ACOEM Commercial Driver Medical Examiner Training Program

Module 4: Respiratory - Pre-read

Respiratory — 49 CFR 391.41(b)(5)

Federal Motor Carrier Safety Regulation (FMCSR)
"A person is physically qualified to drive a commercial motor vehicle if that person —
Has no established medical history or clinical diagnosis of a respiratory dysfunction likely to interfere with his/her ability to control and drive a commercial motor vehicle safely."

Relevance to Driving
The commercial driver spends more time driving than the average individual. Driving is a repetitive and monotonous activity that demands the driver be alert at all times. Symptoms of respiratory dysfunction or disease can be debilitating and can interfere with the ability to remain attentive to driving conditions and to perform heavy exertion. Even the slightest impairment in respiratory function under emergency conditions (when greater oxygen supply may be necessary for performance) can be detrimental to safe driving.

There are many primary and secondary respiratory conditions that interfere with oxygen exchange and may result in gradual or sudden incapacitation, for example:

- Asthma.
- Carcinoma.
- Chronic bronchitis.
- Emphysema.
- Obstructive sleep apnea.
- Tuberculosis.

In addition, medications used to treat respiratory conditions, both prescription and those available without a prescription, may cause cognitive difficulties, compound the risk for excessive daytime sleepiness (EDS), or cause other forms of incapacitation.

Health History and Physical Examination

The general purpose of the history and physical examination is to detect the presence of physical, mental, or organic conditions of such character and extent as to affect the ability of the driver to operate a commercial motor vehicle (CMV) safely. This examination is for public safety determination and is considered by the Federal Motor Carrier Safety Administration (FMCSA) to be a “medical fitness for duty” examination.

As the medical examiner, your fundamental obligation during the respiratory assessment is to establish whether a driver has a respiratory disease or disorder that increases the risk for sudden death or incapacitation, thus endangering public safety.

The examination is based on information provided by the driver (history), objective data (physical examination), and additional testing requested by the medical examiner. Your assessment should reflect physical, psychological, and environmental factors.

Medical certification depends on a comprehensive medical assessment of overall health and informed medical judgment about the impact of single or multiple conditions on the whole person.
During the physical examination, you should ask the same questions as you would for any individual who is being assessed for respiratory diseases or disorders. The FMCSA Medical Examination Report form includes health history questions and physical examination checklists. Additional questions about symptoms of respiratory disease should be asked to supplement information requested on the form.

You must review and discuss with the driver any "yes" answers
Does the driver have:
- Shortness of breath?
- Lung disease?
- Emphysema?
- Asthma?
- Chronic bronchitis?
- Sleep disorder?
- Pauses in breathing while asleep?
- Daytime sleepiness?
- Loud snoring?

Questions that you may ask include
Does the driver:
- Smoke? If yes, how much and for how long?
- Feel short of breath while driving?
- Cough frequently? If yes, is the cough productive of sputum?
- Experience tightness of the chest while resting or exercising?
- Wheeze during the day or night?
- Use respiratory agents?
- Use oxygen therapy?
- Self-report sleepiness that may indicate increased risk for EDS?

You must evaluate if the driver has:
- Impaired respiratory function?
- Cyanosis?
- Abnormal:
  - Chest wall expansion?
  - Respiratory rate?
  - Breath sounds, including wheezes or alveolar rales?
  - Findings that may require further testing such as pulmonary tests and/or X-ray of chest?

You may request a detailed pulmonary function evaluation or consultation with a pulmonologist when the physical examination reveals:
- Clubbing of the fingers.
- Cyanosis.
- Prolonged expiration.
- Tachypnea at rest.
- Pulmonary wheezes and rhonchi, pulmonary rales.
- Absent or decreased breath sounds.
- Pleural friction rub.
- Unequal inflation-deflation contours of the right and left thorax.
- Significant kyphosis or scoliosis of the thoracic spine.
- Use of accessory muscles of ventilation at rest.
NOTE: When requesting additional evaluation from a specialist, the specialist must understand the role and function of a driver; therefore, it is helpful if you include a copy of the description of the driver role found in the Medical Examination Report form and a copy of the applicable medical standard and guidelines with the request.

You must document discussion with the driver about
- Any affirmative respiratory history, including if available:
  - Onset date, diagnosis.
  - Medication(s), dose, and frequency.
  - Any current limitation(s).
- Potential negative effects of medication use, including over-the-counter medications, while driving.
- Any abnormal finding(s), noting:
  - Effect on driver ability to operate a CMV safely.
  - Necessary steps to correct the condition as soon as possible, particularly if the untreated condition could result in more serious illness that might affect driving.
- Any additional respiratory tests and evaluation.

Medical fitness for duty includes the ability to perform strenuous labor. Overall requirements for commercial drivers as well as the specific requirements in the job description of the driver should be deciding factors in the certification process.

Respiratory Topics

Allergies and Asthma-related Diseases

Allergic Rhinitis

Allergic rhinitis, which involves inflammation of the nasal portion of the upper respiratory tract, should rarely render the driver medically unqualified for commercial driving. The symptoms should be treated with non-sedating antihistamines or with local steroid sprays that do not interfere with driving ability.

Allergy-related Life-threatening Conditions

These conditions encompass systemic anaphylaxis and acute upper airway obstruction induced by allergens, genetic deficiencies, or unknown mechanisms, including:
- Stinging insect allergy that may result in acute anaphylaxis following a sting. Preventive measures include carrying an epinephrine injection device in the truck cab and evaluating the driver for immunotherapy.
- Hereditary or acquired angioedema due to deficiency of a serum protein controlling complement function that may result in an acute, life-threatening airway obstruction or severe abdominal pain requiring urgent medical attention. Prevention and control can and should be accomplished with appropriate prophylactic medication.
- Acute recurrent episodes of idiopathic anaphylaxis or angioedema that may occur unpredictably in some individuals and lead to sudden onset of severe dyspnea, visual disturbance, loss of consciousness, or collapse. Similar episodes occur due to known allergens, including medications, which ordinarily can be avoided

Asthma
Asthma is a common disease. Individuals with asthma generally exhibit reversible airway obstruction that can be treated effectively with pharmaceutical agents such as bronchodilators and corticosteroids; however, asthma ranges in severity from essentially asymptomatic to potentially fatal. In some drivers, complications of asthma and/or side effects of therapy may interfere with safe driving. You are responsible on a case-by-case basis for ensuring that the driver is medically fit for duty.

**Hypersensitivity Pneumonitis**

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. The condition may not prevent an individual from qualifying for commercial driving; however, the driver with this condition requires medical care to alleviate symptoms of dyspnea, cough, and fever.

Also, the driver should avoid exposure to the causative agent (e.g., transporting the agent) because severe respiratory impairment could occur with repeated exposure.

**Chronic Obstructive Pulmonary Disease**

Chronic obstructive pulmonary disease (COPD) is not a single disease, but a group of medical conditions characterized by chronic reduction of maximal expiratory flow most often caused by:

- Chronic bronchitis.
- Emphysema.

Most drivers with COPD have a combination of chronic bronchitis and emphysema. COPD has an insidious onset. The driver may have substantial reduction in lung function prior to developing dyspnea on exertion. The cardinal symptoms are:

- Chronic cough.
- Sputum production.
- Dyspnea on exertion.

As the disease progresses, these symptoms can become incapacitating. In the majority of cases, cigarette smoking is a primary etiologic factor.

**Chronic Sleep Disorders**

Approximately 70% of the cases of excessive daytime sleepiness (EDS) are caused by narcolepsy and obstructive sleep apnea (OSA).

Treatments for OSA include surgery and continuous positive airway pressure (CPAP). The successfully treated driver may be considered for certification following the recommended waiting period. You should not certify the driver with suspected or untreated sleep apnea until etiology is confirmed and treatment has been shown to be stable, safe, and adequate/effective.

EDS may also be a symptom of another underlying condition, such as:

- Neurological disease.
- Depression.
- Alcohol or other drug use.
• Prescription and/or over-the-counter medication use.

**Infectious Respiratory Diseases**

Although the conditions in this category are of varying etiology and severity, if properly treated most have no long-term implications for driving ability; however, during acute infection, the symptoms are debilitating and can interfere with the ability to remain attentive to driving conditions and to perform heavy exertion. In addition, medications used to treat respiratory tract congestion can cause drowsiness and loss of attention. The conditions include the common cold, influenza, acute bronchitis, pneumonia, and tuberculosis.

**Acute Infectious Diseases**

For illnesses such as the common cold, influenza, and acute bronchitis, the driver should:

• Be relieved from duty until proper treatment for the illness has been completed.
• Abstain from driving a vehicle for at least 12 hours after taking sedating medications.
• Avoid operating a vehicle during the time that the disease is contagious.

Many of these conditions are of short duration and proper treatment for the illness must be completed for return-to-work.

**Atypical Tuberculosis**

Atypical tuberculosis (TB) covers the same broad spectrum of symptoms and disability as 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 issue to be determined is the amount of disease the patient has and the extent of the symptoms. Many cases of Mycobacteria cause very few symptoms. The X-ray findings are often migratory and are associated with cough, mild hemoptysis, and sputum production.

Atypical TB is not generally treated with medication; however, if the driver is using medication, you should assess for side effects that interfere with driving ability.

The certification issues include the amount of disease the driver has experienced and the severity of the symptoms. The potential risk is that if the disease is progressive, respiratory insufficiency may develop.

**Pulmonary Tuberculosis**

Although modern therapy has been extremely successful in controlling this disease, pulmonary tuberculosis (TB) persists in some individuals while on therapy or in individuals who are noncompliant with therapy. Advanced TB may cause respiratory insufficiency; however, risk of recurrence after adequate therapy is low.

**Non-infectious Respiratory Diseases**

This category includes a number of diseases that cause significant long-term structural changes in the lungs and/or thorax and, therefore, interfere with the functioning of the lungs. Obvious difficulty breathing in a resting position is an indicator for additional pulmonary testing. Certification is determined by clinical evaluation.
Chest Wall Deformities
Acute or chronic chest wall deformities may affect the mechanics of breathing with an abnormal vital capacity as the predominant abnormality. Examples of these disorders include kyphosis, kyphoscoliosis, pectus excavatum, ankylosing spondylitis, massive obesity, and recent thoracic/upper abdominal surgery or injury.

The driver certified with a chest wall deformity should have airway function near normal.

No specific medication exists for treatment of this category. However, individuals may be particularly sensitive to the side effects of alcohol, antidepressants, and sleeping medications, even in small doses.

Cystic Fibrosis
Until recently, few individuals with cystic fibrosis (CF) lived into adulthood, but with modern therapy the number of survivors continues to increase. Treatment for CF may require almost continuous antibiotic therapy and daily respiratory therapy to mobilize abnormal secretions. Chronic debilitating illness may result in limited physical strength. Some individuals have a mild form of the disease that may not be diagnosed until early adulthood.

Individuals must be evaluated as to the extent of their disease and symptoms and ability to obtain therapy while working.

Interstitial Lung Disease
The interstitial lung diseases (ILDs) are a heterogeneous group of diseases classified together because of common clinical X-ray, physiologic, and pathologic features. Occupational and environmental exposures are common causes of ILDs.

A history of breathlessness while driving, walking short distances, climbing stairs, handling cargo or equipment, and entering or exiting the cab or cargo space should initiate a careful evaluation of pulmonary function for any disqualifying secondary conditions.

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.

Pneumothorax
Pneumothorax (air in the pleural space) may follow trauma to the chest or may occur spontaneously.

  Traumatic Pneumothorax - A medical history and physical examination will provide the details of the event but may not help to ascertain recovery. Complete recovery should be confirmed by chest X-rays.

  Spontaneous Pneumothorax - If spontaneous pneumothorax complicates an existing lung disease (e.g., emphysema), then the underlying lung disease will determine the chance of a recurrent pneumothorax and the certification outcome. 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.
Secondary Respiratory Conditions and Underlying Disorders

*Cor Pulmonale* - Cor pulmonale refers to enlargement of the right ventricle secondary to disorders affecting lung structure or function. In North America, the most common pulmonary cause of cor pulmonale is hypoxic pulmonary vasoconstriction in individuals with chronic obstructive pulmonary disease. The most common cause of right ventricular dilation or enlargement is pulmonary hypertension secondary to left heart disease.

The major risks are:

- Dizziness.
- Hypotension.
- Syncope.
- Common side effects of vasodilators that may interfere with driving.

*Pulmonary Hypertension*

Pulmonary hypertension can occur with or without cor pulmonale. Significant pulmonary hypertension is pulmonary artery pressure greater than 50% systemic systolic blood pressure from any cause.

An increased risk for incapacitation and sudden death is associated with:

- Primary pulmonary hypertension.
- Secondary pulmonary hypertension (e.g., *Eisenmenger’s syndrome*).

Respiratory Tests

*Sleep Disorder Tests*

Objective Tests for Sleep Disorders - When indicated, objective sleep tests may be required to determine the presence of a sleep disorder.

Objective tests for sleep disorders include:

- Polysomnography in a controlled sleep laboratory.
- Napping tests:
  - Maintenance of wakefulness test.
  - Multiple sleep latency test.

Definitions:

- Apnea – airflow ceases for more than 10 seconds.
- Hypopnea – airflow decreases for more than 10 seconds.

Severity (apnea-hypopnea index):
• Mild – 5+ episodes/hour.
• Moderate – 15+ episodes/hour.
• Severe – 30+ episodes/hour.

More than 30 episodes per hour of sleep is considered a diagnosis of obstructive sleep apnea.

Self-Reported Sleepiness Surveys - Simple sleepiness surveys may be useful for obtaining driver self-assessment of sleepiness status. Examples of sleepiness surveys include:

• Epworth sleepiness scale.
• Stanford sleepiness scale.
• Functional outcomes of sleep questionnaire.

NOTE: Self-reported sleepiness does NOT always correlate with objective testing (polysomnography). The driver may not perceive sleepiness as excessive or may be hesitant to disclose sleepiness.

Pulmonary Function Tests

Physiological impairment is potentially present in many lung disorders. Indicators for obtaining pulmonary function testing (PFT) include:

• History of any specific lung disease.
• Symptoms of shortness of breath, cough, chest tightness, or wheezing.
• Cigarette smoking in drivers 35 years of age or older.

Spirometry

You should obtain forced expiratory volume in the first second of expiration (FEV1), forced vital capacity (FVC), and FEV1/FVC ratio when any of the following indicators are present:

• History of any specific lung disease.
• Symptoms of shortness of breath, cough, chest tightness, or wheezing.
• Cigarette smoking in drivers 35 years of age or older.

No further testing is necessary if the lung function is normal and no other abnormality is suspected. Abnormal lung function should be further evaluated.

Screening pulse oximetry and/or arterial blood gas (ABG) analysis are indicated when:

• Condition causes airway obstruction and pulmonary function test results are:
  o FEV1 less than 65% of the predicted value.
  o FEV1/FVC ratio less than 65%.
• Restrictive impairment is present and FVC is less than 60%.

Screening Pulse Oximetry - If oximetry is less than 92% (oximetry equals 70), the driver must have an ABG analysis.

Arterial Blood Gas Analysis - Recommend not to certify the driver when ABG measurements reveal:

• Partial pressure of arterial oxygen (PaO2) less than:
- 65 millimeters of mercury (mm Hg) at altitudes below 5,000 feet.
- 60 mm Hg at altitudes above 5,000 feet.
- Partial pressure of arterial carbon dioxide (PaCO2) greater than 45 mm Hg at any altitude.