II Report for evaluation of ILDs. Patients with significant hypoxemia (see the physiological guidelines in the introduction) following lung resection should not be medically qualified for commercial truck driving.

TRACHEOSTOMY

Definition, Description, and Diagnosis

Tracheostomy refers to the surgical creation of an opening into the trachea through the neck. The surgery can be done either by bringing the tracheal mucosa into continuity with the skin or by maintaining a tube placed through the opening of the skin into the trachea. Tracheostomy is performed for laryngeal cancer treated with laryngectomy. Tracheostomy is also performed for other head and neck cancers and for traumatic injuries to the airways. During severe episodes of acute respiratory failure, uacheostomy may be performed, but it is usually allowed to heal after the episode of acute respiratory failure has resolved. Occasionally, patients with other conditions will continue to have a tracheostomy in place as an outpatient. This may include patients with obsauctive sleep apnea syndrome.

Potential Risks for Driving Safety

Tracheostomy itself does not present significant risks for driving safety. However, the condition for which the nacheostomy was performed may have driving safety risks.

Recommendations

Individuals with tracheostomy should be assessed to determine whether the underlying condition stems from symptoms or lung dysfunction severe enough to prevent the individual from being medically qualified for commercial driving. These recommendations are covered under the specific conditions in this report.

DISORDERS OF BREATHING DURING SLEEP

Definition, Description, and Diagnosis

Disorders of breathing during sleep commonly appear in middle-aged men and have serious consequences on a driver's ability to safely operate a commercial vehicle. The most common of these disorders, obstructive sleep apnea (OSA), affects 2 to 3 percent of the adult male population. The disorder is particularly common in obese men who have a history of loud snoring. Other major risk factors include alcohol consumption and use of sedative medications. The abnormality results from collapse, with obstruction of the pharyngeal airway, as the result of the decrease in muscle tone normally occurring during sleep. Accordingly, individuals affected with the disorder have episodes of apnea (interrupted breathing) only occurring during sleep and usually in a repetitive fashion such that more than 30 episodes of apnea occur during each hour of sleep. Such individuals may appear completely normal while awake without any evidence of physical abnormality, which accounts for the need for specific laboratory testing to establish the diagnosis.

Untreated OSA mostly appears clinically as hypersomnolence (sleepiness) during waking hours. This condition results from the frequent apneas present during sleep that interrupt normal sleep cycles. The sleepiness is particularly troublesome during repetitive and

monotonous activities such as driving Every clinician treating such patients has recorded numerous episodes of "falling asleep while driving." Evaluation of a driver suspected of suffering from this disorder should 'be by a specialist knowledgeable about OSA who can supervise a sleep study (polysomnograph). This test records respiratory and brain wave signals and determines the frequency of apneas and sleep stages.

Potential Risks of Obstructive Sleep Apnea for Driving Safety

Recent reports have documented a twofold to fourfold increase in motor vehicular accidents in individuals with untreated sleep apnea. This is of particular concern because most men with this illness are unaware of the problem. In addition, it worsens with advancing age and increasing body weight. It is believed that undiagnosed sleep apnea may be an important cause of vehicular accidents in North America today.

Potential Risks of Treatment for Driving Safety

Treatment is not associated with significant risks for driving safety. Accepted treatment. modalities for OSA include nasal CPAP (continuous positive airway pressure), uvulopalatopharyngeoplasty (UPPP), weight loss, and uacheostomy.

Recommendations

It is recommended that operators with suspected sleep apnea (symptoms of snoring and hypersomnolence), or with proven but untreated sleep apnea, not be medically qualified for commercial motor vehicle operation until the diagnosis has been eliminated or adequately treated. Diagnosis of obstructive sleep apnea occurs when an individual has greater than 30 episodes during each hour of sleep or has hypersomnolence during waking hours associated with any apnea activity (greater than five episodes per hour). The frequency and type of apnea activity can only be accurately assessed following a polysomnographic sleep analysis.

Objective measures of sleepiness during waking hours now exist. Multiple sleep latency testing (MSLT) measures the frequency with which subjects enter sleep during the normal awake hours: Normal subjects do not fall asleep within the first 15 minutes of supine inactivity in a quiet darkened room when tested during their usual waking hours. Individuals with hypersomnolence repetitively enter sleep under similar circumstances in less than 10 minutes. With more severe sleep deprivation due to increasingly frequent apneic episodes, subjects usually demonstrate shorter sleep latencies-some may fall asleep within 5 minutes during MSLT. Successful therapy usually eliminates or decreases apneas and associated sleep disruption, which decreases sleepiness during waking hours. The decreased sleepiness can be measured both subjectively and objectively as improved MSLT.

This task force recommends that individuals with known OSA be allowed to obtain certification to drive only after successful therapy has resulted in multiple sleep latency testing values within the normal range or repeat sleep study during treatment that shows resolution of apneas. Continuous successful therapy for 1 month usually results in major improvements in pathological sleepiness. Sleep apnea subjects obtaining medical qualification should agree, as a condition of continuing qualification, that their sleep apnea therapy will

continue in an uninterrupted fashion while they maintain the operator's certification. This task force recommends the additional requirement of yearly multiple sleep latency testing or repeat sleep study in individuals who have had the diagnosis of obstructive sleep apnea.

Future Areas for Research

According to general population figures, an estimated 100,000 to 150,000 commercial drivers in the United States may suffer from OSA. This figure may even be higher because of the risk factors associated with commercial truck drivers.

This task force recommends a major research effort aimed at evaluating the prevalence of sleep apnea among commercial drivers in North America. Untreated sleep apnea appears to be a major preventable cause of vehicular accidents. Further research will help to determine the impact of increases in apneic events on driving performance, of particular importance because many middle-aged men have some apneas during sleep. Presently, researchers do not know how many apneas per hour of sleep are needed before the condition measurably affects driving performance. Well-designed prospective studies will help determine the influence of sleep apnea therapy on driving performance and accident rates.

DEEP VEIN THROMBOSIS AND PULMONARY THROMBOEMBOLISM

Definition, Description, and Diagnosis

Pulmonary embolism, blood clots to the lungs, originates from thrombi in the deep veins of the leg in 90 percent or more of patients. Most clinically important pulmonary emboli emanate from thrombi in either the popliteal or more proximal deep veins of the leg (proximal-vein thrombosis). Pulmonary embolism occurs in 50 percent of patients with objectively documented proximal vein thrombosis, and many of these emboli are asymptomatic. Usually only part of the thrombus embolizes, and 50 to 70 percent of patients with angiographically documented pulmonary embolism have detectable deep vein thrombosis of the legs at the time of presentation. The major manifestations of pulmonary embolism include shortness of breath, chest pain, arterial hypoxemia, cardiovascular insufficiency, and sudden death. On physical examination, physicians may find tachypnea, tachycardia, and hypotension. Lower extremity examination may reveal edema, erythema, or pain on palpation. However, approximately one-half of subjects with deep vein thrombosis by objective tests will have a normal physical exam. Chest examination may reveal a pleural rub or the findings of pulmonary hypertension (for example, loud second pulmonic sound, murmur of tricuspid insufficiency).

Although venous thrombosis of the lower extremities and pulmonary thromboembolism most commonly complicate the course of sick, hospitalized patients, they may also affect ambulatory and otherwise apparently healthy individuals. Commercial drivers who drive for long periods of time with lower extremities immobilized risk developing deep vein thrombosis and subsequent pulmonary thromboembolism. Venous stasis brought on by lower exaemity immobilization most commonly predisposes commercial drivers to the development of lower extremity venous thrombosis. Additional risk factors include obesity, varicose veins, recent

myocardial infarction, heart failure, malignant disease, history of previous venous thromboembolism, and age over 40.

Lower extremity. venography, doppler, radionuclide scan, or plethysmography (IPG) studies confirm the diagnosis of deep vein thrombosis. Pulmonary thromboembolism diagnosis is made by a consistent clinical picture and a ventilation/perfusion lung scan, with abnormalities indicating a high risk of pulmonary thromboembolism or, when indicated, pulmonary angiography with consistent abnormalities.

Potential Risks of Deep Vein Thrombosis and Pulmonary Embolism

The major risk of deep vein thrombosis is pulmonary thromboembolism. The clinical significance of pulmonary embolism depends on both the size of the embolus and the cardio-respiratory reserve of the patient. Patients may develop severe arterial hypoxemia and/or hypotension and may die if embolic material obstructs a large portion of the pulmonary vasculature.

Risk of Treatment

Treatment with anticoagulants (heparin followed by warfarin) usually prevents further pulmonary embolization, bringing gradual resolution of a clot in the lower extremities and lungs. The greatest risk of recurrent deep vein thrombosis and pulmonary thromboembolism occurs in the first week or two after the initial event(s), and the risk may continue for several months. Accordingly, most patients with documented pulmonary thromboemboli take oral or subcutaneous anticoagulants for 6 weeks to 6 months to prevent recurrence. Bleeding is the major complication of anticoagulation with heparin and warfarin. To minimize bleeding complications, the partial thromboplastin time (PTT) on heparin should be approximately 1.5 times control and the prothrombin time (PT) on warfarin approximately 1.2 to 1.5 times control.

Recommendations

Because of the sedentary nature of their work, commercial drivers risk developing recurrent deep vein thrombosis and pulmonary thromboembolism. Accordingly, such individuals should be alert to leg swelling, erythema, or pain and should seek evaluation by a physician if any of these symptoms occur. Moreover, prior to returning to driving, following an initial episode of deep vein thrombosis and/or pulmonary thromboembolism, commercial drivers should: (I) have received recommended anticoagulant therapy for at least a month; (2) be examined by a physician for evidence of residual lower extremity thrombosis, using testing measures beyond physical examination alone (for example, Doppler studies, plethysmogmphy, radionuclide scan, or venography); and (3) be evaluated for residual pulmonary impairment (for example, arterial hypoxemia [resting PaO_2 less than 65 mm Hg] as detailed in the physiological guidelines in the introduction). If the driver has not been receiving a recommended course of anticoagulant therapy, if the lower extremity venous examination remains abnormal, or if evidence of residual pulmonary impairment is present, the driver should not return to commercial driving.

Occasionally, commercial drivers with previously documented deep vein thrombosis or pulmonary thromboembolism will complete the recommended course of anticoagulation and subsequently develop recurrent deep vein thrombosis or pulmonary thromboembolism. These. individuals should not return to work as a commercial driver unless they meet both the above guidelines and are receiving appropriately monitored chronic anticoagulant therapy. Anticoagulant therapy should be monitored every 2 weeks with appropriate blood tests (for example, prothrombin time for warfarin therapy).

Once a commercial driver with a history of deep vein thrombosis and/or pulmonary embolism returns to work, he or she should be cautioned to avoid long periods of sitting while driving and should be encouraged to stop driving and walk at regular intervals (for example, every hour).

Special Considerations

Currently, drivers receiving anticoagulant therapy are not medically qualified for driving commercial vehicles. The above recommendations, if accepted, would change that policy. Recent evidence shows that lower levels of warfarin therapy (maintaining prothrombin times from 1.2 to 1.5 times control) than previously recommended will effectively prevent deep venous thrombosis and pulmonary thromboembolism, and, at the same time, lower the risk of bleeding complications. Therefore, this task force recommends that individuals on appropriately monitored and controlled anticoagulant therapy be allowed to work as drivers of commercial vehicles. Anticoagulant therapy should be monitored every 2 weeks by appropriate blood tests (prothrombin time for warfarin therapy). Drivers who cannot arrange for biweekly monitoring should not be medically qualified for driving commercial vehicles.

PULMONARY HYPERTENSION/COR PULMONALE

Definition, Description, and Diagnosis

Cor pulmonale, or pulmonary heart disease, refers to enlargement of the right ventricle (through hypertrophy and/or dilation) secondary to disorders affecting lung structure or function. Cor pulmonale is caused by pulmonary hypertension induced by three conditions: (1) intrinsic pulmonary diseases, such as, COPD, recurrent pulmonary thromboembolism, ILDs or so-called idiopathic (primary) pulmonary hypertension; (2) diseases associated with inadequate function of the chest bellows, such as kyphoscoliosis; or (3) insufficient ventilatory drive with or without upper airway obstruction. In North America, by far the most common pulmonary cause of cor pulmonale is hypoxic pulmonary vasoconstriction in subjects with COPD (chronic bronchitis and emphysema). Although it is not considered in the definition of cor pulmonale, the most common cause of right ventricular dilation or enlargement is pulmonary hypertension secondary to left heart disease (for example, ischemic heart disease or mitral valve disease). In patients with moderate to severe elevations in pulmonary artery pressures and associated cor pulmonale, symptoms are nonspecific but classically include dyspnea and easy fatigability. Also, chest pain, dizziness and syncope may occur. As the right ventricle dilates to meet mechanical work demands, symptoms related to fluid retention and weight gain may emerge. On physical examination, the neck veins may

be distended, the liver enlarged, and lower extremities edematous. Cardiac examination may reveal a loud pulmonic second sound (P2), a right-sided gallop sound (S3), and a murmur of tricuspid insufficiency. Evidence of right ventricular enlargement on the scalar electrocardiogram (EKG) and an enlarged right descending pulmonary artery on the chest x ray may appear. Catheterization of the right heart and the pulmonary artery confirms the diagnosis of pulmonary hypertension. However, in the presence of the symptoms mentioned above, physical examination findings, and EKG and chest x-ray findings, right heart catheterization may not be necessary to confirm the diagnosis of pulmonary hypertension and cor pulmonale.

Potential Risks of Pulmonary Hypertension/COR Pulmonale to Driving Safety

The major risks to individuals with pulmonary hypertension and cor pulmonale are dizziness, hypotension, and syncope. Patients, particularly those with underlying chronic bronchitis and emphysema, risk arterial hypoxemia and hypercapnia.

Risks of Therapy for Pulmonary Hypertension and Cor Pulmonale

Physicians commonly use supplemental oxygen, diuretics, and vasodilators to treat pulmonary hypertension and cor pulmonale. Only vasodilators present serious risks, including hypotension, dizziness, and syncope, to driving safety.

Recommendations

Treated or untreated patients with pulmonary hypertension/cor pulmonale who have dyspnea at rest, dizziness, or hypotension should not be medically qualified to drive a commercial vehicle. Also, patients who fail to meet minimum arterial blood gas criteria (PaO, more than 65 mm Hg) are not qualified to drive a commercial vehicle.

PRIMARY LUNG CANCER

Definition, Description, and Diagnosis

Presently, an epidemic of lung cancer has spread across the U.S. and throughout the rest of the world. Lung cancer is the most common cancer in men worldwide and the leading cause of male cancer mortality in more than 35 countries. In fact, preliminary data from the study of truck drivers indicates an excess of lung cancer among workers in the trucking industry compared to the U.S. population as a whole.

Overwhelming evidence indicates that the use of tobacco has caused the epidemic of lung cancer. Eighty-five percent of all bronchogenic carcinoma is attributed to the inhalation of tobacco smoke; however, only 10 percent of heavy smokers actually die from lung cancer. The reasons for the susceptibility of 10 percent of the smoking population are unclear but co-factors may be important in the development of primary lung cancer. These factors include the exposure to co-carcinogens (for example, asbestos), a low dietary intake of foods

containing vitamin A, a familial tendency presumably inherited, and the presence of underlying COPD and/or immunoincompetence.

Bronchogenic carcinoma, the most common kid of primary lung cancer, has five forms: squamous cell carcinoma, adenocarcinoma, small cell carcinoma, large cell carcinoma, and adenosquamous cell carcinoma. There is a subtype of adenocarcinoma called alveolar cell carcinoma or terminal bronchoalveolar cell carcinoma. Other less common primary tumors of the lung include tracheal tumors, carcinoid tumors, and sarcomas. Except for small cell carcinoma, all of these are potentially surgically curable.

Lung cancer is usually suspected when a patient exhibits a new onset of cough, hemoptysis, or pleuritic chest pain or shows constitutional symptoms, such as weight loss or anorexia, or has worsening of underlying pulmonary symptoms such as dyspnea. A bronchoscopy, needle aspiration, or thoracotomy will give a definitive diagnosis.

Potential Risks of Lung Cancer for Driving Safety

Because patients with lung cancer also commonly experience cough, dyspnea, hypoxemia, and underlying COPD, this condition can have a major impact on the performance of truck drivers. In addition, patients can develop constitutional symptoms such as weight loss,. anorexia, and severe weakness.

Risk of Therapy

The therapy for primary lung cancer includes surgical resection of the tumor, radiation therapy, and/or chemotherapy. The most effective method to cure primary lung cancer is to surgically remove it. The procedure usually involves removing some normal lung, which may impair performance and physiologic function. Radiotherapy and systemic chemotherapy do not usually cure primary lung cancer, but do reduce its intensity. Patients who receive these forms of treatment often experience nausea, vomiting, malaise, weakness, and anorexia.

Recommendations

If a patient has newly diagnosed primary lung cancer or has undergone treatment for primary lung cancer (pulmonary resection, radiation, and/or chemotherapy) and does not have severe cough, dyspnea, wasting, metastatic brain disease, hypoxemia (that is, Pa4 levels less than 65 mm Hg) and/or significant physiologic dysfunction (as outlined in the physiological guidelines in the introduction), he or she should be qualified to drive commercial vehicles. In addition, the physician should evaluate the impact that such a diagnosis has on the patient's emotional stability. Followup examination by a physician is recommended every 3 months for 2 years and then yearly for a total of 5 years.

A patient receiving radiation and/or chemotherapy for treatment who is free of symptoms such as severe cough, dyspnea, nausea, vomiting, and weakness and who meets the guidelines for arterial blood gases and physiologic function may continue to drive. These patients, however, should be carefully monitored every month during such therapy.

SECONDARYLUNGCANCER

Definition, Description, and Diagnosis

Cancer, from other organs, commonly spreads to the lungs and impairs its function. Most patients with metastatic cancer in the lung are debilitated, are often dyspneic, and have poor physiologic function. Exceptions might include patients with metastatic germ cell carcinoma, lymphoma, and metastatic thyroid carcinoma. These lesions potentially may be curable or may remain stable for a long period of time. Sometimes, depending on clinical circumstances and the findings on chest x ray, the diagnosis of metastatic disease to the lungs may be made easily. At other times, it may be more difficult to diagnose and may require procurement of lung tissue.

Potential Risk of Secondary Lung Cancer to Driving Safety

Patients with primary lung cancer are often quite symptomatic with cough, dyspnea, weight loss, and general body debilitation.

Risk of Therapy

The therapy given for metastatic carcinoma to the lungs is most often systemic chemotherapy. Less frequently, surgical resection and/or radiation therapy are used. The risks of therapy listed under primary lung cancer apply here as well.

Recommendations

Refer to recommendations for primary lung cancer.

PULMONARY DISEASE AND AIDS

Definition, Description, and Diagnosis

In addition to lung cancer, another epidemic has gripped the world: the acquired immunodeficiency syndrome (AIDS). A retrovirus known as the human immunodeficiency virus-l (HIV-l) causes this severe illness and has infected many more people than those who manifest the syndrome. Although the great majority of people infected with HIV-1 will eventually develop AIDS, the disease may have a latency period of up to ten years or more. Asymptomatic HIV-l infected persons should not be disqualified from driving commercial vehicles.

More than 90 percent of patients with AIDS will encounter a pulmonary disorder during their lifetime. These include infectious, curable but recurrent disorders; infectious incurable but suppressible disorders; and noninfectious, curable and incurable disorders. The diagnosis of the different infectious diseases is made by demonstrating the organism in the sputum or a bronchoscopy specimen; lung tissue is usually necessary to diagnose the noninfectious disorders associated with AIDS.

Potential Risks to Driving Safety

Pulmonary disease associated with AIDS is often characterized by high fever, cough, dyspnea, and hypoxemia. In addition, Pneumocystis carinii pneumonia, the most common pulmonary disease associated with AIDS, is characterized by exertional hypoxemia.

Risk of Therapy

Infectious disorders are treated with antibacterial agents-some of which have side effects that may pose a risk to the safety of driving commercial vehicles. For example, the treatment of Pneumocystis carinii pneumonia can cause severe nausea, vomiting, and weakness. Amphotericin B, which is used to meat fungal disorders, can cause severe rigors and high fevers. Treatment of cancer in the lung associated with AIDS (for example, lymphoma, Kaposi's sarcoma) has the .same risks as outlined under primary lung cancer.

Recommendations

Infectious Disorders

Curable But ***Recurrent.*** The most common infectious disease in this category is Pneumocystis carinii pneumonia. This pneumonia affects up to 85 percent of all patients with AIDS and can present as an acute or subacute pulmonary illness manifested by fever and cough, often accompanied by dyspnea and hypoxemia. Pheumocystis carinii pneumonia is uniformly fatal without treatment. Therapy consists of either TMP-SMX or pentamidine. In the HIV-infected patient, these drugs often cause significant side effects such as nausea, vomiting, anorexia, and weakness. Driving commercial vehicles should not be allowed until full treatment is given,' chest x ray has shown clearing of the pneumonic process, and the patient is free of cough, dyspnea, and hypoxemia.

Another disorder in this category, acute bacterial pneumonia, appears the same in both HIV-infected patients and noninfected patients. Although curable with antibiotic therapy, the disorder commonly recurs in HIV-infected patients. When it occurs or recurs the same guidelines should be followed as outlined for acute pneumonia in non-HIV infected patients.

TB is a common but curable disorder in HIV-infected patients. If adequately treated, TB usually does not recur but long-term followup is required TB is the only infectious disorder associated with AIDS that can be transmitted to others by the respiratory route. Patients should be on treatment and considered noncontagious before returning to driving commercial vehicles. The same guidelines as outlined for patients with active TB without HIV infection should be followed for HIV-infected patients. HIV-infected patients with positive tuberculin skin tests but without active TB infection should be placed on INH prophylaxis. This treatment should not impair an individual's ability to drive a commercial vehicle.

Incurable Suppressible Disorders. Diseases in this category include most of the fungal infections such as histoplasmosis, coccidiomycosis, and cryptococcosis. These disorders ate

never cured in patients with AIDS but suppressed by continuous medication. These patients should not be medically qualified to drive commercial vehicles unless their infection is controlled and they arc free of dyspnea, severe cough, weakness, and persistent fevers. In addition, their pulmonary function and arterial blood gases should meet the recommended physiological guidelines in the introduction.

incurable. Nontuberculous mycobacterial diseases, especially Mycobacterium avium intracellularse and cytomegalovirus pneumonitis, fall into this category. Usually these patients ate extremely debilitated with end-stage HIV disease. individuals should not be considered candidates for driving commercial vehicles if they have persistent fever, a wasting illness, cough, dyspnea, significant physiologic dysfunction, or hypoxemia (as outlined by the physiological guidelines in the introduction).

Noninfectious Disorders

Curable. The only disorder of pulmonary origin associated with HIV-l disease that is of a noninfectious nature and potentially curable is a disorder characterized as nonspecific interstitial pneumonitis. This is an ill-defined disease, but usually characterized by cough, dyspnea, hypoxemia, abnormal chest x ray, and abnormal pulmonary function testing including a low diffusing capacity with or without desaturation of oxygen with exercise. The etiology of this disorder is unclear; usually, however, patients have a benign course and resolve spontaneously with improvement in pulmonary symptomatology, pulmonary function testing, and oxygenation. If a patient is diagnosed with this disorder, he or she should be considered a candidate for driving commercial vehicles' if symptoms subside and pulmonary function tests including oxygenation meet the proposed physiological guidelines in the introduction. A physician who is knowledgeable in pulmonary diseases associated with HIV-1 infection should examine these individuals every 3 months.

Incurable. These disorders include metastatic cancer of the lung (for example, Kaposi's sarcoma and lymphoma) and lymphoid interstitial pneumonitis. These individuals usually are symptomatic and have a downhill course. The same recommendations should be followed as outlined for primary lung cancer.

PULMONARY TRANSPLANTATION

Definition, Description, and Diagnosis

The term pulmonary transplantation currently describes a variety of procedures that involve the transfer of a single lung, a pair of lungs, or combination of the heart and lung. The indications for lung or heart-lung transplantation are simply end-stage pulmonary or cardiopulmonary disease, respectively. However, selection criteria are in a state of flux. At present, each center employs its own criteria. Approximately 150 patients undergo pulmonary nansplantation each year in the U.S. and Canada.

Although a form of treatment, pulmonary transplantation requires its own specific treatment program. The most important aspect of the program is the prevention and therapy

of organ rejection. Maintenance drugs usually include Cyclosporin A, azathioptine, and prednisone-each of which has its own set of adverse reactions. Presently, however, most therapy uses multiple drug immunosuppressive therapy. Together, these drugs increase the risk of infection in all recipients, and the lung allograft seems uniquely susceptible to bacterial, viral, protozoal, and fungal infection. New programs of prophylaxis have reduced the incidence of infection, but infection still is the leading cause of death in pulmonary transplant recipients. Because at present no noninvasive tests exist that reliably indicate early organ rejection, the recipients must be monitored periodically with transbronchoscopic lung biopsy. Rejection occurring in the early postoperative period usually responds well to additional immunosuppressive therapy. Rejection occurring later is characterized histologically by lymphocytic bronchiolitis, which usually produces obliteration of small airways. If not responsive to treatment, this obliterative bronchiolitis results in severe combined obstructive and restrictive lung disease. Death usually occurs from respiratory. insufficiency and overwhelming bacterial pneumonia.

Potential Risks of the Disease for Driving Safety

Healthy lung recipients usually achieve normal lung function and a normal functional physical status within 3 to 6 months after operation. By this time, they usually can perform most physical activities. Because of cardiac denervation, however, heart-lung transplant recipients cannot achieve the expected heart-rate response to exercise, which usually limits their maximum oxygen consumption. This limitation usually impairs their ability to perform heavy exertion for sustained periods. Management of these patients requires a skilled team of physicians with knowledge of the particular complications encountered and their specific treatments. Presently, the number of such teams across the North American continent is small. Thus, if a driver who has undergone pulmonary transplantation develops a serious complication while on the road, appropriate treatment would likely be unavailable unless the individual was near a transplant center. The present regimens of immunosuppression require daily ingestion of antirejection drugs. Missing even 1 or 2 days may result in rejection. In addition, the toxicity of these agents must be monitored closely. This requires frequent blood counts, serum chemisuies, and drug levels. These services may not be available to the operator on the road.

Risk of Therapy

The primary risk of therapy is life-threatening infection that may develop at any time.

Recommendations

For the recipient of a lung or heart-lung transplant to be medically qualified for operation of a commercial vehicle, this individual must meet the pulmonary functional requirements as determined by the physiological guidelines in the introduction. Because of the practical aspects involved in maintaining adequate medical care of these individuals, this task force recommends that their driving be restricted to a geographic area in which access to that medical care is available within a few hours.

APPENDIX A ▪ PARTICIPANTS

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APPENDIX B - AGENDA

PULMONARY/RESPIRATORY DISORDERS AND COMMERCIAL DRIVERS EXPERT PANEL INTERFACE CONFERENCE

September 13 and 14, 1990

THURSDAY
SEPTEMBER 13, 1990

8:00 a.m. - 8:30 a.m. Registration/Coffee Reception

8:30 a.m. - 10:15 p.m. Plenary Session

- Inuoduction: Eliane Viner - Medical Driver Qualification Specialist, Office of Motor Carrier Standards
- Welcoming Remarks: James E. Scapellato - Director, Office of Motor Carrier Standards
- Film Presentation: "Fit for the Road"
- Question and Answer Period
- Introduction of the Task Force' Chairpersons and the Canadian Representative
- Introduction of the Medical Community by the Chairperson

10:15 a.m. - 10:30 a.m. BREAK

10:30 a.m. - 12:30 p.m. Resume Plenary Session

- Introduction of the Motor Carrier Representatives by the Chairperson
- Presentations by Individual Task Forces of the Overviews of their Work

12:30 p.m. - 1:30 p.m. LUNCH

1:30 p.m. - 3:15 p.m. Task Force Sessions

- Task Force Chairperson Remarks
- Presentation of Issues
- Discussion
- Revision of Task Force Papers

APPENDIX B - AGENDA

PULMONARY/RESPIRATORY DISORDERS AND COMMERCIAL DRIVERS EXPERT PANEL INTERFACE CONFERENCE
(continued)

THURSDAY (Continued)

3:15 p.m. - 3:30 p.m.	BREAK
3:30 p.m. - 6:00 p.m.	Resume Task Force Sessions
Evening	Prepare Consensus Report

- Meeting between recorders (one from Prospect Associates and one from each task force) and Task Force Chairman to refine the draft summary paper, or the task forces can continue to meet, if desired, into the evening. Copies of the work-to-date will be available at 8:00 a.m. on the second day for review before the task force sessions resume.

FRIDAY
SEPTEMBER 14, 1990

8:00 a.m. - 8:30 a.m.	Coffee Reception
8:30 a.m. - 10:00 a.m.	Task Force Sessions

- Discuss final draft of consensus papers within each task force - revisions should be noted.

10:00 a.m. - 10:30 a.m.	BREAK
10:30 a.m. - 12:OO noon	Plenary Session (Executive Summary)

- Presentations by Task Force Chairmen
- Discussion

12:00 noon	Adjourn
12:00 noon - 1:00 p.m.	LUNCH
1:00 p.m. - 3:00 p.m.	Steering Committee Meeting