Medical Conditions

Guidance for the Medical Evaluation of Law Enforcement Officers

provided by ACOEM

Chronic Obstructive Pulmonary Disorders
RESPIRATORY/PULMONARY DISORDERS

Introduction
The well-educated, well-motivated law enforcement officer (LEO) with certain well managed pulmonary disorders may be able to safely and effectively perform essential job functions. For many pulmonary disorders the severity of the disease and compliance with the recommended management plan will determine ability to safely perform job duties rather than the specific diagnosis or management plan. This section addresses disorders of the lungs, bronchi, pleura and thoracic cage, including the diaphragm. Disorders of the oropharynx, larynx, and trachea are addressed in the Otorhinolaryngology (ENT) chapter (under development). Disordered nocturnal respiratory conditions, such as obstructive sleep apnea (OSA), are discussed in the LEO Sleep Disorders chapter. Disorders related to gas transfer beyond the pulmonary/blood interface are discussed in the LEO chapters on Cardiology and Hematology (under development).

Obstructive Lung Disease
Asthma and chronic obstructive pulmonary disease (COPD) both have acute and chronic aspects of airflow obstruction that may adversely affect safe performance of law enforcement job functions.

Asthma
See LEO chapter on Asthma.

Chronic Obstructive Pulmonary Disease (COPD)
The well-educated, well-motivated LEO with some degree of chronic obstructive pulmonary disease (COPD) may be able to safely and effectively perform essential law enforcement job functions. However, LEOs with COPD may be adversely affected in their ability to perform demanding aerobic activities depending either on the baseline status of their disease or the effect of exacerbations.

Diagnosis of COPD in LEOs is not the job of the police physician. However, understanding basic concepts both of the disease and the diagnostic criteria is important, particularly given the interplay between ability to perform physically demanding work, physiological conditioning and structural pulmonary disease. LEOs with a diagnosis of COPD should undergo evaluation for classification (see Appendix B) as part of any pre-placement, periodic, or fitness-for-duty evaluation. While questionnaire screening of at-risk populations (ever-smokers aged 40-79) has been shown effective in identifying undiagnosed cases that could benefit from treatment, routine spirometry screening of individuals without any symptoms or history of risk factors for COPD has not been shown to be cost-effective in general population studies.

Mild COPD
LEOs meeting the criteria for mild COPD (see GOLD assessment of airflow obstruction in Appendix B) should undergo a job task simulation testing consistent with their agency’s essential job functions (see Appendix C for discussion of job task simulation testing) without any immediate pre- or during-test use of a short-acting beta agonist (SABA). If LEOs have other contraindications to physical exertion, they should be evaluated by the criteria in the relevant section of these guides.

LEOs with mild COPD who **satisfactorily perform** the specified job task simulation testing evaluation should have **no restriction** from full duty for COPD.

LEOs with mild COPD who are **unable to satisfactorily perform** the specified job task simulation testing should be **restricted** from full duty and referred to their treating physician for re-evaluation and possible modification of current treatment regimen (see Appendix B regarding re-assessment).

If/when the LEO is cleared by his/her treating physician to undergo repeat job task simulation testing, that decision should be reviewed by the police physician. If the police physician agrees with the treating physician’s decision, the LEO should repeat the same job task simulation testing previously performed.

LEOs with mild COPD who **satisfactorily perform** the **repeat** job task simulation testing should have **no restriction** from full duty.
LEOs with mild COPD who are **unable to satisfactorily perform** the repeat job task simulation testing, should **remain restricted** from full duty and be **referred back** to their treating physician for further assessment regarding the diagnosis as well as the treatment plan (see Appendix B regarding reassessment).

This process may be repeated as per agency policy. However, in order to be cleared for full duty, the LEO with mild COPD should successfully complete job task simulation testing consistent with his/her agency’s essential job functions (see Appendix C).

LEOs with mild COPD who have satisfactorily completed the job task simulation testing and have **no restriction** from full duty should be monitored on a regular basis. A monitoring schedule should be established by the police physician to assess for progression of the disease and evaluation of exacerbations. Monitoring should be continued, at a minimum, on an annual basis per consensus of the ACOEM LEO Task Group.

**Moderate COPD**
LEOs meeting the criteria for moderate COPD (see classification scheme in Appendix B) with no history of job performance difficulties potentially due to COPD should be evaluated using a job task simulation testing consistent with their agency’s essential job functions (see Appendix C for discussion of job task simulation testing) without any immediate pre- or during-test use of a short-acting beta agonist (SABA). If LEOs have other contraindications to physical exertion, they should be evaluated by the criteria in the relevant section of these guides.

- LEOs with moderate COPD who **satisfactorily perform** the specified job task simulation testing should have **no restriction** from full duty for COPD.
- LEOs with moderate COPD who are **unable to satisfactorily perform** the specified job simulation task evaluation should be **restricted** from full duty pending re-assessment by their treating physician (see Appendix B regarding re-assessment).

If cleared by the treating physician to undergo repeat job task simulation testing, that decision should be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should repeat the same job simulation task evaluation previously performed. This process may be repeated as per agency policy. However, in order to be cleared for full duty, LEOs should successfully complete a job task simulation testing consistent with their agency’s essential job functions (see Appendix C).

LEOs with moderate COPD who have been re-evaluated, have satisfactorily completed the exercise challenge testing, and have **no restriction** from full duty should be monitored on a regular basis. A monitoring schedule should be established by the police physician to assess for progression of the disease and evaluation regarding exacerbations. Follow-up on, at minimum, a semi-annual basis should be continued, per consensus of the ACOEM LEO Task Group.

**Severe COPD**
LEOs meeting the criteria for severe COPD (see classification scheme in Appendix B) should be restricted from full duty and referred to their treating physician for re-assessment and modification of treatment.

If cleared by the treating physician to undergo job task simulation testing, that decision should be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should be evaluated using job task simulation testing (see Appendix C for discussion of job task simulation testing) without any immediate pre- or during-test use of a short-acting beta agonist (SABA). If the LEO has other contraindications to physical exertion, he/she should be evaluated by the criteria in the relevant section of these guides.

- LEOs who satisfactorily perform the job task simulation testing should have **no restriction** from full duty.
LEOs who are unable to satisfactorily perform the job task simulation testing, should remain restricted from full duty and be referred back to their treating physician for further assessment regarding the diagnosis as well as the treatment plan (see Appendix B regarding reassessment).

If the LEO is re-cleared by her/his treating physician to undergo job task simulation testing, that decision should again be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should repeat the same job task simulation testing previously performed. This process may be repeated as per agency policy. However, in order to be cleared for full duty, the LEO should successfully complete job task simulation testing consistent with his/her agency’s essential job functions (see Appendix C).

LEOs with severe COPD who have been re-evaluated, have satisfactorily completed the exercise challenge testing and have no restriction from full duty should be monitored on a regular basis. A monitoring schedule should be established by the police physician to assess for progression of the disease and evaluation regarding exacerbations. Follow-up on, at minimum, an every-three-month basis should be continued, per consensus of the ACOEM LEO Task Group.

**Very Severe COPD**
LEOs meeting the criteria for very severe COPD (see classification scheme in Appendix B) should be restricted from full duty and referred to their treating physician for re-assessment and modification of treatment; it is unlikely that persons with this degree of FEV\(_1\) loss would be able to safely and effectively perform LEO job functions.

If the LEO is cleared by her/his treating physician to undergo job task simulation testing, that decision should be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should be evaluated using job task simulation testing (see Appendix C for discussion of job task simulation testing) without any immediate pre- or during-test use of a short-acting beta agonist (SABA). If the LEO has other contraindications to physical exertion, he/she should be evaluated by the criteria in the relevant section of these guides.

- LEOs who satisfactorily perform the job task simulation testing should have no restriction from full duty.
- LEOs who are unable to satisfactorily perform the job task simulation testing, should remain restricted from full duty and be referred back to their treating physician for further assessment regarding the diagnosis as well as the treatment plan (see Appendix B regarding reassessment).

If re-cleared by their treating physician to undergo job task simulation testing, that decision should again be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should repeat the same job task simulation testing previously performed.

- LEOs who satisfactorily perform the repeat the repeat job task simulation testing should have no restriction from full duty.
- LEOs who are unable to satisfactorily perform the second repeat job task simulation testing, should remain restricted from full duty.

This process may be repeated as per agency policy. However, in order to be cleared for full duty, the LEO should successfully complete job task simulation testing consistent with his/her agency’s essential job functions (see Appendix C).

LEOs with very severe COPD who have been re-evaluated, have satisfactorily completed the job task simulation testing, and have no restriction from full duty should be monitored on a regular basis. A monitoring schedule should be established by the police physician to assess for progression of the disease and evaluation regarding exacerbations. Follow-up, at minimum, every 3 months should be continued, per consensus of the ACOEM LEO Task Group.

**LEOs with On-the-job Performance Issues Potentially Related to COPD**
LEOs with on-the-job performance issues potentially related to COPD should be restricted from full duty and referred to their treating physician for re-assessment and modification of any treatment.

If the LEO is cleared by the treating physician to undergo job task simulation testing, that decision should be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should be evaluated using job task simulation testing (see Appendix C for discussion of job task simulation testing) without any immediate pre- or during-test use of a short-acting beta agonist (SABA). If the LEO has other contraindications to physical exertion, he/she should be evaluated by the criteria in the relevant section of these guides.

- LEOs who satisfactorily perform the job task simulation testing should have no restriction from full duty for COPD, but may need further evaluation for other potential medical conditions related to the job performance issue cited.
- LEOs who are unable to satisfactorily perform the job task simulation testing, should remain restricted from full duty and be referred back to their treating physician for further assessment regarding the diagnosis as well as the treatment plan (see Appendix B regarding reassessment).

If the LEO is re-cleared by the treating physician to undergo job task simulation testing, that decision should again be reviewed by the police physician. If the police physician agrees with the treating physician’s decision to clear for testing, the LEO should repeat the same job task simulation testing previously performed.

This process may be repeated as per agency policy. However, in order to be cleared for full duty, the LEO should successfully complete job task simulation testing consistent with his/her agency’s essential job functions (see Appendix C).

LEOs who had on-the-job performance issues potentially related to COPD who have been re-evaluated, have satisfactorily completed the job task simulation testing, and have no other restriction from full duty should be monitored on a regular basis. A monitoring schedule should be established by the police physician to assess for progression of the disease and evaluation regarding exacerbations. It is the consensus of the ACOEM LEO Task Group that initial follow-up should be performed at 3 months, with further follow-up per categorizations used above of mild through very severe.

**COPD with Oxygen Dependence**

LEOs with COPD that has progressed to the point of use of supplemental oxygen throughout the day, should be restricted from full duty (see Appendix E). LEOs with COPD using supplemental oxygen only at night should be placed on modified duty and evaluated per the criteria under the section for “Very Severe COPD.”

**Asthma/COPD Syndrome**

LEOs with asthma/COPD syndrome should be assessed through a combination of the above evaluation recommendations and those for asthma (see Appendix F for discussion).
Appendix A – COPD and Law Enforcement Fitness-for-Duty Assessment

Chronic obstructive pulmonary (or lung) disease (COPD) is an entity with which most clinicians caring for adult patients have some familiarity. However, it may be helpful to provide a brief commentary here regarding some of the specifics and nuances regarding this disorder.

The definition and diagnostic criteria for COPD have evolved and continue to evolve as understanding of the pathophysiology, causation and epidemiology has advanced. Two international initiatives focus on promulgating guidance for improved understanding and care. The American Thoracic Society (ATS) and the European Respiratory Society (ERS) have jointly published guidelines for evaluation and management of COPD. The latest version was published in 2011 in conjunction with the American College of Physicians (ACP) and the American College of Chest Physicians (ACCP). The Global Initiative for Chronic Obstructive Lung Disease (GOLD), an initiative formed jointly by the U.S. National Heart Lung and Blood Institute and the World Health Organization, has also published guidelines for diagnosis and management with a major update in 2011 in which assessment of exacerbation history and effect of COPD on life quality were proposed as a basis for classification of severity. However, this model was found to be lacking and was, eventually combined with spirometric assessment to create a 2-dimensional classification system (see Appendix B). Yearly updates have added various modifications and updates in therapeutic and public health recommendations without changing the 2-dimensional classification scheme.

Both sets of guidelines refer to COPD as a disorder involving persistent respiratory symptoms and airflow restriction not reversible by short-acting bronchodilators. These two sets of guidelines have some differences in approach to both definition and recommendations. GOLD characterizes COPD as being represented by “persistent respiratory symptoms and airflow limitation that is...caused by a mixture of small airways disease (obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contributions of which vary from person to person.”

The ATS, et al. group characterize COPD as a “slowly progressive disease involving the airways or pulmonary parenchyma (or both) that results in airflow obstruction.” They have recommended diagnosing COPD in persons “with symptoms of COPD” who are confirmed to have airway restrictions determined by spirometry. Both groups use a spirometry-determined value of <0.7 for the FEV1/FVC ratio as the basis for their diagnostic criterion of airway obstruction.

The following discussion in this and following appendices relies largely on these two publications and the sections of Up to Date on COPD, consulted most recently in February 2019, which references heavily the two other documents. For this reason, unless cited otherwise, statements of fact are associated with these sources.

Both the symptoms and pathological changes often evolve at different rates. Chronic inflammation leads to structural changes with associated narrowing of small airways and destruction of lung parenchyma and subsequent loss of alveolar attachments to small airways and decrease in elastic recoil of the lung tissue. These changes result in collapse of small airways during expiration. There is also a decrease in the number of small airways. Muco-ciliary dysfunction is another characteristic.

GOLD does not use the terms “emphysema” and “chronic bronchitis” in its definition of COPD. It argues that emphysema, the destruction of alveoli, describes a pathological finding and not a clinical condition and represents only one of several structural abnormalities seen in COPD. It also argues that chronic bronchitis, when defined as cough and sputum production for at least 3 months in 2 consecutive years, is present in a minority of persons with COPD, noting that, when alternative definitions of chronic bronchitis are used or older populations with more smoke or occupational inhaling exposure are evaluated, a higher incidence of “chronic bronchitis” is found. Additionally, GOLD notes that chronic respiratory symptoms (see Table 1) may be associated with acute respiratory decompensations in either bronchospasm or infection and may precede quantifiable airflow obstruction.
Table 1: GOLD COPD Symptoms

- Chronic and progressive dyspnea
- Cough
- Sputum production
- Wheezing and chest tightness
- Fatigue
- Others – including weight loss, anorexia, syncope, rib fractures, ankle swelling, depression, anxiety more typically found in association with more advanced COPD

Although cigarette smoking is recognized as the most important environmental risk factor for developing COPD, other environmental exposures, genetics and possible other developmental factors are known to have a role in both presence and severity of COPD. Several epidemiological studies have demonstrated an elevated risk for persons with asthma to develop COPD, even after adjusting for smoking. Additionally, a syndrome of a combination of COPD and asthma has been discussed in the literature, mostly in terms of developing diagnostic schema to aid clinicians with treatment decisions.

GOLD invokes two pathways to COPD diagnosis, one symptom-based and one risk factor-based, though they may be combined. In both cases the diagnosis is finalized by the spirometry findings since symptoms such as cough, sputum production and dyspnea may precede spirometric changes by many years. GOLD recommends screening any individuals over 40 years old who have either symptoms or risk factors suggestive of COPD. Both guidelines recommend performing spirometry only on persons with symptoms or risk factors (see Appendix B for in-depth discussion of GOLD classification criteria).

COPD is also frequently associated with other disease processes such as cardiovascular disease, mostly as a result of the common association with cigarette smoking.

COPD Exacerbation Risk
Risk of exacerbations, usually characterized as bronchospasm with or without increase in mucus production, is, probably, the most important issue of concern in evaluation of LEOs with respect to risk of sudden impairment of being able to safely and effectively perform essential job functions. Both GOLD and the ATS/ERS guidelines report the risk of exacerbations to be based on an individual’s prior history of exacerbations in terms of both frequency and severity.

Exacerbations, whether in the form of bronchospasm, worsened bronchitis or a combination are often more insidious in onset than those of asthma since they are often not as closely linked to environmental factors. They may be associated with respiratory compromise that leads to decreased ability to perform physically strenuous activities. Exacerbations are classed as mild, moderate or severe (see Table 2):

Table 2: COPD Exacerbation Classification

<table>
<thead>
<tr>
<th>Mild</th>
<th>Requires only treatment with a short-acting bronchodilator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>Requires antibiotics and/or oral corticosteroids in addition to a short-acting bronchodilator</td>
</tr>
<tr>
<td>Severe</td>
<td>Associated with hospitalization or emergency department treatment</td>
</tr>
</tbody>
</table>

These categorizations are not precise since, for example, the decision to visit an emergency department varies with many patient-dependent factors that are not biological changes associated with the disease process. Additionally, as critical evaluations of the GOLD report have noted, COPD is extremely variable from person to person, making the clinical responses of physicians to individual patients also variable. This would manifest in this setting that the decision to prescribe antibiotics or oral corticosteroids is based on individualized physician/patient criteria, making generalization difficult.

Predictors of exacerbations have been studied in at least one large population cohort, revealing the most highly predictive factor is the history of prior exacerbations. Additionally, as severity of disease increased in the
GOLD scoring system, frequency of exacerbations also increased (Odds ratio 4.30 (95% confidence interval 3.58–5.17). As noted above, persons may have symptoms related to pulmonary dysfunction, including exacerbations, without meeting the critical diagnostic criterion of an FEV₁/FVC ratio of <0.7.

Additional factors associated with increased risk for exacerbations included >5% lung involvement with emphysema (as determined on chest CT), female sex, gastro-esophageal reflux or heartburn, wheezing or asthma and osteoporosis. Odds ratios ranged from 1.42 for female sex to 1.74 for osteoporosis. Review of data from a large cohort study identified a significant variability year-over-year in exacerbations, even in persons with more severe COPD (GOLD spirometric stages 3 and 4). This report emphasizes the necessity for individualized assessment of LEOs for risk of exacerbations.

**Respiratory Symptoms without Meeting COPD Diagnostic Criteria**

The GOLD 2017 report and other reports have emphasized that many persons, particularly cigarette smokers, are likely to have a variety of respiratory symptoms without meeting the spirometric criterion for a diagnosis of COPD. Evaluation of over 400 current and former smokers with symptoms based on use of the COPD Assessment Test (CAT™ – see discussion in Appendix B) and a FEV₁/FVC ratio >0.7 has demonstrated a significant increase in exacerbations of respiratory symptoms.¹⁰(Woodruff 2016)
Appendix B – Assessment of and Functional Classification of COPD

GOLD diagnostic criteria include the following:
- Presence of symptoms (see Table 1 in Appendix A)
- FEV₁/FVC ratio of <0.70 following short-acting beta agonist
- Exclusion of other diagnoses (e.g., alpha-1 antitrypsin deficiency, cardiac disorders, and others)

For persons meeting the diagnostic criteria, GOLD classifies patients in two phases for purposes of guiding treatment. The initial phase is by severity of airflow obstruction determined by spirometry. The second phase involves matching frequency and severity of prior exacerbations with assessment of the adverse effect of the COPD on the individual’s life. This second phase results in a grid crossing two degrees of each of the categorization criteria.

Assessment of Airflow Limitation

GOLD criteria for staging severity of COPD use spirometry results with a score from 1 to 4 defined by the FEV₁ (see Table 3). This spirometry should be performed following administration of a short-acting beta agonist to assess maximal obtainable results.

Table 3. GOLD COPD Airflow Restriction Categorization

<table>
<thead>
<tr>
<th>Category</th>
<th>GOLD</th>
<th>FEV₁* (% pred)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>1</td>
<td>≥80</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
<td>50-79</td>
</tr>
<tr>
<td>Severe</td>
<td>3</td>
<td>30-49</td>
</tr>
<tr>
<td>Very Severe</td>
<td>4</td>
<td>&lt;30</td>
</tr>
</tbody>
</table>

*With FEV₁/FVC <0.70

Assessment of Symptom Burden

GOLD recommends standardized questionnaires for symptom burden assessment. The Modified Medical Research Council (mMRC) Questionnaire (see Table 4) has been selected by GOLD due to simplicity of application and global distribution despite relying solely on degree of breathlessness. It also correlates well to several general health status questionnaires. GOLD has chosen the 10-element COPD Assessment Test (CAT™) as a questionnaire that does query a wider aspect of a respondent’s life and also correlates well with the 50-element St. George’s Respiratory Questionnaire (SGRQ), considered too complex for routine clinical use. Other validated questionnaire tools and validated functional assessment tools exist. GOLD chose these two questionnaire tools for clinical simplicity and their wide current use.

At least one study has noted variability in classification of a cohort of patients between the mMRC and CAT as well as between the questionnaires with treating physician assessment and patient self-assessment. Several validated functional assessment tools also exist; however, they are targeted largely at populations with quite severe life activity impairment. The mMRC, developed by the British Medical Research Council and well validated, assesses only dyspnea on a 5-point scale.

Table 4. mMRC Dyspnea Assessment Scoring

| Dyspnea only with strenuous exercise | 0 |
| Dyspnea when hurrying or walking up a slight hill | 1 |
| Walk slower than people of the same age because of dyspnea or need to stop for breath when walking at own pace | 2 |
| Need to stop for breath after walking 100 yards (91 m) or after a few minutes | 3 |
| Too dyspneic to leave house or breathless when dressing | 4 |

The CAT was developed by a multi-disciplinary group of COPD experts with financial support from GlaxoSmithKline (GSK) with oversight of GSK activities by a governance board that includes external experts, one of whom chairs the board. Although GSK owns the copyright, the test is freely available on the Internet. The CCQ questionnaire is promulgated through the University Medical Centre Groningen, the Netherlands. Though cited by GOLD and other authors it is less widely used in the U.S. than the CAT and will not be further discussed here as GOLD also only discusses the CAT.
The CAT uses a 0-5 scale for answers in 8 domains:
- presence of coughing, “none” to “all the time”
- production of phlegm, “no phlegm” to “my chest is full all the time”
- chest tightness, “not at all” to “feels very tight”
- shortness of breath when walking up a hill or a flight of stairs, “not breathless” to “very breathless”
- limitation of activities at home, “not limited” to “very limited”
- confidence in leaving home in relation to lung condition, “confident despite” to “not at all confident”
- quality of sleep, “soundly” to “don’t sleep soundly due to my lung condition”
- level of energy, “lots” to “no energy at all”

A score of 10 is considered a cut-point for considering instituting treatment based on correlation to the St. George’s Respiratory Questionnaire (SGRQ), considered too complex for routine clinical use.

**Assessment of Exacerbation Risk**

COPD exacerbations have been defined as changes in clinical status leading to additional therapy that may be simply use of short-acting bronchodilators to hospitalization.

While there have been a number of studies showing that the rate of exacerbations varies greatly among persons with diagnosed COPD, the best predictor of future exacerbations has been determined to be the history of prior exacerbations.

Exacerbations have been categorized into three levels of severity:
- **MILD** – treated only with SABA
- **MODERATE** – SABA plus either antibiotics and/or oral steroids
- **SEVERE** – hospitalization or emergency department visits

GOLD proposes setting the score on the CAT versus the exacerbation risk based on the number and severity of prior exacerbations to determine a secondary classification for treatment guidance expressed in four classifications A, B, C, D.

**Overall GOLD Assessment Scheme for COPD**

The initial assessment of airflow obstruction on the GOLD scale of 1-4 (mild – severe) is matched with exacerbation risk and symptom burden for a final categorization. Although expressed together, based on research since being proposed, GOLD recognizes in the most recent version (2019) that there may be discordance; that is, persons with more severe airway obstruction, but low symptom burden or the inverse.

Figure 1. GOLD Classification Scheme (need to obtain permission for GOLD)
The final GOLD classification is expressed as a combination of a number (1 – 4) for airflow limitation and a letter (A – D) intended to offer a more individualized clinical classification. The classification categories of A – D essentially correlate as follows:

- **A**: Low risk of exacerbation, less life impairment
- **B**: Low risk of exacerbation, more life impairment
- **C**: High risk of exacerbation, less life impairment
- **D**: High risk of exacerbation, more life impairment

The spirometric classifications do not, necessarily, predict to which letter designation an individual patient will be assigned. The categories are intended to assist with treatment decisions. They are not designed to address assessment of functional capacity even though the combinations of numbers and letters can provide a general concept of adverse effect on a patient’s life functions. As is apparent from the grid, categories A and C represent persons with less significant adverse effect reported on their personal lives as reflected by a lower CAT/mMRC score. There is evidence that persons in category B, though having better lung function, may have poorer long term outcomes (death) than ones classified in category C, supporting the importance of evaluation beyond simply spirometry.15(Yusen 2013)

**Overall Assessment for LEO Evaluations**

As is apparent from the GOLD classification scheme, there are multiple factors involved in classifying both the physical status and the life effect of COPD. Additionally, at least one study has noted significant disagreement between the 2011 (same strategy as 2017, 2018, and 2019) GOLD classification scheme and severity rating by treating physicians and patients.12(Mapel 2015)

GOLD proposes the additional steps of assessing symptom burden on quality of life and exacerbation history to assist with treatment recommendations/decisions such as choices among long-acting beta agonists, long-acting muscarinic agents, fixed dose combinations and other interventions such as lung reduction surgery.

As has been noted, spirometry loses specificity on the individual patient level in terms of predicting functional impairment. However, spirometry, does, as reinforced by the GOLD classification scheme, represent a valid component of a final classification process. For assessing whether LEOs can safely and effectively perform the essential job functions, the use of spirometry deficit as classified by GOLD is, in the opinion of the Task Group, an appropriate initial methodology of assessing severity of the pathophysiological status of COPD.

GOLD 2019 recognizes that there may be discordance between severity of airway obstruction and patient reported symptom burden (mMRC or CAT scores). GOLD recommends that, if the assessing clinician has a question regarding the validity of the patient’s self-assessment of burden, some form of physical challenge testing should be employed for a more objective assessment of functional status. This approach is particularly relevant for assessing LEOs with COPD for ability to safely and effectively perform essential job functions.

Functional capacity testing protocols validated for clinical use in COPD patients involve a low level of exertion, being designed for patients with quite significant symptom burden, thus making them not applicable for assessing LEOs, more likely to have milder disease. No functional capacity test designed for COPD patients has been validated in LEOs.

For the purposes of determining, as best as is possible with current methodologies, whether an LEO with a diagnosis of COPD can safely and effectively perform essential job functions, the use of a law enforcement specific physical function test offers a parallel logic to clinical assessment. Appendix C addresses functional testing of LEOs with COPD.
Appendix C – Evaluation of COPD Effect on Ability to Perform Essential Law Enforcement Job Functions

COPD is associated with decreased oxygen delivery from both loss of air exchange tissue due to alveolar changes and decreased capability of air exchange due to bronchial constriction. Severity of impairment in performing physical activities from the changes associated with COPD can vary among persons with similar profiles in terms of symptoms, smoking history and spirometry.

Functional capacity testing protocols validated for clinical use in COPD patients such as the 6 minute walk test, the Glittre Activities of Daily Living Test and others involve a low level of exertion, being designed for patients with quite significant impairment, thus making them not applicable for assessing LEOs with milder disease. No functional capacity test designed for COPD patients has been validated in LEOs.

Ability to exert to a specified level for a specified time is dependent on several factors, of which pulmonary air exchange, the component of primary concern in COPD, is only one. Inability to perform essential physically demanding job functions or functional testing elements may be due to other disorders affecting muscle function or to inadequate general fitness.

Job Task Simulation Testing
Throughout the recommendations above in this document Job Task Simulation Testing (JTST) was recommended for evaluation of LEOs regarding any adverse effect of COPD on the ability to perform. This recommendation was made for two reasons: no studies have been performed to correlate any surrogate testing or fitness testing with ability to safely and effectively perform the essential duties of a law enforcement officer in a particular agency; and essential tasks may vary significantly from one agency to another.

The Southeastern Pennsylvania Transportation Authority (SEPTA) requires all officers, male and female, to be able to complete a 1.5 mile run in 12 minutes, intended demonstrate an aerobic capacity of 42.5 mL/kg/min. This requirement is based on a study of essential job functions in this specific agency. SEPTA’s standard has withstood legal challenge.

Many law enforcement training establishments, whether academies or in-service training facilities, have the ability to place individuals in simulations of various job tasks. A physician consulting with a police department may need to work closely with the department’s training division in order to craft a multi-faceted set of simulations that would assess any adverse effect of COPD on performance.

Surrogate Testing for Adverse Effect of COPD
If it is not possible to use a test incorporating essential job function activities, surrogate testing to a level consistent with the maximum aerobic demand likely to be encountered performing essential job functions may be necessary. No literature has been identified reporting direct assessment of the oxygen consumption or of physiological workload of law enforcement officers performing essential job functions while on-duty. Correlations have been made to published listings of energy expenditure, measured in metabolic equivalents (METs), for other tasks that are similar to components of essential law enforcement job functions. The activity-MET list offered by Jetté was generated by expert opinion and a collection of information from members of a panel whose agenda was disability assessment. This activity listing of MET equivalents has been maintained and expanded slowly with increasing numbers of activity-associated MET levels being measured directly. Although this list does not offer direct evaluation of incumbent LEOs performing physical LEO tasks, it does offer a number of activities that are likely representative of functions performed by LEOs. Many of these activities have been assigned MET ratings in the range of 12 METs.

Job descriptions for LEOs have also been developed and made public by at least two agencies, most notably Massachusetts Human Resources Division and California Police Officers Standards and Training (POST) Commission. Chapter 3 of this ACOEM guidance for LEOs delineates a
set of essential job functions that was developed in conjunction with law enforcement organizations and officers as subject matter experts.

One small study has measured energy expenditure during simulation of a foot chase and apprehension of a resisting person as a part of designing an occupation-specific cardiac rehabilitation program (see Error! Reference source not found. Adams 2010). The peak METs were 14.0 (±2.2) with the mean working MET level was 10.5 (±3.2). Unfortunately, although subjects were fitted with facemasks to measure oxygen consumption, VO2 data were not presented. However, using the standard conversion factor of 3.5 ml O2/kg/min for METS to VO2, these values translate to a maximum oxygen consumption of 49 ml O2/kg/min and an average consumption of 35 ml O2/kg/min. Adams also did not report times for completing the tasks. The components of this simulation as presented in Table 3 might serve as a guide for developing an essential-job-function-based physical activity challenge test.

### Table 5. LEO Job Function Simulations for Energy Expenditure

<table>
<thead>
<tr>
<th>Simulation Element</th>
<th>Job Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprint 150-feet</td>
<td>Foot chase</td>
</tr>
<tr>
<td>Climb up five stairs and descend them 12 times (equivalent to 5 floors)</td>
<td>Chase through an apartment complex</td>
</tr>
<tr>
<td>Scale a 5-foot wooden wall</td>
<td>Climbing over a fence or wall during a foot chase</td>
</tr>
<tr>
<td>Sprint a total of 450 feet, with 100 feet being serpentine through cones and 50 feet involving turning around cones.</td>
<td>Diversion run during a foot chase</td>
</tr>
<tr>
<td>Drop to knees and crawl through a 3.5-foot ditch</td>
<td>Crawling through a small space during a foot chase</td>
</tr>
<tr>
<td>Sprint 100 feet and jump over a culvert.</td>
<td>Traversing a creek bed or ditch during a foot chase</td>
</tr>
<tr>
<td>Kick and punch a dummy fighter 3 times</td>
<td>Fighting during a foot chase</td>
</tr>
<tr>
<td>Drop to knees, roll a 145-lb dummy 3 times one way and 3 times back, and then simulate a behind-the-back arm cuff</td>
<td>Wrestling with and handcuffing a suspect</td>
</tr>
</tbody>
</table>

In a live field operation, the actual energy expenditures are likely to be higher than those attributed to surrogate tasks based on the presumption of higher degrees of activity and the added physiological demand from psychological factors. For a variety of reasons, a police physician may be confronted with needing to request a functional evaluation with no possibility of performing it as a set of job function simulations. Treadmill exercise testing performed using a ramp protocol to maximum effort will supply limited information regarding maximum attainable MET capacity. Ramp protocols use more continuous increase in speed and incline over a set time period, usually 6-12 minutes, as opposed to the standard Bruce protocol which advances effort in steps. Ramp protocols, thus, might be more consistent with actual police responses. The police physician should discuss the particulars of the testing with the medical director of the testing facility since ramp protocols are not standardized. If such testing is used, the ACOEM LEO Task Group recommends that achievement of a MET equivalence of 12 be used as an acceptable value for allowing the LEO to be cleared to full duty.

Whether evaluation is performed using job task simulation or surrogate testing, it is not the role of the police physician to make the determination of whether failure is due to a medical condition or to inadequate conditioning. This is particularly so in the case of applicants. In performing a fitness-for-duty evaluation of incumbents, however, the police physician may need to address this issue with recommendation that the LEO undergo formal cardiopulmonary exercise testing (CPET or CPX) to more precisely define whether the inability to successfully perform job tasks simulation testing is based on pulmonary or other disease versus “fitness.” Formal CPET/CPX involves monitoring oxygen consumption during exercise testing to directly measure VO2.
Appendix D – On-going Monitoring of LEOs with COPD

COPD is a chronic, usually progressive, pulmonary disease in which progression might be variable between persons and over time in an individual. As such, it is imperative to regularly monitor persons with this disorder for potential impairment of ability to safely and effectively perform essential law enforcement job functions. Based on recommendations of the American Thoracic Society et al. and the GOLD Initiative the consensus of this ACOEM LEO Task Group is that monitoring of LEOs follow a similar schedule (see Table 6).

Table 6: ACOEM LEO Medical Guidance Task Group Recommended COPD Follow-up Schedule

<table>
<thead>
<tr>
<th>COPD Severity</th>
<th>Follow-up Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild COPD</td>
<td>Yearly</td>
</tr>
<tr>
<td>Moderate COPD</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>Severe COPD</td>
<td>Every 3 months</td>
</tr>
<tr>
<td>Very Severe COPD*</td>
<td>Every 3 months</td>
</tr>
</tbody>
</table>

*Addressed only for LEOs on restricted duty, but assigned to safety sensitive sedentary activities where the risk of cognitive impairment may represent a concern for safe and effective performance of assigned job functions.

Additionally, LEOs with COPD should undergo medical evaluation and, possibly, repeat physical job task challenge following exacerbations involving hospitalization or changes in medication regimens.

Appendix E – Oxygen Treatment in COPD

Oxygen supplementation in COPD may be continuous or only at night. In either case, it implies a high level of loss of functional lung tissue. LEOs with COPD who might be on continuous supplemental oxygen would, likely, have reduced exercise capacity such that they would be unable to safely and effectively perform essential job functions based on criteria for instituting such treatment (see Table 7).

Table 7: Criteria for starting long term oxygen therapy in COPD22(Bailey 2004)

<table>
<thead>
<tr>
<th>Continuous Oxygen Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting PaO₂ ≤55 mm Hg</td>
</tr>
<tr>
<td>Resting PaO₂ of 56-59 mm Hg plus any of the following</td>
</tr>
<tr>
<td>• Dependent edema</td>
</tr>
<tr>
<td>• P pulmonale on the electrocardiogram (P wave exceeding 3 mm in standard lead II, III, or aVF)</td>
</tr>
<tr>
<td>Polycythemia (hematocrit, &gt;56%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermittent Oxygen Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desaturation (SpO₂ ≤88%) with activity</td>
</tr>
<tr>
<td>Desaturation (SpO₂ ≤88%) at night</td>
</tr>
</tbody>
</table>

Chronic hypoxemia in severe COPD may contribute to the cognitive decline noted in this population versus age-matched populations with COPD. Long-term oxygen therapy (LTOT) has been found to be associated with less rapid decline in cognitive function.23,24(Dal Negro 2015/Thakur 2010) In these evaluations 88% oxygen saturation was used as the criterion for hypoxemia.

A panel of medical experts convened to advise the Federal Motor Carrier Safety Administration in the United States has recommended that commercial truck driver candidates with COPD and a screening pulse oximetry of less than 92% have arterial blood gas analysis. The panel further recommended that if arterial oxygen partial pressure is less than 65 mmHg (at less than 5,000 ft altitude), the candidate be disqualified.25(Turino 1991)

Oxygen supplementation may be either via oxygen containing gas cylinders or via use of an oxygen concentrator. The latter provides gas with oxygen representing around 90% of the content. This is done via extracting the nitrogen. Thus, other gases remain in the mix such as CO₂, argon and water vapor.
Appendix F – Asthma/COPD Syndrome

An increasing interest in defining subtypes (phenotypes) of COPD as they relate to treatment response, disease progression, symptom complexes has led to the specification of the asthma-COPD phenotype or syndrome. Several studies have reported on this syndrome, though the prevalence has varied significantly, depending on the criteria used in the various studies. Overlap between the disorders has been reported to be up to 55%. The important issue in relation to LEOs is that the asthma/COPD overlap is more common in persons with mild COPD and is linked with a worse outcome in at least one study. Additionally, this dual disorder phenomenon brings up the issue that a number of persons with asthma will, eventually, also meet criteria for COPD.
Appendix G – Physician Evaluation Form for Law Enforcement Officer (LEO) with COPD

NOTE TO POLICE PHYSICIAN: The following form has been developed to help expedite gathering the most cogent information for police physicians to make clearance decisions. Since many treating providers may not be willing to spend the time to fill out a form, it may be easier to simply request medical records. In that case the following form may be used as a template for extracting the relevant information from the medical records.

TO: Physician treating or evaluating the following person for performance of law enforcement essential job functions.

Examinee Name:____________________________________________________________ DOB: ____________

You are being asked to evaluate this individual in regard to Chronic Obstructive Pulmonary Disease (COPD). It is essential that this person undergo an individualized assessment of his/her COPD to determine whether the individual’s condition permits safe and effective job performance. This evaluation is based on guidance from the American College of Occupational and Environmental Medicine (ACOEM).

I. Introduction:
The well-motivated LEO with COPD who is well-educated regarding the disorder may be capable of safe and effective job performance. An individualized assessment of the applicant or LEO with COPD should be performed including the following:

- Detailed history and physical examination
- Standardized Testing (e.g., spirometry/PFT, chest x-ray, alpha-1 antitrypsin, etc.) when indicated
- Diagnosis (classification and causation)
- Evaluation of treatment plan for optimization
- Frequency of exacerbations and last exacerbation occurrence
- Medication regimen
- Response to medication regimen
- Complications or activity-limiting side-effects from medication regimen
- Compliance with therapy
- Risk of exacerbations
- Planning for on-going surveillance

Assessing the risk of inability to safely and effectively perform essential law enforcement job functions, or of experiencing a sudden impairment rendering the LEO unable to do so, is the major concern in evaluating LEOs with lung diseases. Law enforcement activities involve several issues that need to be considered in regard to those with COPD:

- Unanticipated extreme physical activity that, if not executed properly, could result in death or severe disability to others or the law enforcement officer.
- Exposure to environmental provocative agents – e.g., dust, allergens, cold, dry air.
- Exposure to tear gas and “pepper spray”

II. Assessment

I am a pulmonologist or physician experienced in the diagnosis and treatment of COPD.  □ Yes  □ No

1. The examinee has been under my care for COPD since __________________.

2. I have reviewed outpatient and in-patient medical record(s) of the last one year or since date of diagnosis (whichever is shorter)  □ Yes  □ No

   If No, please explain ____________________________________________________________

   ____________________________________________________________
3. Has this person any objective testing (pulmonary function testing, challenge testing, etc.) for COPD within the past year?  
    ☐ Yes  ☐ No  
    If YES, supply a copy of the results.

4. Has this person completed a COPD-specific health status questionnaire?  (COPD Assessment Test (CAT™) or COPD Control Questionnaire (CCQ\(^{(C)}\))  
    ☐ Yes  ☐ No  
    If YES, supply the date and score of the most recent test.

5. Medication Regimen  
   a. Current COPD medications:  
      __________________________________________________________________________________________
      __________________________________________________________________________________________
      __________________________________________________________________________________________

   b. When was the last time the medication regimen was changed? ________________

6. Has this individual been educated in COPD and has he/she been thoroughly informed of the risk of exacerbations and the importance of treatment compliance?  
    ☐ Yes  ☐ No

7. Is the examinee’s activity limited by:  
   Weather conditions?  ☐ Yes  ☐ No  
   Exposure to environmental factors?  ☐ Yes  ☐ No  
   High-level physical activity?  ☐ Yes  ☐ No  
   If YES, please specify  
      __________________________________________________________________________________________
      __________________________________________________________________________________________
      __________________________________________________________________________________________

Please provide additional information, not included above, that may be helpful to the police physician.

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

___________________________________________________________  ___________________________
Signature of Physician        Date

___________________________________________________________  ___________________________
Printed name of Physician        Phone
References
20. Goldberg RL, Spilberg SW, Weyers SG. *Patrol Officer Job Demands: Their Implication for Medical Screening.* POST; 2015.


