STATE OF MARYLAND

DHMH

Maryland Department of Health and Mental Hygiene

Larry Hogan, Governor - Boyd Rutherford, Lt. Governor - Dennis R. Schrader, Secretary

January 20, 2017

The Honorable Edward J. Kasemeyer
Chair
Senate Budget and Taxation Committee
3 West Miller Senate Office Building
Annapolis, MD 21401-1991

The Honorable Maggie McIntosh
Chair
House Appropriations Committee
121 House Office Building
Annapolis, MD 21401-1991

RE: 2016 Joint Chairmen's Report, Page 70, M00F03.04 – Report on Chronic Obstructive Pulmonary Disease Prevention

Dear Chair Kasemeyer and Chair McIntosh:

Pursuant to page 70 of the Joint Chairmen's Report of 2016, the Department of Health and Mental Hygiene respectfully submits this report on the current resources for Chronic Obstructive Pulmonary Disease (COPD) in Maryland. Specifically, it was requested that the report include an evaluation of effectiveness of treatment and prevention strategies currently in place in the State and an investigation of the need for improving the quality and accessibility of existing COPD-related community-based services.

I hope this information is useful. If you have any questions regarding this report, please contact Webster Ye, Director of the Office of Governmental Affairs, at (410) 767-6480.

Sincerely,

Dennis R. Schrader
Secretary

Enclosure

cc: Webster Ye, Director, Office of Governmental Affairs
Howard Haft, M.D., Deputy Secretary, Public Health Services
Donna Gugel, M.H.S., Director, Prevention and Health Promotion Administration

Maryland Department of Health and Mental Hygiene

Chronic Obstructive Pulmonary Disease Prevention

2016 Joint Chairmen's Report, Page 70

December 2016

Larry Hogan
Governor

Boyd Rutherford
Lieutenant Governor

Dennis R. Schrader
Secretary

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Acronyms

Center for Chronic Disease Prevention and Control	CCDPC
Center for Tobacco Prevention and Control	CTPC
Centers for Disease Control and Prevention	CDC
Centers for Medicare and Medicaid Services	CMS
Chronic Disease Self-Management Programs	CDSMP
Chronic Obstructive Pulmonary Disease	COPD
Cigarette Restitution Fund	CRF
Department of Health and Mental Hygiene	DHMH
Fiscal Year	FY
National Heart, Lung, and Blood Institute	NHLBI
National Institutes of Health	NIH
Pulmonary Education Program	PEP
US Department of Housing and Urban Development	HUD
US Preventive Services Task Force	USPSTF

Background

This report describes current resources for Chronic Obstructive Pulmonary Disease (COPD) in Maryland and includes: 1) an analysis of the current resources available in Maryland for those with COPD, and 2) a description of COPD-related treatments, a description and evaluation of COPD prevention strategies, and a description of community-based services and resources currently in place for COPD.

COPD is an umbrella term used to describe progressive lung diseases including emphysema, chronic bronchitis, and non-reversible asthma. COPD is characterized by a chronic cough, increasing breathlessness and wheezing, and is associated with increased morbidity and mortality. COPD is the third leading cause of death in the US and is largely preventable, as tobacco use is the primary risk factor for COPD. Exposure to air pollutants and genetic predisposition are also associated with COPD.[1] There is no cure for COPD, but treatment is available to manage the symptoms and improve quality of life.

It is beyond the purview of the Department of Health and Mental Hygiene (DHMH) to evaluate the effectiveness of COPD treatment or to determine the need for improving the quality and accessibility of existing COPD community-based services. DHMH does not routinely collect data on or perform assessments of clinical treatment strategies for COPD. Assessments of quality may instead fall under the purview of entities such as the Centers for Medicare and Medicaid Services (CMS) that regularly collect data on clinical quality, including medication appropriateness, involvement of pulmonary specialists, and comprehensive care coordination. Determining whether Marylanders have sufficient access to COPD-related community-based services is not currently possible using existing Maryland data collection efforts, tools, and systems.

Burden

In 2015, an estimated 284,835 adult Maryland residents (6.1 percent) reported that they have been told that they have COPD, emphysema, or chronic bronchitis.[2] Nationally, 6.3 percent of US adults (an estimated 15 million) have been told by a health care provider that they have COPD.[3] The prevalence of COPD in Maryland has been stable since 2011 and has not shown any significant change.[4] Tobacco use is the main risk factor for developing COPD and COPD disproportionately affects patients of lower socioeconomic status.[5,6] In 2015, Marylanders were more likely to report having COPD if they:

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[1] M. K., Martinez, C. H., Au, D. H., et al, "Meeting the challenge of COPD care delivery in the USA: a multiprovider prospective," 16 May 2016, Lancet Respiratory Medicine Commission: 473-526. 18 November 2016 < https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(16)00094-1/abstract>.

[2] Maryland Behavioral Risk Factor Surveillance System, 2015, Maryland Department of Health and Mental Hygiene, 27 November 2016 <www.marylandbrfss.org>.

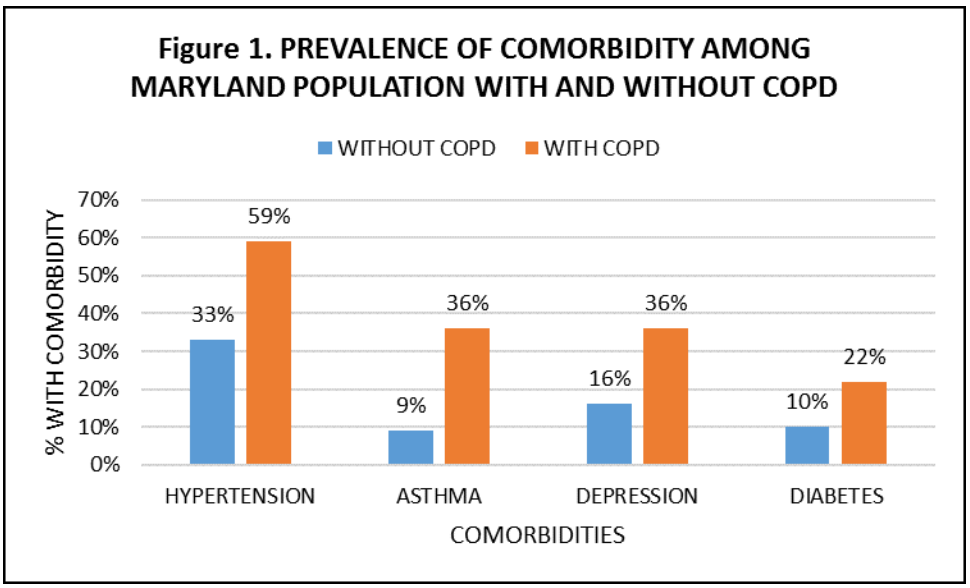
[3] The Centers for Disease Control and Prevention, "Chronic Obstructive Pulmonary Disease Among Adults — United States, 2011," 23 November 2012, MMWR Weekly, 61(46); 938-943, 3 October 2016 <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6146a2.htm>.

[4] Maryland Behavioral Risk Factor Surveillance System, 2011-2015, Maryland Department of Health and Mental Hygiene, 14 July 2016 <www.marylandbrfss.org>.

[5] Paulose-Ram R, Tilert T, Dillon CF, Brody DJ, "Cigarette smoking and lung obstruction among adults aged 40–79: United States, 2007–2012," January 2015, NCHS data brief, 181: 1-8, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pubmed/25569298>.

- Were 55 years of age or older;
- Were retired or unable to work;
- Had not graduated from high school;
- Had a household income of less than $25,000;
- Were divorced, widowed, or separated; or
- Were a former smoker, or currently smoke.[7]

Individuals with COPD are often at a higher risk of developing other chronic conditions. Marylanders with COPD report they have been told they have hypertension, asthma, depression, and diabetes at a higher rate than those without COPD.[8] Those with COPD may require treatment for other conditions, which can result in high health care costs. The risk factors associated with developing COPD, such as smoking, may also increase the risk for developing other conditions; therefore, preventing COPD may also help prevent other chronic diseases.



Source: 2015 Maryland Behavioral Risk Factor Surveillance System www.MarylandBRFSS.org.

Mortality and Morbidity

COPD is the third leading cause of death in the US and the fourth leading cause of death in Maryland, with 1,904 deaths or 4.2 percent of all deaths in the State.[9,10] The COPD-related death rate for US adults aged 25 and older declined from 2000 through 2014, but a more rapid

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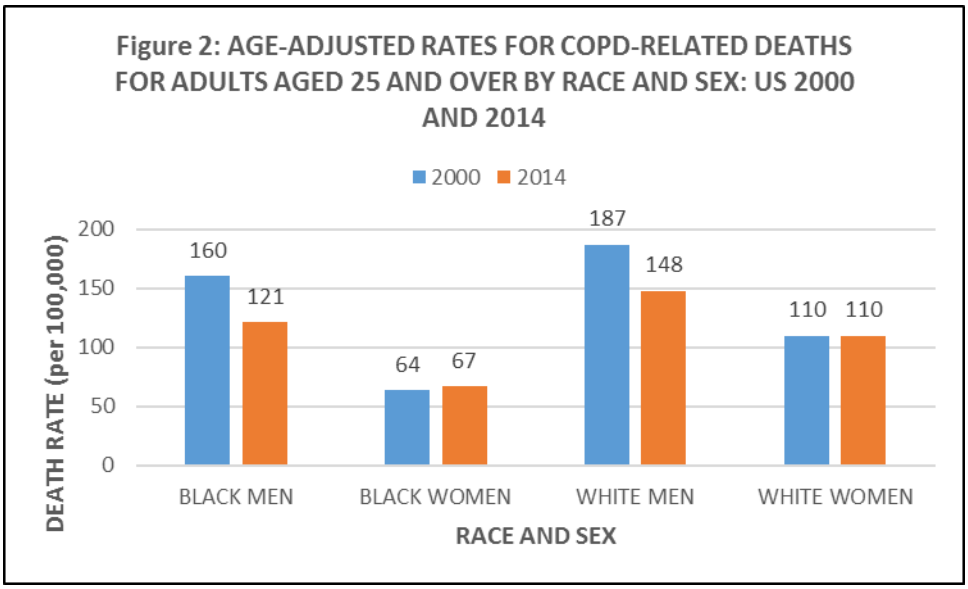
[6] Eisner MD, Blanc PD, Omachi TA, Yelin EH, Sidney S, Katz PP, Ackerson LM, Sanchez G, Tolstykh I, Iribarren C, "Socioeconomic status, race and COPD health outcomes," January 2011, J Epidemiol Community Health, 65: 26–34, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pubmed/19854747>.
[7] Maryland Behavioral Risk Factor Surveillance System, 2015, Maryland Department of Health and Mental Hygiene, 8 December 2016 <www.marylandbrfss.org>.
[8] *Id* fn 2.
[9] Maryland Department of Health and Mental Hygiene, Maryland Vital Statistics Annual Report 2014, 18 November 2016 <http://dhmh.maryland.gov/vsa/Documents/14annual_revised.pdf>.
[10] National Heart, Lung, and Blood Institute, National Institutes of Health, "Breathe Better Network," 1 November 2016 <http://www.nhlbi.nih.gov/health/educational/copd/our-partners/index.htm>.

decline was seen among men (Figure 2). Only black women experienced an increase in the COPD-related death rate during this period. The changes in death rates vary by age, race, and sex, which may reflect differing smoking rates and patterns by race and sex.[11]



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, NCHS Data Brief, No. 256, 2016

COPD develops slowly over many years, and most people are at least 40 years old when symptoms begin.[12] Information on COPD morbidity underestimates the total burden of COPD because the disease is usually not diagnosed until it is clinically apparent and moderately advanced.[13] When adjusted for age, the rates of hospitalizations and emergency department visits for COPD have not changed significantly in the US over the past decade.[14] Unlike COPD, hospitalization rates for common cardiovascular disorders, pneumonia, and lung cancer decreased significantly in the same period.[15]

Cost of COPD

The burden of COPD affects individuals and their families, workplaces, communities, and the State. The direct costs of COPD stem from the health care resources devoted to diagnosis and medical management of the disease. In the US, COPD is responsible for more

[11] Centers for Disease Control and Prevention, National Center for Health Statistics, NCHS Data Brief, No. 256, 2016, 1 December 2016 <http://www.cdc.gov/nchs/data/databriefs/db256.pdf>.
[12] Paulose-Ram R, Tilert T, Dillon CF, Brody DJ, "Cigarette smoking and lung obstruction among adults aged 40–79: United States, 2007–2012," (January 2015), 181: 1-8, NCHS data brief, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pubmed/25569298>.
[13] John F. Devine, "Chronic Obstructive Pulmonary Disease: An Overview," September 2008, Am Health Drug Benefits, 1(7): 34–42, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4106574/>.
[14] Ford ES, "Hospital discharges, readmissions, and ED visits for COPD or bronchiectasis among US adults: findings from the nationwide inpatient sample 2001-2012 and Nationwide Emergency Department Sample 2006-2011," April 2015, Chest, 147(4): 989-98, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pubmed/25375955>.
[15] *Id.*

than 1.5 million emergency department visits and 699,000 hospitalizations annually, resulting in health care costs approaching $72.7 billion.[16,17] Nationally, Medicare pays approximately 50 percent of COPD treatment-related costs, Medicaid 25 percent, commercial insurance plans 18 percent, and the rest is paid by patients and other agencies.[18] Fifty percent of the costs for services associated with COPD are related to exacerbations of COPD, such as hospitalizations.[19] Direct and indirect costs of COPD are shared by all Marylanders through higher health insurance rates, lost productivity, and tax dollars.[20] Indirect costs of COPD include the monetary consequences of disability, missed work, premature mortality, and caregiver or family costs resulting from illness.

Risk Factors

According to the Centers for Disease Control and Prevention (CDC), exposure to tobacco smoke through smoking and secondhand smoke is a key factor in the development and progression of COPD. The more years someone smokes and the more cigarettes they smoke, the greater the risk of developing COPD. From 2007 to 2012, approximately 46 percent of adults aged 40 to 79 with COPD were current cigarette smokers and 30 percent were former smokers.[21] Smoking cessation is an important component of COPD prevention and is critical to the management of COPD.

Asthma is another risk factor for COPD.[22] Research shows a poor prognosis for individuals with both asthma and COPD, and a worse prognosis for those with onset of asthma after 40 years of age.[23] Protection from exposure to secondhand smoke reduces respiratory symptoms of COPD and asthma.[24]

Approximately 25 percent of COPD patients are non-smokers.[25] Long-term exposure to chemical fumes, vapors, and dusts in the workplace are risk factors for COPD not related to tobacco smoke. Finally, an uncommon genetic disorder alpha-1-antitrypsin deficiency is the cause of some cases of COPD.[26]

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[16] Earl S. Ford, Janet B. Croft, David M. Mannino, Anne G. Wheaton, Xingyou Zhang, Wayne H. Giles, "COPD Surveillance-United States, 1999-2011," 2013 July, Chest, 144(1): 284–305, 14 November 2016 <www.ncbi.nlm.nih.gov/pmc/articles/PMC3707177/>.
[17] Mannino DM, "Counting Costs in COPD: what do the numbers mean?" 2015, Chest, 147: 3-5, 14 November 2016 <http://www.sciencedirect.com/science/article/pii/S0012369215302221>.
[18] *Id* fn 1.
[19] Qureshi H, Sharafkhaneh A, Hanania NA, "Chronic obstructive pulmonary disease exacerbations: latest evidence and clinical implications," September 2014, 5(5): 212–227, Therapeutic advances in chronic disease, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pubmed/25177479>.
[20] Healthy People 2020, Respiratory Diseases, 1 November 2016 <https://www.healthypeople.gov/2020/topics-objectives/topic/respiratory-diseases>.
[21] Paulose-Ram R, Tilert T, Dillon CF, Brody DJ, "Cigarette smoking and lung obstruction among adults aged 40–79: United States, 2007–2012," (January 2015), 181: 1-8, NCHS data brief, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pubmed/25569298>.
[22] *Id* fn 1.
[23] Lange P., Colak Y., Ingebrigtsen TS., Vestbo J., Marott J L., "Long-term prognosis of asthma, chronic obstructive pulmonary disease, and asthma-chronic obstructive pulmonary disease overlap in the Copenhagen City Heart study: a prospective population-based analysis," June 2016, The Lancet Respiratory Medicine, 4(6): 454-462, 3 October 2016 <http://www.thelancet.com/journals/lanres/article/PIIS2213-2600(16)00098-9/abstract>.
[24] *Id* fn 3.
[25] *Id* fn 1.
[26] University of Maryland Medical Center, Chronic Obstructive Pulmonary Disease, 1 November 2016 <http://umm.edu/health/medical/reports/articles/chronic-obstructive-pulmonary-disease>.

Standard of Care and Evaluation

With proper disease management, most people with COPD can achieve good symptom control and quality of life, as well as reduced risk of other associated conditions. According to the National Heart, Lung, and Blood Institute (NHLBI), the goals of COPD treatment include:

- Relieving symptoms;
- Slowing the progress of the diagnosed disease;
- Improving exercise tolerance (the patient's ability to stay active);
- Preventing and treating complications; and
- Improving overall health.

Identifying COPD

The main test for detecting COPD is spirometry. During a spirometry test, a technician will ask the patient to take a deep breath in. Then, the patient blows into a tube connected to a small machine called a spirometer. Spirometry can detect COPD before symptoms develop. The test results also may help determine whether another condition, such as asthma or heart failure, is causing the symptoms.[27]

There are other tests to aid in detection and diagnosis of COPD including arterial blood gas, pulse oximetry test, carbon monoxide diffusing capacity, and imaging tests like a chest x-ray. Further tests may also include a test for alpha-1-antitrypsin deficiency, additional blood tests, and a bronchodilator challenge.[28] These tests vary by individual and can be discussed with the patient's health care provider. Pulmonary function tests range from $40 to $800 and are usually covered 80 to 100 percent by health insurance.[29]

Although there are benefits to early treatment for COPD, physicians will not normally screen patients for COPD unless they present with symptoms such as shortness of breath, persistent or recurrent cough with sputum, or decreased exercise tolerance. In fact, in 2016 the US Preventive Services Task Force (USPSTF) recommended against screening asymptomatic individuals as screening does not improve patient outcomes.[30] The USPSTF did not find evidence that screening for COPD in asymptomatic individuals improves health-related quality of life, morbidity, or mortality. The USPSTF determined that early detection of COPD, before the development of symptoms, does not alter the course of the disease or improve patient outcomes.[31] The USPSTF concludes with moderate certainty that screening for COPD in asymptomatic individuals has no net benefit.

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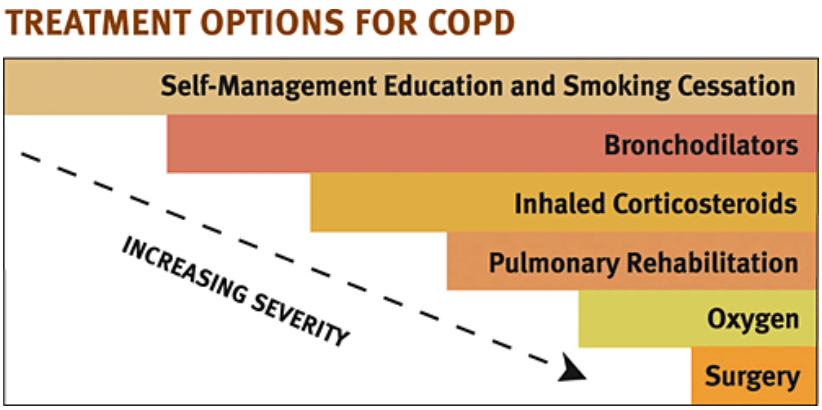
[27] National Heart, Lung, and Blood Institute, National Institutes of Health, "How is COPD Diagnosed?" 1 November 2016 <http://www.nhlbi.nih.gov/health/health-topics/topics/copd/diagnosis>.
[28] *Id* fn 27.
[29] Cost Helper, Pulmonary Function Test Cost, 1 November 2016 <http://health.costhelper.com/pulmonary-function-tests.html>.
[30] US Preventive Services Task Force (USPSTF), "Screening for Chronic Obstructive Pulmonary Disease: US Preventive Services Task Force Recommendation Statement," 5 April 2016, JAMA, 315(13): 1372-1377, 3 October 2016 <http://jama.jamanetwork.com/article.aspx?articleid=2510917>.
[31] *Id*.

Treatment Options for COPD

Once diagnosed with COPD, patients will commonly work with primary care providers, general internists, or pulmonologists.[32] As shown in Figure 3, treatment options for COPD vary by the severity of the disease.[33]

Figure 3.



Prevention

For those who currently smoke tobacco, the most important aspect of prevention and treatment is smoking cessation. For many individuals who quit smoking tobacco prior to the development of lung damage, the rate of lung function decline stabilizes and approaches the rate of non-smokers in the same age group. Although quitting smoking tobacco can slow the accelerated rate of decline, lost lung tissue cannot be fully recovered. Therefore, quitting as soon as possible is essential to the prevention of COPD. Avoiding secondhand smoke and removing other air pollutants from the home or workplace are also important prevention strategies.

Medication Therapy

Early treatment includes medications such as bronchodilators and inhaled steroids to treat symptoms such as coughing or wheezing.[34] Bronchodilators, the most common medications used to treat COPD, relax the muscles around the airways, which helps open the airways to make breathing easier. Most bronchodilators are taken using an inhaler, which allows the medicine to be delivered straight into the lungs. If the patient's COPD is more severe, or if symptoms flare up often, the doctor may prescribe a combination of medications that include a bronchodilator and an inhaled steroid, which may help reduce airway inflammation.[35] Medicare Part D provides

[32] National Heart, Lung, and Blood Institute, National Institutes of Health, "How is COPD Treated?" 1 November 2016 <http://www.nhlbi.nih.gov/health/health-topics/topics/copd/treatment>.
[33] *Id*.
[34] *Id* fn 1.
[35] *Id* fn 33.

access to affordable bronchodilators and inhaled steroids for Medicare eligible patients.[36] The Maryland Medicaid Pharmacy Program provides pharmacy coverage for Medicaid eligible patients.[37]

Acute Exacerbation of Chronic Obstructive Pulmonary Disease

The risk of hospital admission due to COPD increases with age, decreasing lung function, and when chronic respiratory symptoms are present. It is also increased by the presence of other comorbidities like diabetes, chronic heart failure, and ischemic heart disease (coronary artery disease). Even with ongoing treatment, patients may experience worsening of symptoms for days or weeks at a time. This worsening of symptoms is called an acute exacerbation, and it may lead to lung failure if prompt treatment is not received. Exacerbations may be caused by a respiratory infection, air pollution, or other triggers of inflammation. When exacerbations occur, patients may need additional medications (such as antibiotics, steroids, or both), supplemental oxygen, or admission to the hospital for treatment.

Medicare, Medicaid, and commercial insurers are working to prevent COPD-related hospital readmissions, improve care quality, and reduce the costs of care.[38] In 2014, CMS began financially penalizing hospitals that have COPD patients readmitted after an initial hospitalization. The penalties are meant to encourage hospitals to improve discharge planning to reduce the need for readmissions. Other major health insurance plans have developed innovative strategies for patients with COPD, including high-intensity care management programs and proactive care management planning to improve care transition from a hospital to a home or a community setting.[39] Care management strategies may include: pre-discharge planning; patient education to promote self-management including medication safety, how to engage community support, and advance care planning; care coordination between inpatient and outpatient providers; symptom treatment and assessment after discharge; and outpatient follow-up. Post-discharge follow-up may include phone calls, home visits, clinic visits, and hotline services for patient support.[40]

Oxygen Therapy

When COPD becomes severe, oxygen treatment can help with shortness of breath. For some patients, oxygen is needed all the time, while others only need oxygen intermittently. Long-term oxygen therapy has been shown to improve survival for those who, when at rest or not engaged in activity, have low blood oxygen due to severe lung damage. In cases of severe COPD when patients have low levels of oxygen in the blood, oxygen therapy can help patients breathe better. Oxygen is supplied in a metal cylinder or other container and can be administered in a hospital, another medical setting, or at home. The oxygen flows through a tube and is

[36] *Id* fn 1.
[37] Maryland Pharmacy Program, Information for Consumers, 27 November 2016 <https://mmcp.dhmh.maryland.gov/pap/Pages/paphome.aspx>.
[38] *Id* fn 1.
[39] *Id* fn 1.
[40] Burke RE, Kripalani S, Vasilevskis EE, Schnipper JL, "Moving beyond readmission penalties: creating an ideal process to improve transitional care," February 2013, J Hosp Med, 8: 102–109, 3 October 2016 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3650641/>.

delivered to the lungs either through a nasal cannula, a face mask over the nose and mouth, or inserted into the windpipe through the front of the neck.[41]

Medicare covers most of the cost for the nearly 1 million people with COPD who use oxygen at home. However, recent Medicare reimbursement reductions have led to fewer equipment suppliers providing oxygen support and services to patients.[42] Maryland Medicaid covers home oxygen therapy for patients not eligible for Medicare. [43]

Surgery

For severe COPD that does not improve with medications and other therapies such as pulmonary rehabilitation, surgery is considered. Surgical interventions for COPD may include removal of enlarged air spaces that are ineffective in moving oxygen from the lungs to the blood stream, lung volume reduction surgery, and lung transplantation. Medicare, Maryland Medicaid, and commercial insurers vary in their coverage of surgical treatments for COPD. [44]

Pulmonary Rehabilitation

Pulmonary rehabilitation can also play an important role in helping patients manage COPD. Pulmonary rehabilitation combines education, exercise, nutrition advice, and counseling. Participating in pulmonary rehabilitation may shorten hospital stays, increase patients' ability to carry out activities of daily living, and improve quality of life.[45]

Components of pulmonary rehabilitation often include:

- Exercise training;
- Nutritional counseling;
- Education on lung disease physiology;
- Energy-conserving techniques;
- Breathing strategies; and
- Psychological counseling or group support.

Pulmonary rehabilitation requires a long-term commitment from the patient and a team of health care providers. The pulmonary rehabilitation team may include physicians, nurses, and specialists. Examples of specialists include respiratory therapists, physical and occupational therapists, dietitians, and psychologists or social workers. Pulmonary rehabilitation is often an outpatient program based in a hospital or clinic, although some patients can also receive

[41] National Heart, Lung, and Blood Institute, National Institutes of Health, "Oxygen Therapy," 1 November 2016 <http://www.nhlbi.nih.gov/health/health-topics/topics/oxt/>.
[42] Id *fn 1*.
[43] Maryland Health Connection. What does Medicaid Cover? 1 December 2016 <https://www.marylandhealthconnection.gov/shop-and-compare/medicaid-basics-and-benefits/what-does-medicaid-cover/>.
[44] Id *fn 1*
[45] Han MLK, Martinez CH, Au DH, Bourbeau J, Boyd CM, Branson R, Criner GJ, Kalhan R, Kallstrom TJ, King A, "Meeting the challenge of COPD care delivery in the USA: a multiprovider perspective," 1 June 2016, The Lancet Respiratory Medicine, 4(6): 473-526, 3 October 2016 <https://uic.pure.elsevier.com/en/publications/meeting-the-challenge-of-copd-care-delivery-in-the-usa-a-multipro>.

rehabilitation in their homes.[46] As of 2016, there are 14 pulmonary rehabilitation centers in Maryland in 11 different locations.[47] Most pulmonary rehabilitation programs last a few months.[48]

Nationally, there is a severe shortage of pulmonary rehabilitation programs.[49] No data exist to determine whether availability of pulmonary rehabilitation in Maryland is sufficient to meet the needs of those with COPD who could benefit from this comprehensive therapy.

Evaluation

Evaluation of the quality of COPD-related care is usually measured within the health system providing care. As part of their quality assessment process, health systems might determine whether patients are on an appropriate medication regimen, whether referrals have been made to pulmonary rehabilitation programs, and if care is properly coordinated to ensure medication access and prevent hospitalization. As Medicare, Medicaid, and commercial payers generally require this data be reported to provide compensation for care, the impetus for health care providers to do these quality assessments is often tied to their reimbursement levels.

Community-Based COPD Services

Pulmonary Education Programs (PEPs)

PEPs are designed for patients who graduate from a pulmonary rehabilitation program to keep them engaged after the rehabilitation program ends. PEP activities help individuals with COPD maintain the gains they made in rehabilitation so they may stay as healthy, active, and independent as possible over the long term. PEP provides:

- High-quality, up-to-date, disease-specific patient education materials, free of charge;
- Post-graduation calls to patients with support, encouragement, and information;
- Professional development for PEP Pulmonary Rehabilitation staff;
- Peer support from health care professionals for PEP Pulmonary Rehabilitation staff; and
- Assistance with hosting a COPD Education Workshop in PEP Pulmonary Rehabilitation communities (select locations).

There are three PEP centers in Maryland: MedStar St. Mary's Grace Anne Dorney Pulmonary Rehabilitation, Leonardtown; St. Agnes Hospital Pulmonary Rehabilitation, Baltimore; and Holy Cross Hospital Pulmonary Rehabilitation, Silver Spring.[50]

[46] National Heart, Lung, and Blood Institute, National Institutes of Health, "What is Pulmonary Rehabilitation?" 1 November 2016 <http://www.nhlbi.nih.gov/health/health-topics/topics/pulreh/>.
[47] EFFORTS, Pulmonary Rehabilitation Locations, 1 November 2016 <http://www.emphysema.net/Rehab-Support/Rehab/pulmo_rehab_centers.asp?state=MD&sort=2>.
[48] National Heart, Lung, and Blood Institute, National Institutes of Health, "What to expect after Pulmonary Rehabilitation?" 1 November 2016 <http://www.nhlbi.nih.gov/health/health-topics/topics/pulreh/after>.
[49] *Id* fn 1.
[50] COPD Foundation, Pulmonary Education Program, 1 November 2016 <http://www.copdfoundation.org/Learn-More/Pulmonary-Rehabilitation/Pulmonary-Education-Program-PEP.aspx>.

Chronic Disease Self-Management Programs

In Maryland, "Living Well" is the evidence-based Chronic Disease Self-Management Program (CDSMP) hosted by various community agencies. CDSMP provides guidance to adults 18 years of age and older who have ongoing major health problems, and helps them take charge of their health to live active and enjoyable lives. Family members and caregivers are also welcome to participate in the program. Participants have conditions such as diabetes, heart disease, arthritis, pain, and high blood pressure, or a combination of conditions that may include COPD. The six-session workshops are held once a week at 20 locations throughout the State and are led by trained peer leaders who also have a chronic condition.[51,52] Participants learn to:

- Solve problems and make health care decisions;
- Take small steps to reach goals;
- Eat healthy foods;
- Include physical activity during the day; and
- Talk with their doctor.

In FY16, there were 57 CDSMP workshops in Maryland attended by more than 550 participants. Average session attendance was 10 people per session. Although the classes are not specific to COPD, the classes are open to those with COPD, and cover topics that impact individuals living with COPD. There has been insufficient evaluation of the long-term clinical outcomes of these programs.

COPD Prevention Resources and Evaluation

The resources described in this section include COPD prevention initiatives and other resources available in Maryland for individuals with COPD. Resources and programs are provided by the State and local health departments, clinics in the community, and various government and non-government organizations.

Prevention

Exposure to tobacco smoke is the most significant risk factor for developing COPD, making tobacco prevention and control key to preventing COPD. The Center for Tobacco Prevention and Control (CTPC) in DHMH oversees a comprehensive Statewide tobacco control program.

CTPC works with community partners, State agencies, health care entities, and local health departments to implement proven strategies to protect Maryland residents from tobacco-related death and disease. CTPC goals are to:

- Prevent youth and young adults from ever using tobacco products;
- Provide resources to assist residents who are ready to quit using tobacco;

[51] Maryland Department of Health and Mental Hygiene, Be Healthy Maryland, 3 October 2016 <http://phpa.dhmh.maryland.gov/ccdpc/livingwell/Documents/Living%20Well%20Contacts.pdf>.
[52] Maryland Department of Health and Mental Hygiene, Be Healthy Maryland, 3 October 2016 <www.behealthymaryland.dhmh.maryland.gov>.

- Eliminate exposure to harmful toxins found in secondhand smoke; and
- Identify and eliminate health disparities among population groups disproportionately affected by tobacco-related death and disease.

Maryland's tobacco use prevention efforts have had an impact, with a steady increase in the proportion of adults who have never smoked cigarettes, as well as a significant decrease in the initiation of tobacco use by underage middle and high school adolescents. In 2014, over 60 percent of adults reported that they had never been a cigarette smoker, and among the 14.6 percent of adults who currently smoke cigarettes, almost three-fourths stated that they would like to quit smoking. Despite this progress, more than 880,000 Marylanders still smoke or use some form of tobacco product, placing their health at significant risk.

Statewide Tobacco Control Initiatives

CTPC provides oversight, technical assistance, and training to local health departments, grantees, and partners to ensure that efforts are coordinated with the Statewide program's goals and messages.

Maryland Tobacco Quitline

The Maryland Tobacco Quitline has been an effective service for Marylanders since it launched in 2006, and has an established quit rate of 30 percent (average quit rates without assistance range from 4 percent to 7 percent).[53] The Quitline provides free, evidence-based, tobacco cessation counseling by telephone that is in line with recommendations from CDC.[54] Services are available 24 hours a day/7 days a week to Marylanders 13 years of age and older. Residents 18 years of age and older can receive a free supply of up to 12 weeks of Nicotine Replacement Therapy (a combination of a patch and/or gum), web support, and text support via the Quitline. Based on their location, callers are also referred to community resources like local health departments, which may offer in-person cessation classes.

The Quitline collects self-reported demographic and health information about callers, including whether they have chronic conditions like COPD. In FY15, the Quitline recorded 1,578 self-reports of diagnosed COPD from callers (16.0 percent). Since the Quitline launched in 2006, 11,629 self-reports of diagnosed COPD have been recorded from callers (14.9 percent).

Information about the Quitline consistently reaches Marylanders, including minority populations, Medicaid participants, and uninsured callers. Marketing and promotions at the local, State, and national levels promote Statewide brand awareness and visibility of the Quitline as a resource for residents seeking free cessation services. The Quitline has served over 82,000 Marylanders to date. More information is available at www.smokingstopshere.com and 1-800-QUIT-NOW (1-800-784-8669).

[53] Fiore MC, Jaen CR, Baker TB, et al., "Treating tobacco use and dependence: 2008 update," May 2008, US Department of Health and Human Services, 1 November 2016 <https://www.ncbi.nlm.nih.gov/books/NBK63952/>.
[54] *Id*.

MDQuit Resource Center

MDQuit (Maryland Quitting Use and Initiation of Tobacco) is the information resource center for tobacco use cessation and prevention for Maryland. MDQuit is dedicated to assisting providers and programs in reducing tobacco use among Marylanders. The mission of the center is to: link tobacco control professionals and health care providers to State tobacco control initiatives; provide evidence-based, effective tools and resources to local programs; create and support an extensive collaborative network of tobacco use prevention and cessation professionals; and provide a forum for sharing best practices to reduce tobacco use throughout Maryland. For more information, visit www.mdquit.org.

Legal Resource Center for Public Health Policy

The Legal Resource Center for Public Health Policy, located at the University of Maryland Francis King Carey School of Law, provides best practice legal and policy technical assistance and training to State agencies, local health departments, decision-makers, community organizations, and residents across the State on a wide-range of tobacco control issues, including:

- Youth access to tobacco products, especially in the retail environment;
- Smoke-free multi-unit housing policy development and enforcement;
- Smoke-free outdoor area policy development and enforcement (for example, beaches and parks);
- Youth use of other tobacco products, such as little cigars, cigarillos, and smokeless tobacco; and
- Emerging products, such as e-cigarettes, e-cigars, e-hookah, and vape pens.

For more information visit The Legal Resource Center for Public Health Policy (https://www.law.umaryland.edu/programs/publichealth/tobacco/index.html).

Health Communications

CTPC creates campaigns to increase awareness of the dangers of tobacco use, encourage those who use tobacco to quit, and provide information on services available for Marylanders who are ready to quit using tobacco. Examples of campaigns include: The Maryland Tobacco Quitline, No Tobacco Sales to Minors, No Tobacco Litter, The Cigar Trap, and Smoke-Free Multi-unit Housing. CTPC also supports national initiatives, including the CDC Tips from Former Smokers campaign. CTPC develops television, radio, transit, billboard, and print media, as well as websites to support the campaigns.

Initiatives to Eliminate Exposure to Secondhand Smoke

In 2006, the US Surgeon General issued a comprehensive report, "The Health Consequences of Involuntary Exposure to Tobacco Smoke." According to the report, scientific evidence indicates that there is no risk-free level of exposure to secondhand smoke.[55] To reduce exposure to secondhand smoke and to further establish non-smoking as the norm, Maryland successfully instituted the Clean Indoor Air Act of 2007 (Chapter 502 of the Acts of 2007), which prohibits smoking in virtually all public places including bars and restaurants. Maryland has also successfully implemented State and local policies prohibiting smoking on worksite outdoor campuses, within multi-unit housing complexes, and at parks and beaches. In addition, several college and university campuses now have smoke-free policies, including the University of Maryland.

Workplace Initiatives

Maryland has made significant progress in reducing involuntary exposure to secondhand smoke in the workplace. This effort began in the early 1990s, first with a regulatory smoking ban, and was followed shortly thereafter by legislative prohibitions on smoking indoors at most workplaces. Those initial efforts were significantly strengthened by the Clean Indoor Air Act of 2007, prohibiting smoking at all indoor workplaces, including restaurants, bars and clubs, and inside work vehicles.

Statewide Smoke-Free Multi-Unit Housing

The Clean Indoor Air Act of 2007 also protects residents from secondhand smoke exposure in common areas of multi-unit housing complexes. CTPC expanded State and federal efforts to encourage implementation of smoke-free multi-unit housing properties. CTPC developed Maryland-specific materials targeted to property owners and managers of multi-unit housing complexes to promote smoke and tobacco-free policies. CTPC hosted focus groups, utilized information from other states, and referenced best-practices from the US Department of Housing and Urban Development (HUD) to develop a toolkit and testimonial videos for landlords, property owners, and managers of market rate, voucher-based, affordable, and public housing.

Individuals with COPD may reach out to the Legal Resource Center for information regarding smoke-free housing.[56] CTPC is working with HUD and the Maryland Department of Housing and Community Development to establish a tracking system for smoke-free policies in multi-unit housing properties. While no formal system has been developed yet, the Legal

[55] US Department of Health and Human Services, "The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General," 2006, US Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 3 October 2016 <http://www.surgeongeneral.gov/library/reports/secondhandsmoke/fullreport.pdf>.

[56] Legal Resource Center for Public Health Policy, University of Maryland, 1 November 2016 <http://www.law.umaryland.edu/programs/publichealth/index.html>.

Resource Center tracks housing entities that have gone smoke and tobacco-free, including public housing authorities.[57]

An increasing number of Marylanders are reporting less exposure to secondhand smoke. In 2014, 76 percent of middle and high school youth reported that they had not been exposed to secondhand smoke indoors as compared to just 44 percent in 2000.[58] In addition to the protections afforded Marylanders by the Clean Indoor Air Act of 2007, households are increasingly adopting voluntary smoking bans inside their homes, in both smoking and non-smoking households. Since 2000, there has been a 37 percent increase in voluntary household bans among smoking households (now 66.7 percent) and a 12 percent increase among non-smoking households (now 94.2 percent). [59]

Local Tobacco Prevention and Cessation Initiatives

The Cigarette Restitution Fund (CRF), established as a result of a multi-state settlement with the tobacco industry in 1998, provides the funding for local health department tobacco prevention and cessation initiatives. The legislation (Chapter 17 of the Acts of 2000, Health-General Article 13-1001—13-1014, Annotated Code of Maryland) directs DHMH to fund tobacco use prevention and cessation activities following best practice recommendations from CDC and the Task Force Report to End Smoking in Maryland.[60]

These initiatives address the four goals of the CRF Tobacco Program: 1) preventing the initiation of tobacco use among young people; 2) promoting quitting among adults and young people; 3) eliminating exposure to secondhand tobacco smoke; and 4) identifying and eliminating disparities related to tobacco use and its effects among different population groups. DHMH provides tobacco control funding to local health departments to support community-based outreach and coalition building, school-based initiatives, tobacco use cessation, and enforcement of tobacco sales to minors. DHMH conducts targeted outreach in several jurisdictions with high rates of smoking during pregnancy to increase cessation rates in women of childbearing age during or before pregnancy, and to prevent relapse after the baby is born.

CTPC partners closely with DHMH's Office of Minority Health and Health Disparities to ensure that messaging and programming are culturally sensitive. CTPC is a collaborative partner of the Minority Outreach and Technical Assistance Initiative that funds community organizations to champion public health issues in minority and low-income communities across Maryland.

[57] A list of smoke-free properties is available at http://www.mdsmokefreeliving.org.
[58] *Id* fn 53.
[59] *Id* fn 58.
[60] The Task Force to End Smoking in Maryland, "Making Maryland a Tobacco-Free State." 18 November 2016 http://phpa.dhmh.maryland.gov/ohpetup/Documents/1999_TaskForce_End_SmokinginMaryland.pdf.

Other Resources

COPD Foundation

The COPD Foundation is a not-for-profit organization with a focus on prevention and eventually finding a cure for COPD. The Foundation is patient-focused and provides resources for care providers to educate their patients and for patients to connect with one another for support. Some of these resources include, but are not limited to: the "COPD360social" website, which is an online community for participants to learn about COPD research and share ideas; the "On Track with COPD Ongoing Support Program," which is a phone service for follow-up support for patients who have completed a PEP or pulmonary rehabilitation program; and the "Patient-Powered Research Network," which is a patient registry to participate in COPD research.

The COPD Foundation also offers printed materials that can be ordered or accessed online. They offer an online catalogue at copd.oiondemand.com. Some examples of their printed materials include: "COPD in the Hospital and the Transition Back to Home Slim Skinny Reference Guide®," "The COPD Pocket Consultant," and "The 1s, 2s, and 3s of COPD" booklet.

COPD Coalition

The COPD Coalition is the advocacy platform for patients and health care providers to educate lawmakers on COPD, and ultimately prevent the disease and find a cure. The COPD Coalition and the COPD Foundation convened the first Maryland COPD Summit in 2010. The Summit brought together a diverse group of over 85 stakeholders to discuss current challenges faced by the COPD community in Maryland and to use the collective expertise of the participants to devise strategies for the Maryland COPD Action Plan.

The Maryland COPD Action Plan aims to reduce the burden of COPD in Maryland through the following goals:

- To optimize the prevention, diagnosis, and treatment of COPD in outpatient and hospital settings;
- To improve and expand COPD surveillance;
- To improve COPD awareness and education among employers and health care providers; and
- To increase COPD awareness by connecting individuals to tools and resources to improve their quality of life.[61]

The Action Plan includes four sections with specific strategies. The first section includes data and surveillance techniques. Maryland is currently implementing the Plan's surveillance strategy by tracking prevalence using Maryland Behavioral Risk Factor Surveillance System data on COPD. The second section on health care providers focuses on strategies for smoking

[61] The Maryland COPD Coalition, 1 November 2016 <http://www.uscopdcoalition.org/StateCoalitions/Maryland.aspx>.

cessation. Section three includes strategies for employers, purchasers, and payers. The fourth section of the Action Plan covers COPD in the community and includes patient resources and toolkits which have been created by multiple partners.

Following the 2010 Maryland COPD Summit, the Coalition developed an employer toolkit with funding from the NHLBI COPD "Learn More Breathe Better campaign." DHMH served in an advisory role, and the Mid-Atlantic region stakeholders provided input for research creation. The purpose of the employer toolkit is to help employers develop and implement a successful COPD worksite program. The toolkit includes a COPD Employer Cost Calculator for employers to understand the health care cost impact the condition has on their employees, resources for on-site COPD screening events, and pre-written newsletters for email blasts. The Beta Toolkit launched on September 14, 2012 and can be found online at: www.copdfoundation.com/employertoolkit.

American Lung Association

The American Lung Association is the leading organization working to save lives by improving lung health and preventing lung disease through research, education, and advocacy.[62] The American Lung Association organizes Better Breathers Clubs, which are welcoming support groups for individuals with COPD, pulmonary fibrosis, and lung cancer, and their caregivers. These support groups are led by a trained facilitator and provide participants the tools they need to improve their quality of life. Better Breathers Clubs meet regularly and feature educational presentations on a wide range of relevant topics, including how COPD affects the lungs, breathing techniques, exercise, talking with physicians, medications and other treatment options, medical tests, supplemental oxygen, home health care, lung transplants, and air pollution. Maryland Better Breathers Clubs are located at: Anne Arundel Medical Center, Annapolis; Suburban Hospital, Bethesda; Western Maryland Regional Medical Center, Cumberland; University of Maryland, LaPlata; MedStar St. Mary's Hospital, Leonardtown; and Peninsula Regional Medical Center, Salisbury.[63]

National Heart, Lung, and Blood Institute's COPD Learn More Breathe Better Campaign

Since the inception of the "COPD Learn More Breathe Better®" campaign, the NHLBI has partnered with a variety of organizations to implement the campaign. Since the campaign launch in January 2007, the "Breathe Better Network" has grown to include more than 80 members in all 50 states and the District of Columbia. The "COPD Learn More Breathe Better®" Campaign seeks to:

- Increase awareness of COPD as a serious lung disease—the third leading cause of death in the US;
- Increase understanding that COPD is treatable; and
- Encourage people at risk to get a breathing test and talk to their doctor.

[62] American Lung Association, Mission, Impact & History, 1 November 2016 <http://www.lung.org/about-us/mission-impact-and-history/>.
[63] American Lung Association, Better Breathers Club, 1 November 2016 <http://www.lung.org/support-and-community/better-breathers-club/>.

The campaign is for men and women over age 45, especially those who smoke or have smoked, and those at risk of COPD due to genetics or environmental exposures. In addition, the campaign aims to reach people with COPD as well as health care providers, particularly those in the primary care setting.[64]

The Center for Chronic Disease Prevention and Control (CCDPC) within DHMH has used NHLBI resource kits for promotional and educational events. For example, for National COPD Awareness Month in 2014, CCDPC utilized the NHLBI materials that were part of the "COPD Learn More Breathe Better®" campaign and "Breathe Better Network" toolkit. The toolkit included "What is COPD?" laminated key rings, fact sheets, posters, and a DVD which included copies of public service announcements and sample media materials.

Investigation and Conclusion

COPD is a serious health problem and the disease is a substantial burden on patients and their families, the health care system, public health agencies, and tax payers. Tobacco prevention and control is key to preventing COPD. DHMH oversees a robust and comprehensive Statewide tobacco control program. Along with partners, CTPC has effectively worked to promote and educate residents and policymakers about the importance of tobacco control initiatives. There has been major progress in reducing tobacco use and its harmful effects, including:

- Rates of tobacco use among Maryland adults and youth have decreased since 2000;[65]
- Exposure to secondhand smoke has declined due to State and local laws prohibiting smoking inside public places (restaurants, bars, workplaces, and public transit); and
- The number of Maryland residents who have never smoked has increased.

Early COPD treatment with bronchodilators and steroids has been shown to be effective in management of COPD symptoms for many patients. For severe and acute exacerbations, hospitalization may be necessary. Community-based programs for pulmonary rehabilitation, which may improve nutrition and exercise capacity and provide psychological support, may offer additional benefits. However, these programs may not be available to all patients. Statewide evaluation of the effectiveness of such programs in Maryland has not taken place. However, future evaluation by insurance payers and comprehensive analysis of health systems data may be useful to assess COPD outcomes.

COPD treatment in Maryland reflects the same challenges that face COPD treatment nationally. Treatment is delivered through a complex system of care that varies by the patient's health insurance, geographic location, and economic status. In Maryland, the COPD Foundation and the American Lung Association maintain State chapters and prioritize COPD. Both organizations belong to the Maryland COPD Coalition, the advocacy platform for patients and health care providers to improve COPD care and ultimately prevent the disease and find a cure.

[64] National Heart, Lung, and Blood Institute, National Institutes of Health, "COPD Learn More, Breathe Better Campaign," 1 November 2016 <http://www.nhlbi.nih.gov/health/educational/copd/lmbb-campaign/index.htm>.
[65] *Id* fn 4.